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Article

Research on the Application of Cloud Computing Platform in Educational Innovation and Entrepreneurship Activities in Colleges and Universities

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Abstract: Innovation and entrepreneurship education is an important content of higher education. The emergence of emerging technologies, cloud computing, big data technology, for example, provides a technical realization basis for innovation and entrepreneurship education activities in colleges and universities. In this regard, this paper designs an innovation and entrepreneurship education service platform based on Open stack cloud computing technology, which provides a strong basis for the guidance of innovation and entrepreneurship education for college students. In order to explore the application of this platform, the university innovation and entrepreneurship education quality evaluation index system is constructed, and the improved BP neural network evaluation model and method are used to objectively and comprehensively evaluate and analyze the innovation and entrepreneurship education quality of the students of school A who apply the innovation and entrepreneurship education service platform. After empirical analysis, the comprehensive network output value of the quality of innovation and entrepreneurship education of students in School A is 0.8485, which is at a good level. In this regard, the study further proposes to optimize the training system of innovation and entrepreneurship education in colleges and universities from the aspects of building school-enterprise cooperation and optimizing the curriculum structure, which provides a powerful reference for the application of cloud computing platform in innovation and entrepreneurship education activities in colleges and universities.

Keywords: cloud computing; Open stack; BP neural network; innovation and entrepreneurship education

1. Introduction

Cloud computing refers to the integration of computing resources, data storage resources, and resources for developing applications dispersed around the world through the network to form a computing, storage, and service platform similar to the Internet, and provide convenient and time-sensitive computing, storage, and service resources for users of the Internet [1-4]. In today's digital era, the pattern of innovation and entrepreneurship in higher education has been changed through the establishment of a cloud computing platform, which provides a lot of convenience for innovation and entrepreneurship in colleges and universities [5-6].

College education has inherent resource advantages and talent advantages in the construction of innovation and entrepreneurship cloud computing platform. Colleges and universities have a large number of innovation and entrepreneurship resources, including all kinds of advanced instruments and equipment, experimental platforms and sufficient financial security; while the rich team of experts and teacher groups can provide intellectual support for innovation and entrepreneurship activities [7-9]. With many advantages, cloud computing platform can bring many benefits to innovation and entrepreneurship in universities. First, cloud computing platform solves the problem of lack of resources at the early stage of entrepreneurship [10]. For university education, especially for the students who start their own

business, it is a huge expense to purchase and maintain a large number of servers, software and other hardware facilities [11-12]. While cloud computing platform provides on-demand computing resources, entrepreneurs do not need to invest a large amount of money to buy equipment at one time, but only need to rent the corresponding cloud services according to business needs [13-15]. At the same time, the cloud computing platform also enhances the flexibility of innovation and entrepreneurship [16]. Innovative entrepreneurship in colleges and universities can rapidly adjust the business scale and resource allocation according to market changes, and this flexibility is difficult to reach by traditional entrepreneurship mode, which makes innovative entrepreneurship more agile to adapt to the market environment [17-19]. In addition, the cloud computing platform breaks the geographical limitations, no matter where the entrepreneurs are, as long as there is a network connection, they can manage and operate the innovation and entrepreneurship program through the cloud computing platform, which provides a broad space for innovation and entrepreneurship in universities [20-23].

With the development of the times, the traditional innovation and entrepreneurship activities in colleges and universities face many challenges, which seriously hinder the development of innovation and entrepreneurship activities and limit the pace of student growth, and the application of cloud computing and its related technologies effectively solve these problems. Literature [24] examined the resource construction of art education innovation and entrepreneurship platform based on the wide application of cloud computing technology, and verified that the cloud computing-based innovation and entrepreneurship platform creates a broad development space for students to carry out art creation and entrepreneurial activities. Literature [25] points out the problems of the current innovation and entrepreneurship platform, and proposes an open sharing cooperative education system of innovation and entrepreneurship education resources based on cloud service technology, and looks forward to the significance and application of this system to promote innovation and entrepreneurship education in colleges and universities. Literature [26] established an innovation and entrepreneurship platform based on cloud computing, and used ant colony algorithm to establish the performance optimization model of the platform, and the simulation analysis showed that the algorithm effectively improved the performance of the innovation and entrepreneurship platform. Literature [27] pointed out that the increase of enrollment rate increases the difficulty of statistics of innovation and entrepreneurship in colleges and universities, in order to effectively statistics emphasizes the importance of combining innovation and entrepreneurship in colleges and universities and cloud computing, and believes that the intelligent cloud computing data processing system can significantly improve the quality and efficiency of entrepreneurship service management. Literature [28] studied the impact of cloud computing-based big data platform on IE education and put forward the proposal of using cloud computing-based big data platform as a carrier to carry out IE education, which was analyzed through a questionnaire survey, showing that the cloud computing-based big data platform has a variety of positive impacts on IE education. Literature [29] analyzed the design and implementation of an innovative entrepreneurship system based on cloud model data mining algorithms in a university environment, and a comprehensive performance evaluation of the system revealed that the system performs well in a number of aspects, and there are also aspects that need to be improved. Literature [30] examined the impact of big data technology on innovation and entrepreneurship by analyzing the current state of research and development trend of innovation and entrepreneurship, designing big data algorithms, and analyzing innovation and entrepreneurship approaches in universities, showing that big data technology plays an important role in promoting innovation and entrepreneurship. Literature [31] analyzed the influencing factors in the process of Internet+ entrepreneurship and innovation based on the cloud analysis perspective, and constructed an evaluation index system for entrepreneurship and innovation, which verified that “Internet+” entrepreneurship and innovation can directly demonstrate the “Internet+” environment. The promotion factors of “entrepreneurship innovation” in the “Internet+” environment are verified. Literature [32] examined the virtual simulation college students' innovation and entrepreneurship platform constructed based on Internet of Things technology, and established a systematic training platform for college students' innovation ability, aiming to improve students' innovation and entrepreneurship ability, and verified the effectiveness of the above platform. Literature [33] constructed a mobile education platform based on cloud computing, aiming at solving the problem of uneven distribution of course resources in mobile education platform, and verified that the platform has good performance.

The study firstly designs an innovation and entrepreneurship education service platform including three dimensions of entrepreneurship incubation, entrepreneurship growth and entrepreneurship operation, which can manage multiple modules such as innovation and entrepreneurship competition, innovation and entrepreneurship project, self-assessment of innovation and entrepreneurship, entrepreneurship course, innovation and entrepreneurship base, and so on. Then, the innovation and entrepreneurship education quality evaluation index system and evaluation model are constructed to

assess the application effect of the platform. Finally, the optimization strategy of innovation and entrepreneurship activities in college education based on cloud computing technology is proposed based on the results of empirical analysis.

2. Feasibility analysis of applying cloud computing

2.1. Technical feasibility

In technical terms, cloud computing is a new term, not a new technology, but a further development of distributed computing, parallel processing and grid computing. According to the explanation in Wikipedia, cloud computing is a dynamic and easily scalable way of computing that provides virtualized resources, usually over the Internet, and the user does not need to know the details of the cloud computing system, nor do they need to have expertise in the cloud computing system, or even have direct control over the infrastructure of the cloud computing system. Cloud computing technology is maturing and has been formally commercialized, and major cloud computing vendors such as Amazon, IBM, Google, Microsoft, Sun and other companies have launched their own developed cloud computing service platforms. Users to enjoy the services provided by cloud computing, simply configure a terminal that can be connected to the network (such as laptops, desktop computers, tablet computers or cell phones, etc.), install browser software in the terminal, you can easily enjoy cloud computing according to the individual needs of the cloud services provided by the cloud computing, and cloud computing services are paid in accordance with the actual amount of resources used to pay for the use of resources to pay as much as the cost of how many resources, just like the It is as convenient as using water and electricity resources in life. At present, cloud computing technology is penetrating into various fields such as enterprises, governments and schools with its on-demand use, convenient and new service mode. Therefore, it is feasible to apply cloud computing to college students' innovation and entrepreneurship activities in terms of technical conditions [34].

2.2. Economic feasibility

In terms of economic costs, although the state invests a large amount of money in the Innovation and Entrepreneurship Training Program for College Students every year, there is actually not much of this money when it is divided equally among each project, and it may not be enough to pay for the cost of expensive physical facilities or software resources that need to be used in the process of project implementation. In order to solve these problems, the best way is to realize the sharing of expensive physical facilities or software resources, in the experimental process only need to connect to the network through a terminal and use the browser software to use these resources, without having to spend more money to update the terminal's hardware and software resources, and only need to pay the rent, do not have to think about paying for the maintenance costs. Therefore, it is also feasible to apply cloud computing to college students' innovation and entrepreneurship activities in terms of economic costs.

2.3. Operational feasibility

From the point of view of the operating environment, the terminal requirements for running the cloud computing platform are very low, in terms of hardware, you only need to configure a terminal that can connect to the network. In terms of software, you only need to install a browser software, all other resources can be accessed through the cloud computing platform, such as storage of data resources, because there is a copy mechanism on the cloud computing platform, through the copy mechanism for the same data resources to establish multiple copies, and decentralized storage, while using the consistency of the requirements of making multiple copies to maintain consistency. Configuration of the operating environment, sometimes there will be software and hardware compatibility issues, making the configuration of the operating environment to spend a lot of time and effort can not be completed, in the cloud computing platform has the most professional technical team to help configure the operating environment, just upload the program code and data to complete the experiment. Therefore, cloud computing can save a lot of time and energy when applied to college students' innovation and entrepreneurship activities.

3. Cloud computing-based innovation and entrepreneurship platform design for colleges and universities

The design goal of cloud computing-based innovation and entrepreneurship platform for colleges and universities is to establish an innovation and entrepreneurship platform for college students by using cloud computing technology, investing the smallest cost to achieve the maximum resource utilization and resource sharing, so that the users can enjoy the cloud services only through the browser. The service

platform designed this time includes three modules of entrepreneurship incubation, entrepreneurship growth and entrepreneurship operation, which are further subdivided into nine service management systems, and the structural framework of the system is shown in Figure 1.

The platform mainly includes the following nine functional management modules:

(1) Innovation and Entrepreneurship Competition Management

It is applicable to information release, competition management, online or on-site scoring by experts, and release of competition results of various innovation and entrepreneurship competitions.

(2) Innovation and Entrepreneurship Program Management

It applies to innovation and entrepreneurship project release, application, audit, project establishment, tracking the project process, use of funds, and completion of the project.

(3) Crowd Creation Space

For some good projects, it can release project investment and financing, enterprise registration, project participation, crowdfunding supervision and information release. At the same time, it builds a platform for entrepreneurs, alumni, mentors, enterprises and investment institutions to communicate with each other, share various problems encountered in the process of entrepreneurship, and summarize the lessons learned in the process of entrepreneurship. The main innovation and entrepreneurship as the core of the establishment of a community form of communication space, the administrator through the release of innovation and entrepreneurship posts, students can be in the module for posting interactive comments and exchanges.

(4) Mobile Management System for Self-Assessment of Innovation and Entrepreneurship Ability

Self-assessment of entrepreneurial ability will integrate four types of assessment systems, such as entrepreneurial ability assessment, entrepreneurial psychology assessment, personality trait test, and career interest assessment, into the assessment of innovation and entrepreneurial ability level. The assessment design system will be established, based on data analysis, the testers will assess themselves and generate test reports, and the assessment results will provide students with personalized learning guidance programs and practice programs, which will be conducive to students' learning, entrepreneurship, employment and growth, and help entrepreneurs to self-evaluate, self-improvement, self-improvement, and help entrepreneurial teams to give full play to their respective strengths, to give full play to the team's energy efficiency, and to achieve complementarity of strengths.

(5) Management of entrepreneurship courses

It realizes the management of entrepreneurship courses, which can be added, deleted, modified, queried, imported, exported, and analyzed by course statistics.

(6) Innovation and Entrepreneurship Base Management

It manages the process of project application, qualification audit, project stationing agreement, expiration (withdrawal), operation and management, performance assessment and evaluation of college students' projects entering the innovation and entrepreneurship base.

(7) Innovation and Entrepreneurship Information (Counseling Room)

Provide comprehensive and timely information on the forefront of innovation and entrepreneurship at home and abroad and innovation and entrepreneurship policies for students to learn, cultivate their entrepreneurial interest and enhance their confidence in entrepreneurship. It provides entrepreneurs with practical information and services on law, industry and commerce, taxation, personnel agency, management consulting, project recommendation, project financing, policies and regulations, practical training information, entrepreneurial assessment, entrepreneurial simulation, etc. to help entrepreneurs grow better. It is mainly used to publish innovation and entrepreneurship consulting and related policies, provide to the needy entrepreneurship students to check and pay attention to some professional innovation and entrepreneurship news and quotations.

(8) User information management realization

The information of students (innovative entrepreneurs) is managed, including the management of basic user information, student registration management, user password management, user enterprise information, etc., and user information query and statistics can be carried out.

(9) Entrepreneurship Teacher Management

It realizes the management of entrepreneurship teachers' information, including the management of basic information of on-campus teachers, the management of information of off-campus instructors, and the management of teachers' passwords.

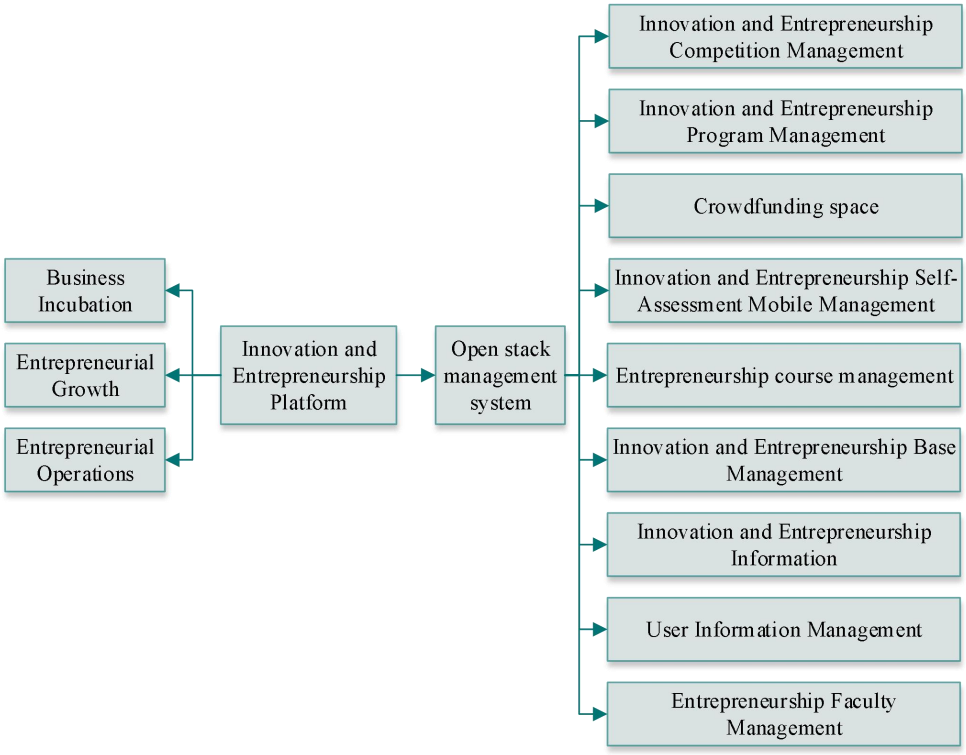


Figure 1. Cloud computing innovation entrepreneurship service platform system.

4. Methods for evaluating the quality of innovation and entrepreneurship education

This chapter reacts to the application effect of innovation and entrepreneurship platform based on the evaluation results of innovation and entrepreneurship education. By constructing innovation and entrepreneurship education evaluation index system and BP neural network evaluation model to judge the application effect of innovation and entrepreneurship platform designed in this paper.

4.1. Construction of evaluation index system for innovation and entrepreneurship education

In order to obtain a reasonable, fair and rational teaching quality evaluation index system, this study conducted an in-depth study of the questionnaire design to ensure the rationality of the questionnaire: open questionnaire was distributed, preliminary screening of the indicators, expert guidance, generation of the questionnaire, and a rigorous statistical methodology was used in order to analyze the reliability and validity of the questionnaire. The questionnaire was randomly distributed 100 copies in the university city where University A is located, and 95 copies were effectively retrieved, with an effective recovery rate of 95%, and the effective questionnaire data were entered into SPSS to analyze the reliability and validity of the questionnaire.

The reliability analysis is shown in Table 1. According to the analysis of reliability, there table can be deduced that the Cronbach`s alpha coefficient value is higher than 0.8, indicating that the developed questionnaire reliability index is ideal, the indicators are consistent, and the questionnaire has reliability.

Table 1. Reliability analysis.

Cronbach`s Alpha	Cronbach`s Alpha Based on Standardized Items	N of Items
0.871	0.855	23

In general, the value of sampling adequacy can reflect the adequacy of the questionnaire sample. The results of the Bartlett and KMD tests of this survey study are shown in Table 2, so it can be seen that the

KMD coefficient value of the questionnaire is 0.932, and the probability of significance is 0.00 < 0.01, indicating that the questionnaire variables have many factors in common, which is suitable for factor analysis.

Table 2. Validity analysis.

Kaiser -Meyer-Olkin Measure of Sampling Adequacy		0.932
Bartlett`s Test of Sphericity	Approx.Chi-Squeare	11063.625
	Df	365
	Sig	0.000

This article adheres to the principles of strategic goal orientation, comprehensiveness and completeness, objectivity and scientificity, dynamic flexibility, systematicness, and operability, etc. It comprehensively analyzes the characteristics of innovation and entrepreneurship education in universities of different levels, and designs indicators and determines evaluation methods based on factors such as students' personalities and their own characteristics. From the perspectives of result evaluation and process investment, After screening based on the expert investigation method, an innovation and entrepreneurship education index system containing 3 first-level indicators and 9 second-level indicators was constructed. The design results are shown in Table 3. The first-level indicators contain: innovation and entrepreneurship literacy improvement, practical skills and project progress, successful transformation and initial incubation. Level 2 indicators include: theoretical knowledge mastery, innovative thinking and ability, entrepreneurial awareness and spirit, project completion quality, key skills improvement, competition awards, physical project registration and operation, financing and resource matching results, and intellectual property output.

Table 3. Innovation entrepreneurship education teaching quality evaluation system.

Primary index	Secondary index
Innovation entrepreneurship X1	Theoretical knowledge mastery Y1
	Innovative thinking and ability Y2
	Entrepreneurship and spirit Y3
Practice skills and project progress X2	Project quality Y4
	Key skill improvement Y5
	Contest award Y6
Successful transformation and incubation X3	Entity project registration and operation Y7
	Financing and resource docking results Y8
	Intellectual property output Y9

4.2. BP neural network evaluation model construction

The commonly used evaluation methods have the limitation of knowing the specific information of the analyzed object in advance, and it is difficult to establish an accurate mathematical model, while the BP neural network model can overcome the time-varying and complexity of the parameters and improve the accuracy of evaluation of the more subjective problems, but the stability is poor, and the speed of convergence is slow, and it is often caught in the dilemma of not being able to achieve the global optimum, thus, in this paper, we adopt the modified BP neural network to carry out optimization, through the simulation of the neural system, making full use of its powerful memory, learning and adaptive power in information processing and the characteristics of fault-tolerance, nonlocality and nonlinearity, in order to obtain a more desirable practical output and get the evaluation results [35].

The BP neural network structure consists of three parts: the input layer, the hidden layer, and the output layer, whose number of units are determined by the actual problem. The activation function of the hidden layer is generally a sigmoid function, i.e., $f(x)=\left(1+e^{-x}\right)^{-1}$, while the activation function of the output unit can be chosen from any one of the following three functions:

$$f(x)=\left(1+\mathrm{e}^{-x}\right)^{-1} \tag{1}$$

$$f(x)=\begin{cases}1, x>0\\0, x\bullet 0\end{cases} \tag{2}$$

$$f(x)=\begin{cases}1, x>0\\-1, x\bullet 0\end{cases} \tag{3}$$

Notation Note (Let the number of samples learned be n):

$x^{(k)}$ is the k th input of the n th sample, where $k=1,2,\cdots,n, y_k, \hat{y}_k$ are the desired and actual outputs of the k th sample, respectively. o_{ik}, w_{ij} are the output of cell i and the weight from cell i to cell j , respectively. $net_{jk}=\sum_i w_{ij}o_{ik}$ is the total input to cell j . $E_k=\frac{1}{2}\left(y_k-\hat{y}_k\right)^2$ is the error function for the k th sample. $E=\sum_{k=1}^{n}E_k$ is the cumulative error.

Algorithm description:

(1) Randomly initialize the weights w_{ij} .

(2) Make $k=1$ while inputting learning samples $\left(x^{(k)}, y^{(k)}\right)$.

(3) Calculate:

$$net_{jk}=\sum_i w_{ij}o_{jk}, o_{jk}=f\left(net_{jk}\right) \tag{4}$$

$$E_k=\frac{1}{2}\left(y_k-\hat{y}_k\right)^2 \tag{5}$$

(4) Reverse calculation:

$$\sigma_{jk}=\begin{cases}-\left(y_k-\hat{y}_k\right)f'\left(net_{jk}\right), j \text{ is the output unit}\\ f'\left(net_{jk}\right)\sum_m \sigma_{mk}w_{mj}, j \text{ is an implicit unit}\end{cases} \tag{6}$$

(5) Correction weights:

$$w_{ij}(t+1)=w_{ij}(t)-\eta\sigma_{jk}o_{ik} \tag{7}$$

(6) Discriminate: if $k+1>n$, go to (7), otherwise, let $k=k+1$ and go to (2).

(7) If $E_k<\varepsilon$, terminate the operation, otherwise return to (2).

The following necessary improvements are made to the BP neural network algorithm as follows.

(1) Adding perturbation amount: add a part of the original weight correction amount to the weight correction amount obtained from this error, the specific adjustment is as follows:

$$\Delta w_{ij}(t+1)=\alpha\left[w_{ij}(t)-w_{ij}(t-1)\right]+\eta\frac{\partial E_k}{\partial w_{ij}}=\alpha\cdot\Delta w_{ij}(t)+\eta j_{jk}o_{ik} \tag{8}$$

where α is the momentum coefficient, generally taken as 0.9, and the learning step $\eta>0$.

(2) Improvement of error function: it is required that the new error function should not only retain the influence of $f'\left(net_{jk}\right)$, but also the influence factor of σ_{jk} when $|net|$ changes, so that the occurrence of non-convergence can be avoided, therefore, we adopt the following error function:

$$\sigma_{jk}=-\left(y_k-\hat{y}_k\right)\left[f'\left(net_{jk}\right)+0.1\right] \tag{9}$$

(3) Improvement of activation function: the commonly used BP neural network generally uses the sigmoid function with the value range of (0,1) as the activation function, which may lead to the change of

the magnitude of the weights to be honestly slower, which leads to slower convergence. The value range of S-type function is (-0.5,0.5), which can reduce the convergence time by 50%. Therefore, we use the S-type function as the activation function:

$$f(x) = -\frac{1}{2} + \frac{1}{1+e^{-x}} \tag{10}$$

The steps for evaluation with the improved BP neural network are shown in Figure 2.

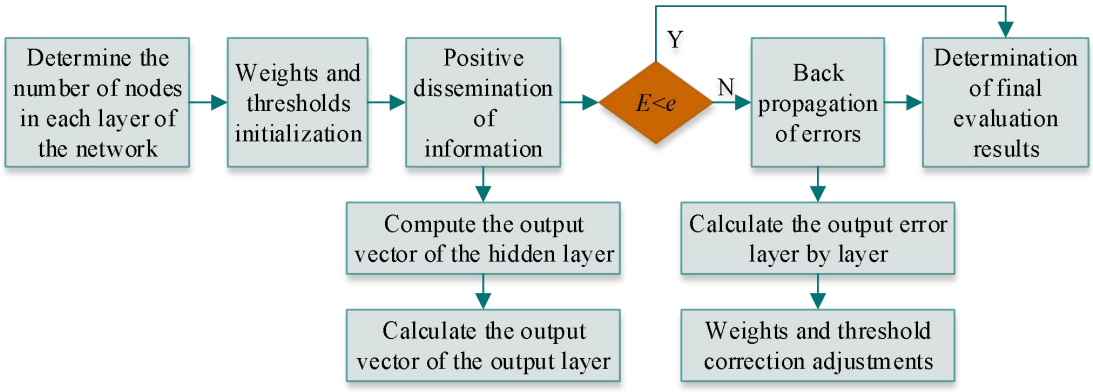


Figure 2. Improved bp neural network model evaluation flowchart.

5. Empirical analysis

5.1. Basic data collection

This paper empirically analyzes the effectiveness of the use of the innovation and entrepreneurship platform based on the educational activities carried out in school A after the use of the platform. In order to effectively evaluate the effectiveness of practical teaching in this university, firstly, the questionnaire topics are designed according to the second-level indicators in the innovation and entrepreneurship education index system, each second-level indicator is taken as a topic, and five options are set for each question, and the corresponding scores for each option are 20, 40, 60, 80, and 100, and the samples recovered are the scores of each question in the questionnaire survey. The survey questionnaire targets from the university's College of Computer Science and Technology, College of Life Sciences, College of Political Science and Law, College of Education, College of Physical Education and other 9 colleges of multiple majors, the questionnaire issued to fill out the time of half a month, a total of 1,230 copies were collected, of which 306 freshmen, sophomores 359, juniors 263, juniors 302, valid questionnaires 1,063 copies.

Some of the raw data collected are shown in Table 4. Taking Student 1 as an example, he has a high degree of agreement with the innovation and entrepreneurship platform in terms of "successful transformation and start-up incubation", and with the role of the innovation and entrepreneurship platform, the registration and operation of physical projects (X7) and the results of financing and resource matchmaking (X8) have received perfect scores.

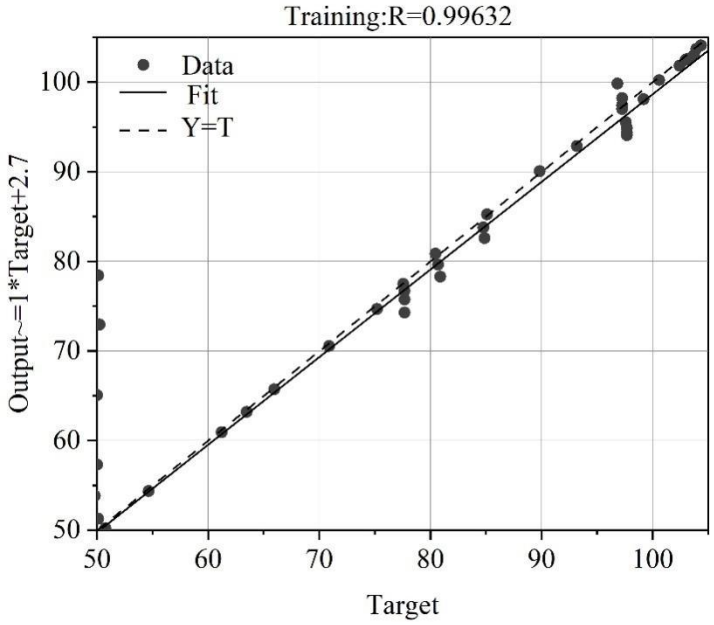
Table 4. Raw data.

Student	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
S1	40	60	80	60	60	80	100	100	60
S2	60	80	100	20	40	40	80	80	60
S3	100	60	80	40	20	20	80	80	80
…	…	…	…	…	…	…	…	…	…
S1061	60	60	80	100	80	60	20	40	40
S1062	100	20	40	40	80	80	80	40	20
S1063	100	20	40	40	60	80	40	100	80

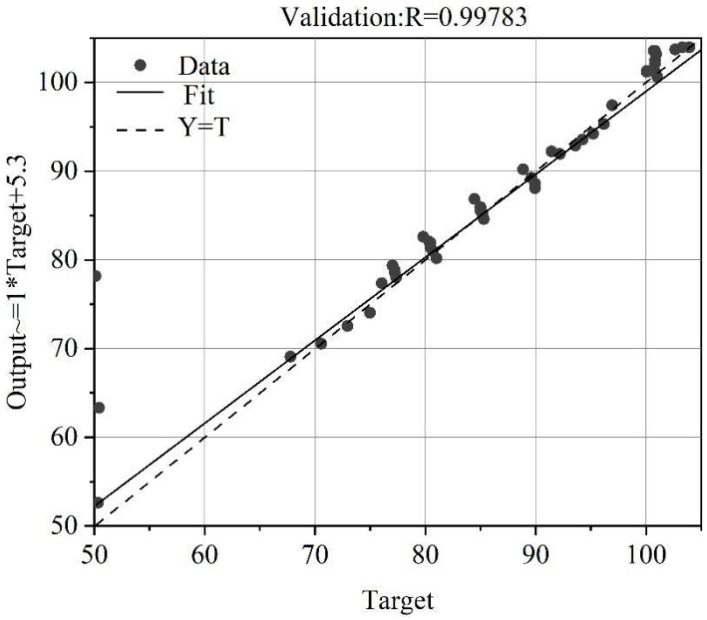
5.2. Training and Testing of BP Neural Networks

The BP neural network model was applied and created in MATLAB R2012a software platform. The first 1043 data from the preprocessed dataset were selected for training the model and the last 20 data were used for testing. The data normalized to the interval [0,1] are input into the constructed BP neural network model, where the constructed model is a three-layer neural network structure, the number of neurons in the input layer is 9, and the number of neurons in the hidden layer is 10, and the maximum number of iterations is set to be 3000, and the learning rate is 0.01. The training achieves the expected effect after n iterations, and the performance of the network is evaluated by the training results.

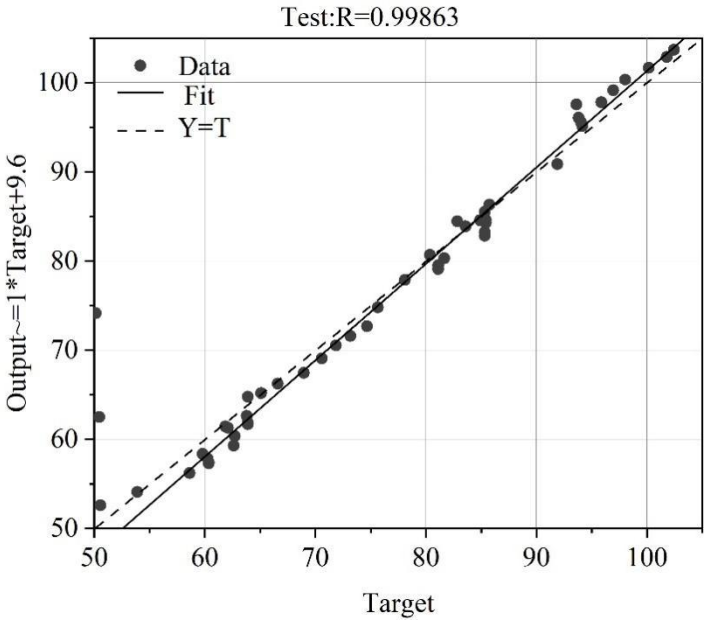
Based on the various parameters of the BP neural network model and the training results, it is shown that the training process and validation process of the BP neural network as well as the overall test results are satisfactory. The results of the comparative analysis of neural network fitting regression are shown in Fig. 3, with (a) to (d) indicating the fitting regression of the training process, the validation process, the testing process and the overall process, respectively. The analysis shows that the R-values in the fitted regression for the four processes are 0.99632, 0.99783, 0.99863 and 0.99563, respectively. The closer R is to 1, the more ideal the BP neural network model fitting effect is, which also indicates that the real data and the model have a certain degree of discipline and rationality. The accuracy of the experiment is also further verified by the neural network fitting regression comparison analysis graph.



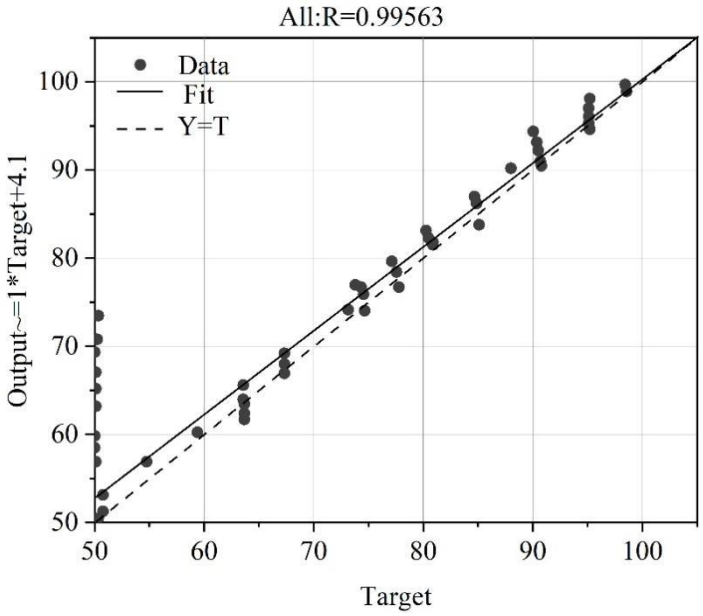
(a) Training



(b) Validation



(c) Test



(d) All

Figure 3. The analysis results of the regression comparison of neural network.

After the training of the improved BP neural network is completed, some test data are randomly selected to test the BP neural network model, and the corresponding evaluation value of innovation and entrepreneurship education for students of school A is obtained, and the comparison between the actual value and the expected value of the output of the network is shown in Figure 4. As a whole, the actual value is basically consistent with the expected value, and there is no substantial change, which also reflects the reliability of the neural network model and the data collected are relatively reasonable.

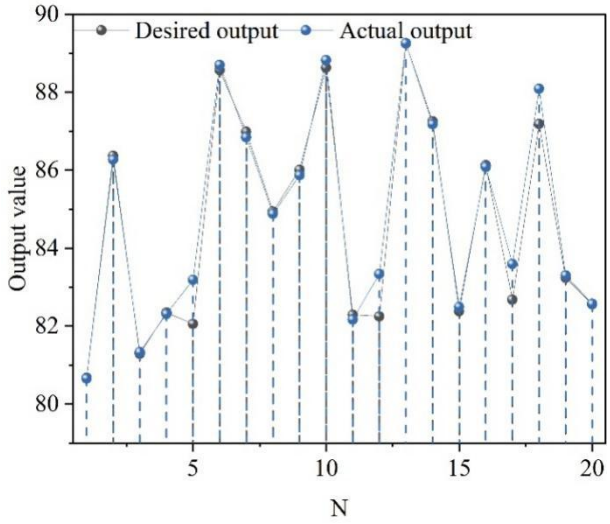


Figure 4. The actual value of the network output is compared to the expected value.

The specific comparison results are shown in Table 5. Through the BP neural network test and output the actual value, the actual value is valid, the expected value is reasonable, and the maximum relative error of the two is 1.37%, which basically tends to the ideal state. The actual value of the trained neural network is basically the same as the expected value, only in the 5th, 12th, 17th and 18th serial number there is a local fluctuation, which is also within the acceptable range.

Table 5. The comparison of expected expectations and actual values.

N	Desired output	Actual output	Error (%)
1	80.671	80.656	0.02
2	86.373	86.272	0.12
3	81.288	81.332	-0.05
4	82.347	82.312	0.04
5	82.057	83.194	-1.37
6	88.567	88.701	-0.15
7	86.991	86.846	0.17
8	84.943	84.883	0.07
9	86.012	85.873	0.16
10	88.634	88.825	-0.22
11	82.294	82.168	0.15
12	82.25	83.34	-1.31
13	89.249	89.259	-0.01
14	87.256	87.182	0.08
15	82.379	82.492	-0.14
16	86.131	86.087	0.05
17	82.677	83.597	-1.1
18	87.185	88.093	-1.03
19	83.241	83.305	-0.08
20	82.557	82.57	-0.02

5.3. Analysis of evaluation results of innovation and entrepreneurship education

Using the data of University A collected by the questionnaire survey, innovation and entrepreneurship education performance is evaluated by applying the above well-trained and improved BP neural network model, and the output value of the comprehensive network is 0.8485, which proves that the innovation and entrepreneurship education of University A is at a good level, and there is still part of the room for improvement.

The output results of each index are shown in Figure 5.University A has achieved corresponding results based on the innovation and entrepreneurship platform, which are as follows: mastery of theoretical knowledge, innovative thinking and ability, entrepreneurial awareness and spirit, project completion quality, improvement of key skills, awards in competitions, registration and operation of physical projects, results of financing and resource docking, and output of intellectual property rights.

(1) Innovation and entrepreneurship knowledge balanced with specialized knowledge

By analyzing the evaluation results of the indicators, the mastery of theoretical knowledge (Y1) = 0.96, key skills improvement (Y5) = 0.91, entrepreneurial awareness and spirit (Y3) = 0.85, it can be learned that with the assistance of the innovation and entrepreneurship platform of University A, the students have gradually begun to master the relevant knowledge, and their satisfaction with the application effect of the platform is relatively high, which provides a corresponding guarantee for the continuation of the promotion of the innovation and entrepreneurship platform.

(2) Remarkable Academic Achievements

With regard to the evaluation indexes of competition awards (Y6) = 0.85 and entity project registration and operation (Y7) = 0.83, it can be learned that University A has made great progress in academic seminars on professional innovation and entrepreneurship education, and it has achieved remarkable results in social practice, and the proportion of awards won in academic competitions in related fields has been increasing, and its social influence is increasing.

However, this entrepreneurship education platform still has some deficiencies:

(1) Lack of experience in entrepreneurship and enterprise management

Among the indicators related to enterprise management, innovative thinking and ability (Y2) = 0.72, financing and resource matching results (Y8) = 0.71, which can be concluded that the relevant teachers are not strong enough. The knowledge transfer process of college students' innovation and entrepreneurship education requires practical experience as the guiding force, and teachers need to have a wide range of knowledge, both practical and comprehensive.

(2) Incomplete curriculum system of innovation and entrepreneurship education

The quality of innovation and entrepreneurship education curriculum is related to the quality of program completion (Y4) and the quality of intellectual property output (Y9). The output values of these two indicators are 0.76 and 0.69 respectively, reflecting that the relevant curriculum system of university A needs to be improved.

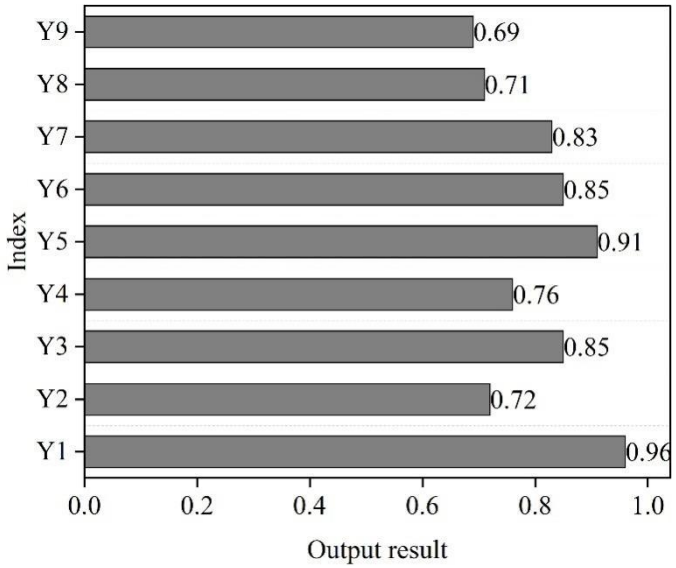


Figure 5. Output of each index.

6. Optimization strategy of innovation and entrepreneurship education based on cloud computing

The previous article analyzed that the current innovation and entrepreneurship platform exists lack of experience in entrepreneurship and enterprise management, innovation and entrepreneurship education curriculum system is not perfect and other problems, in this regard, this chapter based on the cloud computing technology to put forward relevant optimization strategies to promote the development of innovation and entrepreneurship education.

6.1. Building school-enterprise cooperation alliances

Enterprises produce a variety of products or provide diversified services to meet the needs of consumers and society, which are closely connected with the actual needs of the market, so the starting point of innovation and entrepreneurship originates from enterprises. The design of new products can greatly promote the collaborative development of universities and enterprises, and at the same time, it also provides model support for innovation and entrepreneurship training in colleges and universities. The development of university innovation and entrepreneurship education under the school-enterprise cooperation model should start from the precise positioning of the main body of innovation production, task objectives, production organization, function enhancement, and the construction and optimization of related platforms, to build an objective innovation model that is compatible with innovation production.

The above can be realized by using cloud computing to create a creative exchange platform for college students. Before college students formally carry out the innovation and entrepreneurship training program, they should determine the relevant innovation theme, and the theme of the project originates from the actual needs of the market. Since college students are mostly students with less contact with the society, the creative platform can be used by different colleges and universities to give information on the content of scientific research projects that are being developed and researched, or to actively communicate with relevant enterprises to release information on the content of the relevant scientific

research projects, which provides reference value to students during the selection of the theme, and thus avoids the need to select the theme. It provides reference value for students in the process of theme selection, thus avoiding unrealistic target orientation of students, which will have negative impact on the overall application and development of the project. In the creative entrepreneurship exchange platform, students and enterprises release relevant data and information in real time, so as to realize students' control of scientific research information and consumer-oriented enterprise demand at any time and any place, and track a wide range of scientific research information at all times, so as to establish specific innovation goals and themes, enhance the sense of cooperation between the university and enterprises, promote the development of innovation and entrepreneurship teaching by the industry, and provide enterprises with innovative talents support through teaching, and form a community of interests under the cooperation mode. In addition, it forms a community of interest under the cooperation mode, guarantees the maximization of the interests of both parties, and greatly enhances the satisfaction of enterprises in the process of participation [36].

6.2. Optimize the design of the course structure

Through the habitual education mode, the content of the innovation and entrepreneurship training course is optimized according to the sequence of occupation-specific specifications, innovation and entrepreneurship common skills, innovation and entrepreneurship thinking and relevant cases. It is specifically reflected in the module of new era professionals' formation, the module of innovation and entrepreneurship common technology training, the module of innovation and entrepreneurship professional technology training, and the module of related case sharing and analysis.

For all of the above modules, modern Internet information technology is used to design data and information resource libraries such as micro-video, which in turn forms a multi-angle, omni-directional and three-dimensional teaching resource center. First, establish specific innovation goals and themes, and design general technology modules with tasks as action-oriented, meanwhile, use cloud computing to realize mind map data analysis and processing. Secondly, in the practical stage guided by the training course, a scientific and systematic training method should be developed under the established environment of the cloud data entrepreneurship platform, taking the typical deeds of the relevant industries as reference, using cloud data to complete the knowledge transfer and problem analysis, and forming a systematic innovation and entrepreneurship practical training system. Finally, in the innovation and entrepreneurship case analysis module, using the cloud data innovation and entrepreneurship platform, integrating successful entrepreneurial planning, understanding the survival and development of enterprise management experience, providing college students with a more reasonable and intuitive case analysis system for college students, and analyzing the relevant experience and lessons learned to guide college students to the correct entrepreneurial path.

7. Conclusion

The study evaluates the innovation and entrepreneurship education service platform constructed in this paper based on the improved BP neural network model. 1063 questionnaires about the application effect of the platform were collected for the students of A school. The specific data collected were used to train the structural BP neural network to verify the scientificity of the evaluation model. Compare the real output value with the expected output value. The maximum relative error between the two is 1.37%, which is within the acceptable error range, indicating that the improved BP neural network model can effectively evaluate the quality of innovation and entrepreneurship education. By analyzing the output results of the indicators, the current design of the innovation and entrepreneurship education service platform can help students improve their innovation and entrepreneurship literacy and meet the needs of social practice. However, there are still problems related to entrepreneurship and business management experience as well as innovation and entrepreneurship education curriculum system. It is possible to create a creative exchange platform for college students with the help of cloud computing, provide a case analysis system for college students, improve the platform services, and further enhance the educational level of cultivating innovative entrepreneurial talents.

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