Research on Talent Cultivation of Modern Logistics Management Majors in Vocational Education Based on Artificial Intelligence

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Abstract. The traditional experimental teaching of logistics management has problems such as slow update speed and incompatibility of theory and social practice, which affects the learning effect of students. It is very necessary and urgent to reform the experimental teaching mode of logistics management specialty. Based on artificial intelligence and computer systems, this paper builds a training and teaching system for modern logistics management professionals in vocational education undergraduates. The system integrates big data and advanced technologies of the Internet of Things to build a logistics training platform including intelligent logistics unmanned warehouse system, transportation monitoring system, full traceability system, data analysis system, etc. The system designs and completes the experimental content with the characteristics of demonstration, operation, design and comprehensiveness. The system realizes the close combination of teaching objectives and professional personnel training, the deep integration of informatization teaching and the integration of enterprise needs. Finally, the teaching system of this paper verifies the effectiveness of the logistics professional training method based on the concept of artificial intelligence.

Keywords: artificial intelligence · vocational education undergraduate · modern logistics · talent training · teaching system

1 Introduction

The report of the 19th National Congress of the Communist Party of China clearly stated that it is necessary to accelerate the construction of first-class universities and first-class disciplines, and realize the connotative development of higher education. For undergraduate higher education, this embodiment is mainly implemented in the construction of first-class undergraduate majors and first-class undergraduate courses. The logistics management and engineering major is a professional category that is rapidly developing to meet the needs of the times. It currently includes logistics management, logistics engineering, procurement management, supply chain management and other majors. The training of talents in this professional category has promoted the improvement of China's economic development level. It meets the basic needs of various industries and

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industries for circulation talents. Under the background of the "Double Ten Thousand Plan" of the Ministry of Education, the logistics management and engineering majors aim to run a first-class major and cultivate first-class talents, accelerate the reform of professional teaching, and improve the quality of training applied talents [9]. At present, judging from the setting of this major in various undergraduate colleges and universities across the country, the most open major is logistics management, followed by logistics engineering major, and some colleges and universities open two majors at the same time. The traditional teaching concept of positive design starts from the subject curriculum system, sets graduation requirements according to the curriculum system, and then extends to talent training goals and then to market demand. However, the talents cultivated by this model can usually only meet internal needs, but not necessarily match external needs, because the final product of this talent training logic is only the result of education, not the goal of education. Therefore, it is difficult for traditional education models and concepts to meet the external needs of the market, and can only be adapted. However, outcome-based education refers to an educational philosophy based on learning outputs.

As an advanced educational concept, after years of theoretical and practical explorations in the United States and other developed countries, a relatively complete theoretical system and implementation model have been formed, which have proved to be the correct direction for the reform of higher engineering education. This paper analyzes the current teaching status of logistics courses, determines the solution, and puts forward the training objectives and training methods of logistics majors based on artificial intelligence. Integrating advanced technologies of big data and Internet of Things to build a logistics training platform including intelligent unmanned warehouse system, transportation monitoring system, whole-process traceability system, data analysis system, etc., and designed a demonstration, operability, design and comprehensiveness The characteristic experimental content realizes the close integration of teaching objectives and professional personnel training, the deep integration of information-based teaching and the integration of enterprise needs [4]. Finally, the effectiveness of the logistics professional training method based on the concept of artificial intelligence is verified through the teaching reform practice case.

2 Design of Professional Teaching Platform for Logistics Management Talents

2.1 System Function Design

The whole logistics management experimental course management system can be divided into three modules, namely the student module, the experimental management module and the platform management module.

2.1.1 Student Learning Modules

For students, the main task in computer artificial intelligence is to actively participate in and complete each experimental teaching and learning activity arranged by teachers, and to raise their own problems in the learning process, through interaction between teachers and students or students through discussions to solve the problem.

2.1.2 Experiment Teaching Management Module

The experiment management module is responsible for the experiment teacher or the experiment manager who guides the experiment. Its main job is to manage the experiment on the learning platform, including the organization and management of the experiment, the organization and management of the students, and the organization and management of the experiment resources. as well as the organization and management and final evaluation of various activities in the experimental teaching content.

2.1.3 Platform Management Module

The platform management module is specifically responsible for the technical personnel of the network platform. He is the technical person in charge of the entire computer artificial intelligence learning platform to ensure the normal operation of the computer artificial intelligence learning platform. His main work is to set system parameters, including site web page settings, module settings, user management settings, and experiment management settings.

2.2 System Architecture Design

Teaching activities are composed of several learning activities, and learning activities are the basic unit of teaching design [3]. Combined with the characteristics of the logistics management specialty experimental course and the characteristics of the computer artificial intelligence platform, the new teaching model of the logistics management specialty experimental course teaching activity based on the network platform is shown in Fig. 1.

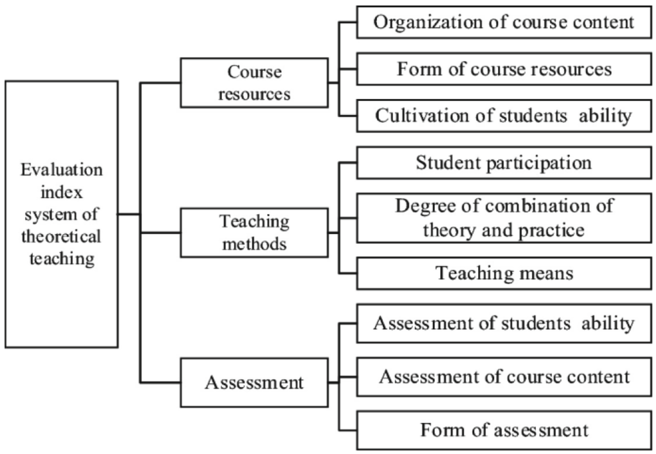

Fig. 1. Teaching design of logistics management experimental course

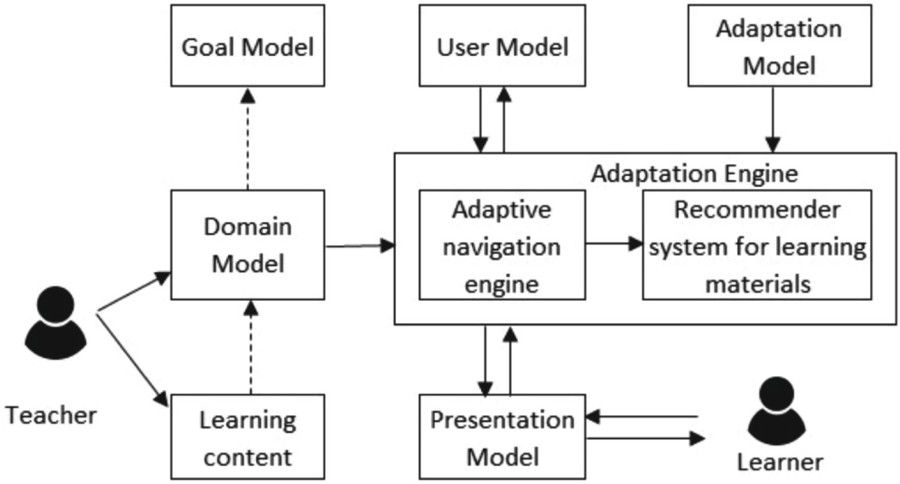

Fig. 2. System architecture of the logistics experimental teaching platform based on computer artificial intelligence

2.3 System Modules

The online teaching modules supported by the computer artificial intelligence platform include more than ten kinds of classes, assignments, discussions, questionnaires, chats, and quizzes. These functional modules are optimized and improved for network education, and are based on the characteristics of higher vocational logistics experimental courses [6]. We designed the system architecture of the logistics experimental teaching platform based on computer artificial intelligence as shown in Fig. 2. In the following, according to the characteristics of the logistics management experimental course, the main modules required to construct the logistics management experimental course system of higher vocational colleges are introduced.

2.3.1 Experiment Resource Module

Students need to study independently or preview, these do not leave the resources. In order to meet the needs of basic experiments, design experiments, and comprehensive experiments. Teachers can directly upload various digital experimental resources on the computer artificial intelligence platform: teachers' handouts, content of textbooks, experimental outlines, experimental projects, experimental steps, experimental courseware, and experimental audio and video materials [2]. The editor and formula editor dynamically create resources, and can dynamically link directly to related resources on the Web.

2.3.2 Experiment Report Module

Before and after experimental teaching, students need to submit relevant experimental reports, such as preview experimental reports, experimental reports, and experimental papers. Experimental teachers can use the “homework” module in computer artificial intelligence to provide services for experimental reports. Teachers can assign lab assignments to students and set deadlines for completion. Students can complete the lab report within the stipulated time [8]. After the student uploads the report, record the time of the upload. Teachers can check the experiment report according to class, student number and time, and submit feedback, and the feedback will be displayed on the homework page and notified by email. This method facilitates the submission of experimental reports anytime and anywhere, and facilitates the timely and orderly development of scoring.

2.3.3 Experiment Discussion Module

There are two ways to discuss on the computer artificial intelligence platform: forum and chat room. The chat room supports synchronous and smooth text interaction, which is convenient for online discussion. The forum provides various types of methods such as experimental teachers, course news, and one topic per user. Mainly offline discussions. It mainly provides a platform for design experiments and comprehensive experiments in logistics management professional experiments. In logistics management design experiments and comprehensive experiments, experimental teachers are required to group students for experimental teaching [5]. Because traditional experimental teaching is limited by experimental space, experimental environment, experimental time and tasks, it is difficult to fully discuss experimental problems and plans. The construction of such a computer artificial intelligence platform can create a space for free discussion, which is convenient for teachers and students and between students to think together, discuss and communicate, and collaboratively solve problems.

2.3.4 Experimental Test Module

The experiment is inseparable from the test. It needs to test the students’ professional experimental skills and also test the relevant experimental theories. Therefore, a very important module in the computer artificial intelligence platform is the test module, which supports the experimental teacher to design and set the test. First, teachers define the experimental question bank, and then edit various test questions (multiple-choice, fill-in-the-blank, true-false, and calculation questions, etc.) online or import from the outside, and then select the corresponding questions from the question bank to form a test. In the process of taking the test, students can take the test multiple times, and the results of each test can be automatically graded and fed back in time.

2.3.5 Experimental Questionnaire Module

Questionnaire module is very simple in logistics experiment, but very practical. Instructors can ask a question about the actual risk and provide some alternative answer options from which students can choose. Its purpose is to hold a discussion similar to brainstorming about a certain problem. To a certain extent, the questionnaire module is equivalent to the measurement tool of the online classroom, so that the experimental teacher can target the knowledge that the students do not understand. Click for a better explanation.

3 Simulation Modeling of Talent Training Planning for Modern Logistics Management Professionals

In the process of studying the autocorrelation and memory of price or funding fluctuations in academia, many scholars use the improved fractional Brownian motion model as an analytical tool. However, this kind of process of analyzing memory can be basically divided into two categories: Gaussian process and non-Gaussian process. Among them, Gaussian processes mainly include fractional Brownian motion, subfractional Brownian motion, mixed fractional Brownian motion, multi-scale fractional Brownian motion, binary fractional Brownian motion, indexed set fractional Brownian motion and Grantis process. Non-Gaussian processes include Robson processes, etc. Fractional Brownian motion is a Gaussian process. It has the characteristics of additive invariance, long-term correlation, thick tail and discontinuity [7]. This makes fractional Brownian motion an excellent tool for studying price or funding fluctuations.

The informatization of China's logistics personnel training is a continuous Gaussian process with zero mean and obeying fractional Brownian motion. Suppose $B_t^H(T = 1, 2, \cdots, n)$ is the observed informatization level of logistics personnel training in China over the years. B_t^H obeys fractional Brownian motion and the Hurst exponent is H. Also assume $\xi_1 = B_1^H, \xi_2 = B_2^H - B_1^H, \cdots, \xi_t = B_t^H - B_{N-1}^H$. Where x is the integral of ξ and E(k) represents their covariance.

This paper uses the information level of China's logistics personnel training from 1980 to 2020 as an indicator. A total of 37 sample observations [1]. The selection of the research data set in this paper has deducted the impact of price changes on the analysis results. First, we use Whittle's method to estimate the Hurst exponent H. From the above assumptions, the spectral density function of the informatization level of logistics personnel training in China over the years can be obtained:

$$f(x, H) = \sum\nolimits_{k=-\infty}^{\infty} E(k)e^{tkx} = (1 - \cos x)\sum\nolimits_{k=-\infty}^{\infty} |x + 2k\pi|^{-1-2H} \tag{1}$$

Then we make the following assumptions

$$I_n(x) = \frac{1}{2\pi n}|\sum\nolimits_{j=1}^{N} \xi_j e^{jx}|^2 \tag{2}$$

$$\tilde{f}(x, H) = \exp(\frac{1}{2\pi}\int_{-\pi}^{\pi} \log f(x, H)dx) f(x, H) \tag{3}$$

Where $I_n(x)$ denotes the periodogram of a given time series ξ of length n. Thus, we can further obtain the following relation:

$$L_n^{\omega}(H) = \int_{-\pi}^{\pi} \frac{I_n(x)}{\tilde{f}(x, H)}dx + \int_{-\pi}^{\pi} \log[\tilde{f}(x, H)]dx \tag{4}$$

Then Whittle estimates that $\widehat{H}$ satisfies $\widehat{H} = \arg\max L_n^{\omega}(H)$. And the confidence interval of the Hurst index at the 95% confidence level.

$$\widehat{H} \pm 1.96\sqrt{\frac{2D^{-1}(H)}{n}} \tag{5}$$

Table 1. Estimation results of Hurst exponent H based on R/S method

	Estimated value	t-statistic	P-value
a = 1–11			
H	0.6371	111.7922	0
a = 1–18			
H	0.5334	120.8717	0
a = 1–24			
H	0.6762	137.558	0
a = 1–35			
H	0.4707	247.1779	0

In

$$D(H) = \frac{1}{2\pi}\int_{-\pi}^{\pi}[\frac{\partial}{\partial H}\log f(x,H)]^2 dx \tag{6}$$

We write sample data into C++ software. We can estimate the Hurst exponent H = 0.4357 < 0 for the entire sample period by writing a program. This shows that under the impact of various dynamic mechanisms, there is a certain negative correlation between the current level of China's logistics talent training informatization and its increment. Its growth process has short memory. The current logistics personnel training informatization system has not shown a good long-term effect in the process of promoting the growth of the logistics personnel training informatization level. At the same time, we can also use the software R-3.1.1 to write a program to estimate the Hurst exponent H = 0.4736728 < 0.5 for the entire sample period. The confidence interval for the Hurst index at 95% confidence is [0.35738, 0.58996]. This again supports the above conclusion. Now we write the sample data into the analysis software Matlab.2012. We will program the above calculation process. Finally, we use the ordinary least squares method OLS to calculate the Hurst exponent H and the results are shown in Table 1.

4 Conclusions

The construction of the experimental course teaching system for logistics management based on the artificial intelligence platform can make up for the shortcomings of traditional experimental teaching. Practice has proved that the teaching and training platform has strong openness while meeting the needs of teaching and training. It can carry out professional training, curriculum design, graduation design, subject competition and other activities based on the laboratory environment, providing multi-disciplinary sharing of open laboratories support and guarantee.

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