Design of Online Teaching System for Innovation and Entrepreneurship of Finance Major Based on Big Data

Tong Sun(✉)

Department of Economics, Shenyang Institute of Science and Technology, Shenyang 110167, China

Abstract. The currently proposed online teaching system for financial innovation and entrepreneurship has a limited scope and a long period of time. Based on big data technology, a new online teaching system for financial innovation and entrepreneurship is designed. The system hardware includes memory, central processing unit, input device and output device. The memory includes the teacher-side memory and the student-side memory. The central processing unit mainly includes three parts: logic unit, control unit and input/output unit. The software has designed big data server program and database program respectively. In order to verify the effectiveness of the teaching system, a comparative experiment was designed. The results show that the financial innovation and entrepreneurship online teaching system based on big data can effectively expand the scope of assistance and shorten the time of assistance.

Keywords: Big data · Finance · Professional innovation · Online teaching

1 Introduction

At present, in the process of talent training, university finance majors have all been integrated into the content of innovation and entrepreneurship education, and innovation and entrepreneurship activities have become more abundant [1]. However, the design of the talent training system is not integrated with the entire industrial innovation chain. First, the design of the entrepreneurship education system for finance majors is not systematic. Undergraduate innovation and entrepreneurship education is limited to the corresponding course modules in the talent training plan, and cannot be designed according to the actual needs of students in the first to fourth grades. Second, innovation and entrepreneurship education mainly depends on the two links of college theory teaching and practical teaching. The subject is single, and it is impossible to start from the needs of the entire industrial innovation chain and form a joint education force through the government, financial industry, financial institutions, research institutions, etc., to jointly realize the cultivation of innovative spirit and innovative ability [2].

W. Fu et al. (Eds.): eLEOT 2021, LNICST 390, pp. 143–153, 2021.
https://doi.org/10.1007/978-3-030-84386-1_12

In order to innovate the education model and upgrade the education system, my country uses computer technology to construct an online teaching system for innovation and entrepreneurship in finance, and uses the advantages of computers to assist teachers and students in teaching and learning. Computer technology is a widely used distributed application decoupling, which is used to realize the information exchange between the client and the server. It uses application programs, script programs, and plug-in technologies to achieve more powerful information exchange.

Traditional methods include an online teaching system for financial innovation and entrepreneurship based on data mining technology, which uses data mining algorithms to obtain the teaching goals of financial innovation and entrepreneurship, and constructs a teaching system; an online financial innovation teaching system based on information analysis, through the analysis of financial data, obtains Set out teaching goals. Traditional online teaching systems have many faults and unstable connections. Therefore, in order to optimize the shortcomings of traditional online teaching systems, this paper designs a financial innovation and entrepreneurship online teaching system based on big data based on big data technology. From the perspective of software and software, the system's physical equipment and application programs are designed in detail, which is of great significance for improving teaching effects, strengthening teachers' evaluation of students, and providing students with a good distance teaching network environment. It can also promote big data technology. Further development.

2 The Hardware Design of the Online Teaching System for Innovation and Entrepreneurship of Finance Majors Based on Big Data

Computers are the material basis for the online teaching system for innovation and entrepreneurship of finance majors based on big data technology. In the process of online teaching, computers are the communication medium between teachers and students. The teaching logic is shown in Fig. 1 below:

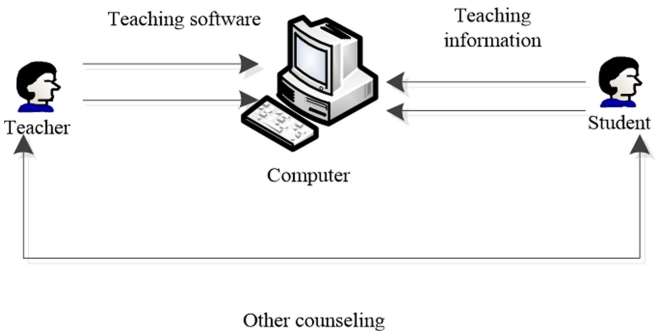

Fig. 1. Online teaching logic diagram

The hardware structure of the system is shown in Fig. 2:

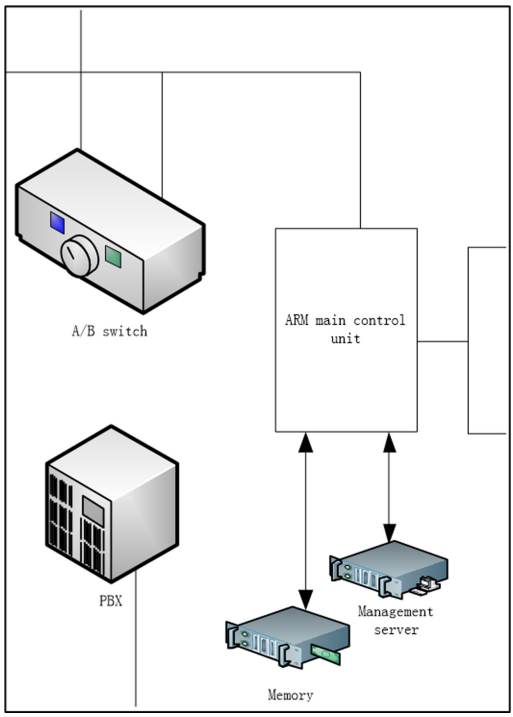

Fig. 2. System hardware structure

2.1 Memory Design

The memory is the instruction holder, which is mainly used to store the multiple instructions issued by the teacher and the multiple instructions replied by the students. Therefore, the hardware is divided into two types: teacher-side memory and student-side memory, but the function is the same. The main function of the embedded computer is to enhance the overall endurance and anti-interference ability of the embedded computer remote-assisted teaching system. In the application process of the system, the memory will first typeset and reprint the code commands input by the teacher in sequence. Transmitted to the next hardware of the system, when the received code instructions are too many or too cumbersome to be transmitted at one time, the memory will retain the code instructions that have not been transmitted and keep the integrity of these code instructions at all times Sexuality and activity. After the code instruction being transmitted is completed, the memory will transmit the reserved code instruction again in order and ensure the perfect connection between the two before and after. The connection error will not be higher than 0.001 s, so it will not This has an impact on the teaching system designed in this article, and the hardware for students' code instructions will also play the same role, that is, to complete the complete transmission of the code instructions while ensuring the integrity and continuity of all instructions [3, 4].

2.2 Central Processing Unit

The central processing unit, also known as the CPU, is one of the core hardware of the system designed in this article. The processor is mainly composed of three unit parts, namely the arithmetic logic unit (ALU), the control unit, and the input/output unit. Its specific structure The picture is shown in Fig. 3:

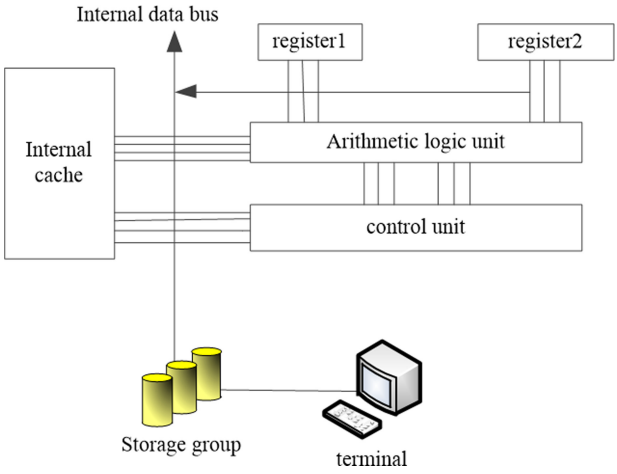

Fig. 3. Central processing unit composition structure diagram

In the process of working, the hardware processor will first continuously accept the code instructions sent by the memories at both ends through the arithmetic logic unit and unitize these instructions. The reason for unitization is that the unitized instructions will be better. Incorporated into the overall operation of the central processing unit, greatly improving the overall operation and work efficiency of the central processing unit [5, 6].

The main function of the arithmetic logic unit is to perform operations and comparisons on all unitized code instructions and finally typeset functional modules. It will gradually list all possible items of the unitized code instructions during the calculation process and then proceed step by step. Excluding the most definite unitized code instructions in the end, when all the unitized code instructions are determined, the arithmetic logic unit will integrate these unitized code instructions to obtain a set M, and then pass the set through the transmission/input unit. To the control unit for processing [7].

The control unit is a functional block that is mainly responsible for managing the overall actions of the unitized code instructions. When the control unit receives the unitized code instruction set M, it will decompose and analyze the unitized code instructions in the set M according to the order, and finally The obtained data is processed into action to obtain the most clear unitized code instruction, and then transmitted to the memory at both ends for both parties to receive and respond [8].

2.3 Input Devices and Output Devices

The input device and output device of the financial innovation and entrepreneurship online teaching system based on big data technology designed in this paper are the teacher's input and output device and the student's input and output device. The main function of the input device is to transmit the code instructions of the memory to The central processing unit of the system is used for calculation and analysis, and the main function of the output device is to transmit the unitized code instruction set M of the central processing unit to the memory. The difference from the input device is that the output device has a unitized code instruction set. The number-conversion converter that transforms M into code instruction set N [9].

3 Software Design of Online Teaching System for Innovation and Entrepreneurship of Finance Major Based on Big Data Technology

The program is the lead of the financial innovation and entrepreneurship online teaching system based on big data technology. Students and teachers interact through the program running on the computer. By writing the program, the entire auxiliary teaching process can be controlled to realize the teaching function. Therefore, this article On the basis of the system hardware, design related software to cooperate with the hardware to work together. The main software design includes a big data server based on big data technology and a database based on big data technology [10, 11].

Big data server is currently the most widely used server with the most comprehensive performance. Based on big data technology, it refers to a computer that provides browsing of teaching information for the embedded computer remote assistant teaching system based on big data technology in the corresponding network environment Program, students and teachers can send teaching requests, teaching files and other data information through the server. Generally speaking, a big data server includes four working processes: establishing a connection, sending a request, sending a response, and closing the connection. The working principle is as follows 4 shows (Fig. 4):

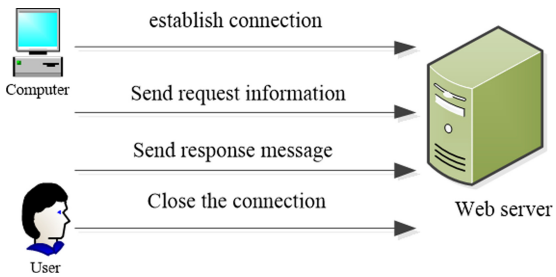

Fig. 4. Working principle of big data server

Among them, the establishment of the connection is to connect the big data server and the browser through a network protocol, and the user can log in to the browser to

see if the connection is established. Sending requests means that users send requests to the big data server through the browser, such as login requests, access requests, teaching requests, and other required requests. After receiving the request, the big data server uses related algorithms to calculate and process the request, and finally transmits the result to the browser through the network protocol, and displays the requested content while displaying the result. After the end, disconnect the connection between the big data server and the browser, and maintain and upgrade the big data server [12, 13].

The database is an electronic file cabinet that stores teaching-related information. The teacher and student can add, download, update, and delete files in the database. The database can be divided into online learning database and online exam database according to system requirements. A form of storing online learning data and online exam data of students and teachers. In order to more clearly show the attributes between various types of information in the database and conceptualize it, the E-R diagram is used to describe its basic attributes [14, 15]. The specific E-r diagram of an online learning database based on big data technology is shown in Fig. 5:

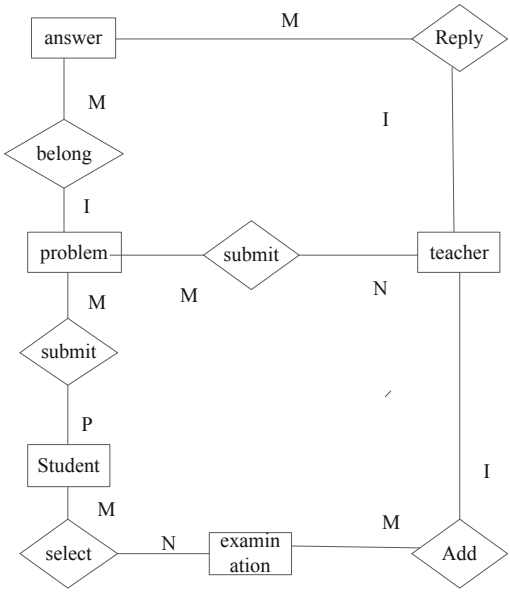

Fig. 5. E-R diagram of online learning database based on big data technology

By observing the above figure, we can clearly understand that the online learning subsystem database is composed of multiple tables, which are class, test, answer, announcement, management, tutorial, tutorial number, teacher, question, system setting, user, and data table. Each table of "class" has a special meaning. These tables represent the students' personal information, usual test results, classroom teaching notes and other necessary materials. The data administrator of each table can add and delete data according to the students' learning situation. The unique advantage based on big data technology is that if other attributes are changed during the learning process of students,

by entering the database system and changing the corresponding attributes, the data in the previous learning process can be retained and the new model can be continued. Learning.

The online examination subsystem database based on big data technology designed in this paper also consists of 13 tables, as shown in Table 1:

Table 1. Database subsystem table

Serial number	Name
1	admin
2	department
3	exam database
4	exam
5	degree exam news
6	exam news_ log
7	exam_ score
8	exam subject
9	exam_ test
10	exam tetuser
11	user
12	waitforpass

The examination subsystem database and the student online learning subsystem database have the same characteristics. The administrator can change the attributes and data content of each table at any time to achieve the purpose of remote assistance based on computer technology. Among them, the most unique advantage of the student examination subsystem database is that for the internal examination questions of the storage system, free administrators can view them only through fingerprint authentication, but not through passwords, which ensures the fairness of student examinations. On the other hand, the student examination subsystem database based on big data technology can review some objective questions on student examination papers, which reduces classroom work and improves classroom teaching efficiency.

4 Experimental Research

In order to verify the effectiveness of the financial innovation and entrepreneurship online teaching system based on big data technology proposed in this article, the system is compared with the traditional financial innovation and entrepreneurship online teaching system based on data mining technology and the financial innovation based on information analysis. Entrepreneurship online teaching system conducts experiments to compare teaching scope and auxiliary time.

Table 2. Experimental parameters

Project	Parameter
Question number length	5
Auxiliary level	Level 3
Full score	100
Difficulty ratio	Medium

Set the experimental parameters as shown in Table 2:

According to the above experimental parameters, a comparative experiment was carried out. Provide teaching guidance for different difficulty ratios and compare the scope of assistance. The experimental results obtained are shown in Table 3:

Table 3. Scope of teaching system

Knowledge point difficulty	Online Teaching System for Innovation and Entrepreneurship of Finance Major Based on Data Mining Technology	Online Teaching System of Innovation and Entrepreneurship for Finance Majors Based on Information Analysis	Financial innovation and entrepreneurship online teaching system based on big data technology
Knowledge points are more difficult	95%	70%	65%
Knowledge points are moderately difficult	97%	82%	75%
Knowledge points are easier	99%	90%	74%

According to Table 3, the financial innovation and entrepreneurship online teaching system proposed in this paper based on big data technology can effectively expand the scope of system assistance, adopting different assistance methods for different knowledge points, and when the difficulty of the knowledge points is different, traditional auxiliary system assistance The scope is much smaller than the auxiliary scope proposed in this article.

The auxiliary time proposed in this paper is shown in Fig. 6:

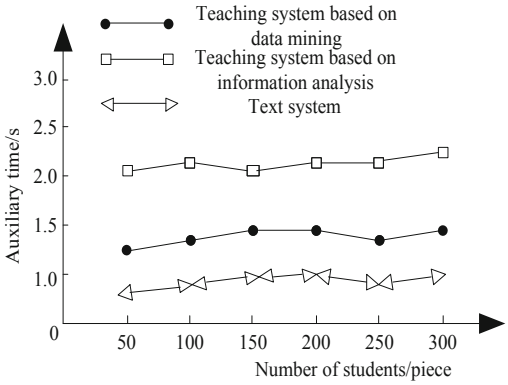

Fig. 6. Results of auxiliary time experiment

Observing Fig. 6 we can see that, compared with the traditional auxiliary teaching system, the financial innovation and entrepreneurship online teaching system proposed in this paper based on big data technology has shorter auxiliary time, can distinguish information in a short time, realize assistance, and has extremely strong assistance The ability and auxiliary effect are better, and it is more suitable for practical applications.

Digital circuit and logic design is to make virtual experimental instruments and equipment more authentic in the virtual simulation experiment teaching environment, and make the virtual simulation experiment teaching multi-dimensional data visualization environment more suitable for the real teaching environment. The specific design process is:

(1) Right-click the virtual simulation experiment teaching page to pull out the display bar and properties window anywhere
(2) Select different experimental instruments according to different experimental operations, click the desired instrument, left-click and click use. The virtual simulation experiment teaching multi-dimensional data visualization system will automatically select the operator to perform multi-dimensional processing to make the operating instrument have a three-dimensional effect.
(3) When the experimental instrument is added to the experimental platform, the operator can perform the experimental operation. If the operation is wrong, the experimental instrument will be damaged like the real instrument, which increases the operator's understanding of the experiment.

Virtual simulation experiment teaching multi-dimensional data visualization system teaching environment screen test, because in the operating environment with the increase of the number of operations, the page needs to continuously change the screen, so the test is mainly to detect whether there will be a white screen in the virtual simulation experimental teaching operating environment Or the situation of stuck screen. The test of this article selects the additional tool test. It only needs to transmit the operating video of the operator in the virtual simulation teaching system. The tool will automatically detect it. If there is a white screen or a stuck screen, the test tool will emit a red light. If

the conversion is normal, a green signal light is displayed. In order to avoid contingency, this experiment adopts an experiment process of 100 operators. The test result is shown in Fig. 7:

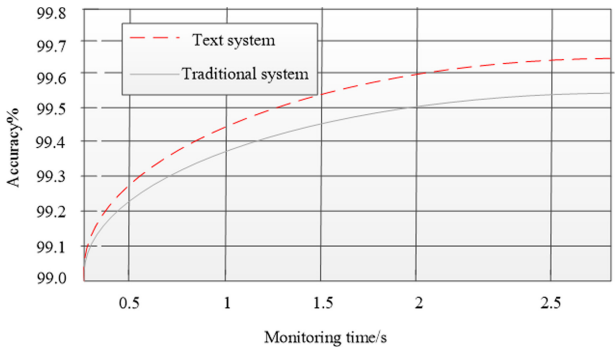

Fig. 7. Screen conversion test results

As shown in Fig. 7, after many tests, the virtual simulation experiment teaching environment shows an average of 1.5 s when the screen transition stays, which is a normal phenomenon. If it exceeds 3 s, it proves that the virtual simulation experiment teaching multidimensional data visualization system has problems. The linux browser has high security and few viruses. The system itself will perform virus detection and cleaning to reduce the probability of virus attacks. The E-R model can fully reflect the internal and external relationships of various types of information, and can also quickly screen out stored information. The security design of the teaching system proposed in this paper adopts the authorization mechanism based on role characteristics, which can efficiently save the data information of the operator and the server, and ensure the stable operation of the teaching multi-dimensional data visualization system. The system administrator will analyze and update the data in the database regularly. And backup. In summary, the optimized teaching system in this paper can construct a more rigorous teaching virtual environment.

5 Conclusion

Based on big data technology, this paper designs an online education system for financial innovation and entrepreneurship based on big data technology. It uses computer as the medium and software program as the leading factor. The memory, central processing unit, input and output devices are designed in detail. Application programs such as physics foundation and big data server and database realize the remote embedded auxiliary teaching system, which provides convenience for students' remote online examination and online learning, and not only enables teachers to more accurately and clearly understand the true abilities of students, Accurate evaluation in order to specify a reasonable teaching plan, but also to enable students to obtain better educational resources at home and provide them with a good teaching environment.

Fund Projects. Supported by The China Association for Non-Government Education of Liaoning (No. LMJX2021283).

References

1. Barcia, M., Kesidou, E.: Innovation and entrepreneurship as strategies for success among Cuban-based firms in the late years of the transatlantic slave trade. Bus. Hist. **60**(3–4), 542–561 (2018)
2. Grillo, C., Ferreira, F.A.F., Marques, C.S.E., et al.: A knowledge-based innovation assessment system for small- and medium-sized enterprises: adding value with cognitive mapping and MCDA. J. Knowl. Manag. JKM-08–2017–0332 (2018)
3. Usai, F., O'Neil, K., Newman, A.: Design and empirical validation of effectiveness of LANGA, an online game-based platform for second language learning. IEEE Trans. Learn. Technol. **11**(1), 107–114 (2018)
4. Durak, H.Y.: Digital story design activities used for teaching programming effect on learning of programming concepts, programming self- efficacy, and participation and analysis of student experiences. J. Comput. Assist. Learn. **34**(6), 740–752 (2018)
5. Castro, M., Scheede, C., Zermeño, M.: The impact of higher education on entrepreneurship and the innovation ecosystem: a case study in Mexico. Sustainability **11**(20), 5597 (2019)
6. Malik, T.H., Huo, C.: Entrepreneurial state vs liberal market: Chinese comparative advantage in the transformation of national science to technology artefacts. Chin. Manag. Stud. **13**(3), 550–573 (2019)
7. Chen, Feng-Wen., Long-Wang, F., Wang, K., Tsai, Sang-Bing., Ching-Hsia, S.: The influence of entrepreneurship and social networks on economic growth—from a sustainable innovation perspective. Sustainability **10**(7), 2510 (2018)
8. Garcia-Morales, V., Martín-Rojas, R., Lardón-López, M.: Influence of social media technologies on organizational performance through knowledge and innovation. Baltic J. Manag. **13**(3), 345–367 (2018)
9. Gao, Q., Xu, J., Tao, Z., et al.: Exploration and analysis on the psychological capital of entrepreneurship and the deviant innovation behavior of employees. Front. Psychol. **11**, 1880 (2020)
10. Beynon, M., Jones, P., Pickernell, D.: The role of entrepreneurship, innovation, and urbanity-diversity on growth, unemployment, and income: US state-level evidence and an fsQCA elucidation. J. Bus. Res. **101**, 675–687 (2019)
11. Liu, S., Bai, W., Zeng, N., et al.: A fast fractal based compression for MRI images. IEEE Access **7**, 62412–62420 (2019)
12. Liu, S., Li, Z., Zhang, Y., Cheng, X.: Introduction of key problems in long-distance learning and training. Mobile Netw. Appl. **24**(1), 1–4 (2018). https://doi.org/10.1007/s11036-018-1136-6
13. Liu, S., Glowatz, M., Zappatore, M., et al. (eds.): e-Learning, e-Education, and Online Training, pp. 1–374. Springer, Heidelberg (2018). https://doi.org/10.1007/978-3-319-93719-9
14. Cancino, C.A., Merigó, J.M., Urbano, D.: et al.: Evolution of the entrepreneurship and innovation research in Ibero-America between 1986 and 2015. J. Small Bus. Manag. (2), 1–31 (2020)
15. Tok, E.: The incentives and efforts for innovation and entrepreneurship in a resource-based economy: a survey on perspective of Qatari residents. Sustainability **12**(2), 626 (2020)