Intelligent Platform of Ideological and Political Education Resources under Digital Education Environment

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Abstract: With the development of China's society, the construction and utilization of digital educational resources in the field of basic education in China has many years of practical experience and is gradually developing in depth. In this paper, the text quantization in vector space model was discussed in depth, and the improved Term-Frequency Inverse Document Frequency (TF-IDF) formula was described in detail, which aimed to build an intelligent platform for Ideological and Political Education (IPE) resources. In this paper, 200 students and 50 ideological and political teachers were investigated by questionnaire. It could be seen from the questionnaire data of teachers that only 20.00% of teachers were very satisfied with the application of digital education resources in the existing ideological and political discipline teaching. According to the data of the group experiment of 200 students, before the experiment, the scores of learning efficiency and learning achievement of the experimental group were 5.00 and 5.30 respectively, and the scores of the control group were 5.10 and 5.40 respectively. After the intervention experiment of IPE resource intelligence platform, the learning efficiency and learning achievement scores of the experimental group were 7.90 and 7.60 respectively, and the scores of the control group were 6.20 and 6.10 respectively. It was not difficult to see that the intellectual platform of IPE resources had a promoting effect on students' learning and was worthy of further promotion and application.

1. Introduction

With the improvement of China's economy and education level and the advent of information technology, the digital construction of China's educational resources has achieved fruitful results. At present, all countries are vigorously developing online education and teaching resources, and have produced huge economic benefits in society. In the public service system of digital education, resource sharing is the basis. Through the establishment of a smart digital education resource platform and a series of sharing mechanisms, high-quality education resources can be widely shared and teachers' abilities can be continuously developed. It is more convenient for teachers and

students to communicate and obtain resources, and education and teaching services are more personalized. While improving the utilization of resources, it also meets the current actual situation and urgent needs. This is of great significance to the overall improvement of the ability of information technology to support and service education, the promotion of balanced development of education, the rational allocation of education resources, and the advancement of education equity.

With the development of society, the research of IPE resources has gradually increased. Chen Shaohong discussed the feasibility of setting up an electronic classroom platform for counselors in private universities to develop implicit IPE in private universities. To improve the implicit IPE ability of counselors in private colleges and universities, the educational methods involved were discussed in depth [1]. In order to meet the needs of the new situation, Yue Yun discussed the IPE in English teaching based on the production-oriented approach. Practice proved that this approach was feasible and conducive to the combination of IPE and English teaching [2]. Xie Xiao discussed how to integrate IPE into college English teaching, and how to embody socialist core values in English courses to achieve the organic unity of knowledge transfer and value guidance [3]. Liu Rong analyzed the background of ideological and political theory teaching of operations research course, and put forward a "trinity" based ideological and political theory teaching design framework of operations research course, which would further promote the application of TF-IDF [4]. Although these research methods were very innovative, a large number of experimental data were needed to prove the reliability of the methods.

The content involved in this paper included the title of IPE resources, resource introduction, resource outline, resource label, etc. [5]. Among them, the introduction of ideological and political resources and the resource outline could be combined, and the resource label referred to the knowledge taught by the teaching resources [6]. When classifying documents, people often only pay attention to the contents of the documents and ignore the information such as the title. The innovation of this paper was to discuss the expression of IPE resources from three aspects of the title, content and label knowledge, and to study and improve the traditional TF-IDF weight calculation formula in the text expression stage.

2. Intelligent Platform Design Method for Digital Education Resources

2.1 Digital Education

Educational resources refer to various hardware equipment, media, scientific research personnel, teaching content and various material resources. Material resources include information resources, human resources, etc. Digital educational resources are a method of digital processing of educational resources.

Information instructional design is a design of teaching activities under the background of information. It provides accurate, efficient, high-quality and suitable teaching environment for students through reasonable planning and scientific organization of teaching. In normal work, teachers should actively collect and sort out valuable and frequently used online materials, and eliminate duplicate content, so as to reasonably classify, integrate and use them. Finally, free high-quality IPE resources should be added [7].

The construction of digital teaching resource library that meets the needs of educational practice:

First of all, the connotation of teaching resources should be actively expanded and guided by the needs of students and teachers. The teaching resource platform of digital education is oriented to teachers and students. Therefore, in the process of building digital teaching resources, the different needs of teachers and students should be fully considered, and the resource information should be classified reasonably and scientifically to achieve a seamless connection between supply and demand. At the same time, the characteristics of education should also be reflected. Secondly,

different teaching resource libraries should be used to build the platform of educational digital teaching resources. At the same time, in order to achieve the integration and sharing of IPE, it is necessary to establish a public teaching resource library to lay the foundation for the sharing of resources [8-9].

2.2 Construction of Intelligent Platform

In view of the traditional search engine's single service function and poor user browsing experience, this paper starts with the structure features of the existing network teaching resources, and combines the automatic text classification technology with data mining technology on the basis of ensuring the convenient use of the search engine. An intelligent search platform for online teaching resources is built to improve the user's retrieval experience and effectively integrate it into the current teaching resources.

2.3 Improvement of Classification Algorithm

At present, the existing automatic text classification algorithm has been widely used in practical systems, so this method is used in this paper to automatically classify ideological and political teaching resources [10]. Through research, it is found that the summary part of online video teaching resources is usually very short, or only a small amount of text information can not be fully expressed. Video resources on the network usually refer to courses. In class, there is usually an outline, but there may be no outline. Therefore, in order to ensure that the resources can have more text descriptions, this paper combines the resource outline and introduction as the content of the resources. When users upload teaching materials, the defined topic usually contains the main teaching knowledge of the resource, and sometimes includes its classification information in the topic. In addition, the resource tag is the resource knowledge point demarcated by the user. It describes the image resources with high accuracy, and its importance is self-evident. According to people's habit of putting emphasis on secondary knowledge, the position of each knowledge point hides the information of importance.

On this basis, this paper describes the improvement of automatic classification algorithm based on vector space model in detail.

(1) Research on vector space model

Generally speaking, the words that people see most can express the content of the text. The number of times to see each feature item in the text is calculated, that is, frequency:

$$tf_{o,k} = freq_o(k) \tag{1}$$

$tf_{o,k}$ represents the frequency of feature o in text k, but the text also has its advantages and disadvantages. Some feature items are used more frequently in long papers than in short papers. Therefore, in order to compare texts of different lengths, the frequency of feature items in the document is divided by the sum of the frequency of all feature items in the document.

$$tf_{o,k} = \frac{freq_o(k)}{\sum_l freq_l(k)} \tag{2}$$

At this time, the word frequency in the document was quantified. However, people soon found that the TF value of a feature word is similar in all documents. In other words, this feature word does not distinguish these files well. Therefore, this paper proposes a word frequency adjustment factor to measure the general degree of a feature word. A feature word is rare in a corpus. However, if it often appears in this file, it can be considered that this is a better place to describe its content

characteristics. Therefore, its feature quantification value should also be improved accordingly.

On the basis of TF, each feature item should also be given the weight of "particularity". The common feature words in the corpus are given less weight, and the uncommon feature words in the corpus are given more weight. The famous Inverse Document Frequency (IDF) was proposed by scholars in 1972:

$$idf_o = \log(\frac{H}{1+M_o}) \qquad (3)$$

idf_o represents the inverse document frequency of feature item o; H represents the total number of corpora in a group of corpora; M_o represents the number of files with feature item o in the corpus. The denominator on the right of the formula uses M_o plus the number 1 to ensure the correctness of the formula. This is because if o does not appear in all documents in the corpus, M_o is equal to 0.

TF and IDF are combined, and the product of TF and IDF is taken as the quantitative analysis of the characteristic items, thus forming the weight statistical method of TF-IDF. According to TF-IDF theory, when a specific feature item appears in a specific file, its recognition ability would be better.

$$tfidf_{o,k} = tf_{o,k} \times idf_o = \frac{freq_o(k)}{\sum_l freq_l(k)} \times \log(\frac{H}{1+M_o}) \qquad (4)$$

TF-IDF is not the specific formula mentioned above. It represents a set of deformation formulas based on word frequency TF and inverse file frequency IDF, including the deformation of TF and IDF and the deformation of the whole. Formula (4) is also the most effective one among many systems.

(2) TF-IDF formula improvement

On this basis, document $Doc = (T_1, T_2, ..., T_m)$ is set. Among them, $T_1, T_2, ..., T_m$ are the feature items of document Doc, and the quantized representation of the document is $Doc = (u_1, u_2, ..., u_m)$. Among them, $u_1, u_2, ..., u_m$ represent the weight value of feature item $T_1, T_2, ..., T_m$, which is the product of the word frequency TF of feature item and the inverse document frequency IDF of feature item. The calculation formulas of TF, IDF and u are as follows:

$$tf_{o,k} = \frac{freq_o(k)}{\sum_l freq_l(k)} \qquad (5)$$

$$idf_o = \log(\frac{H}{1+M_o}) \qquad (6)$$

$$u_{o,k} = tfidf_{o,k} = tf_{o,k} \times idf_o = \frac{freq_o(k)}{\sum_l freq_l(k)} \times \log(\frac{H}{1+M_o}) \qquad (7)$$

Formulas 5, 6 and 7 calculate the same weight for each feature item without distinguishing its source. However, in the resource description, the feature words in the title are obviously more persuasive than the feature words in the introduction, and the features presented in the tag are much more important than those in the introduction, which is sometimes more important than the title.

The improved TF calculation formula is as follows:

$$tf_{o,k} = \frac{\alpha_o \times u_T \times m_{o,kT} + u_k \times m_{o,kV} \times (1 + e^{-a_{o,k}}) \times u_G \times u_T \times m_{o,kG}}{\sum_l \alpha_o \times u_T \times m_{l,kT} + u_k \times m_{l,kV} \times (1 + e^{-a_{l,k}}) \times u_G \times u_T \times m_{l,kG}} \quad (8)$$

The IDF calculation method of each characteristic item does not change, and the final TF-IDF formula is as follows:

$$tfidf_{o,k} = tf_{o,k} \times idf_o$$
$$= \frac{\alpha_k \times u_T \times m_{o,kT} + u_V \times m_{o,kV} + \beta_k \times (1 + e^{-a_{o,k}}) \times u_G \times m_{o,kG}}{\sum_l \alpha_k \times u_T \times m_{l,kT} + u_V \times m_{l,kV} + \beta_k \times (1 + e^{-a_{l,k}}) \times u_G \times m_{l,kG}} \times \log(\frac{H}{1+M_o}) \quad (9)$$

In the experiment, the results of the experiment are observed by adjusting the values of u_T, u_V and u_G, so as to find the value of the optimal weight parameter.

3. Experiment and Evaluation of Intelligent Platform Application of IPE Resources

3.1 Investigation Object

By investigating the actual situation of five middle schools in Z City, it was found that there was no significant difference between the current infrastructure and school hardware configuration of the middle schools in Z City. Multimedia classrooms and computers were the inevitable choice of implementing digital educational resources in curriculum teaching.

In this paper, 200 students and 50 teachers from 5 middle schools were investigated and analyzed by questionnaire. 200 and 50 questionnaires were collected, all of which were valid.

3.2 Application Status of Digital Education Resources

(1) Construction of digital education resources

Table 1 is a relevant survey on the question of "whether the school has a portal that can be accessed outside the school".

Table 1: Whether the school has a portal that can be accessed outside the school

	Number of people	Percentage
Have	194	97.00%
Don't have	2	1.00%
Unclear	4	2.00%

It could be seen from Table 1 that 194 students said that the school had a portal website that could be accessed outside the school, accounting for 97.00%; two students said that the school had no off-campus portal, accounting for 1.00%; there were 4 students who were not clear, accounting for 2.00%.

Figure 1 is a related survey on the establishment of subject teaching resource database and teachers' solutions to resource shortage.

In order to further improve the level of educational informatization and promote the development of subject teaching, the middle schools in Z City established their own "curriculum resource database" to include ideological and political curriculum resources. The goal of educational informatization was to improve the efficiency of teaching and serve teaching. Therefore, an important criterion to measure the degree of educational informatization was to have its own digital resources.

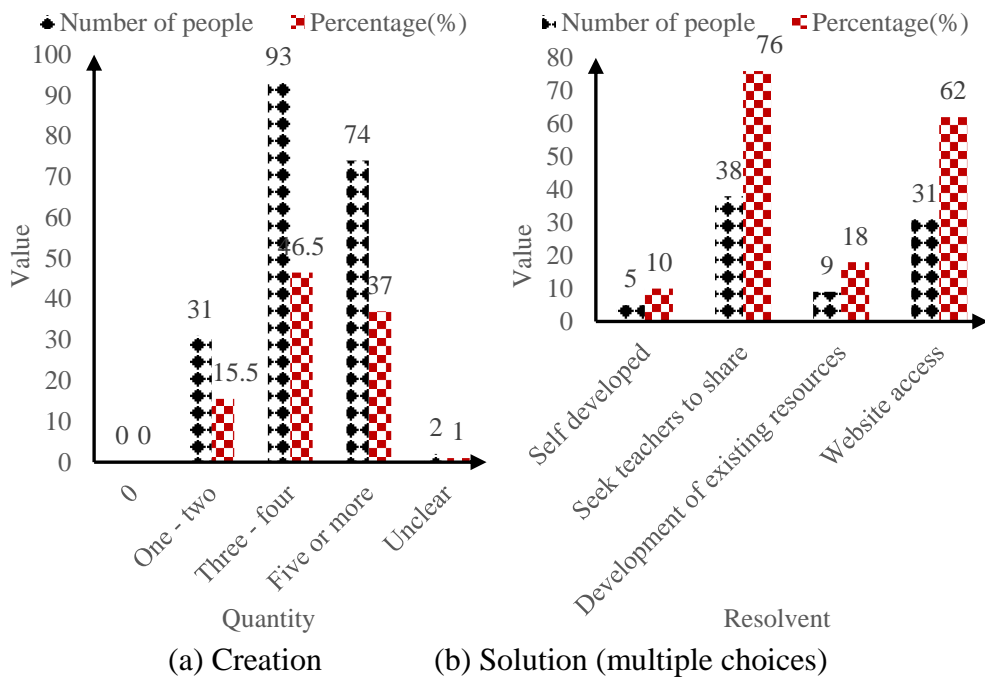(a) Creation   (b) Solution (multiple choices)

Figure 1: Creation of subject teaching resource database and teachers' solutions to resource shortage

(2) Application of digital educational resources in IPE teaching

Figure 2 is a survey of the ways teachers access digital education resources and the motivation of using digital education resources.

(a) Access to digital education resources (multiple choices)
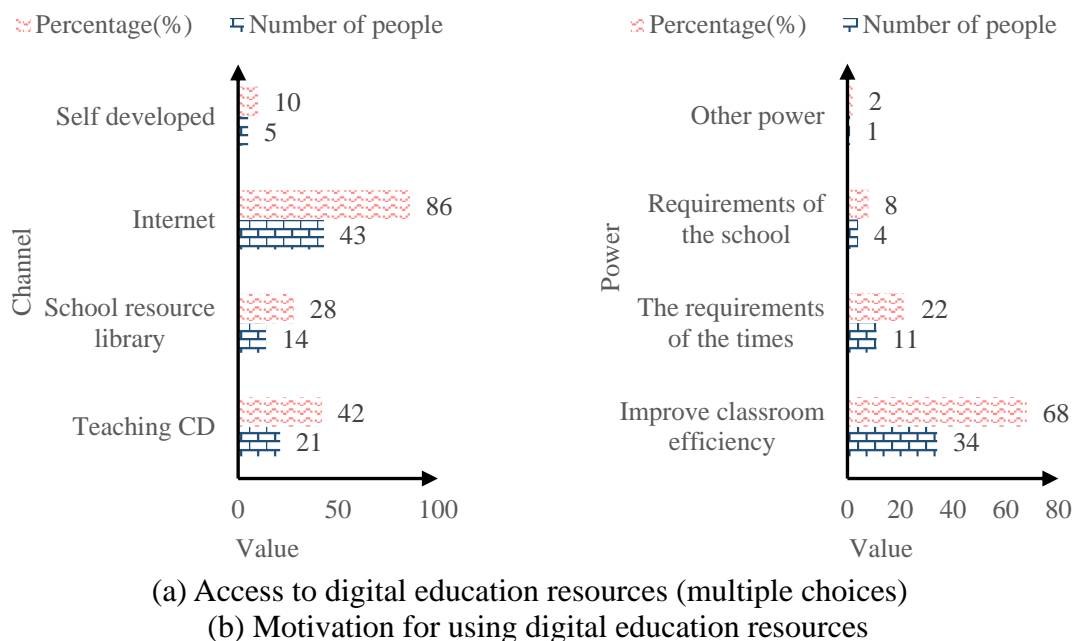(b) Motivation for using digital education resources

Figure 2: Teachers' access to digital education resources and motivation to use digital education resources

It could be seen from Figure 2 (a) that 21 teachers had access to digital education resources through teaching CDs, accounting for 42.00%; there were 14 teachers through the school resource pool, accounting for 28.00%; 43 teachers were obtained through the Internet, accounting for

86.00%; 5 teachers were self-developed, accounting for 10.00%. It could be seen from the data that ideological and political teachers were highly dependent on the Internet, which was the main source of teachers' access to digital resources. However, the importance of other resources such as CD and school material library was low, and few teachers developed and obtained digital teaching resources by themselves. It could be seen that the way for ideological and political teachers to obtain digital resources was relatively simple.

It could be seen from Figure 2 (b) that 34 teachers said that improving classroom efficiency was their motivation to use digital education resources, accounting for 68.00%; 11 teachers said that this was the requirement of the times, accounting for 22.00%; 4 teachers said they were required by the school, accounting for 8.00%; 1 teacher said that this was another driving force, accounting for 2.00%.

Table 2 is a related survey on the overall application of digital education resources of ideological and political teachers.

Table 2: Overall application capacity of digital education resources

	Number of people	Percentage
Very good	6	12.00%
Common	28	56.00%
Bad	15	30.00%
Very bad	1	2.00%

It could be seen from Table 2 that 6 ideological and political teachers felt that their overall application ability of digital education resources was very good, accounting for 12.00%; there were 28 teachers who felt their ability was common, accounting for 56.00%; 15 teachers felt that their abilities were bad, accounting for 30.00%; 1 teacher felt that his ability was very bad, accounting for 2.00%. In general, teachers' ability to use digital resources in subject teaching was not strong enough and needed to be further strengthened.

Figure 3 is a related survey on the effect evaluation and satisfaction degree of digital education resources on teaching effect.

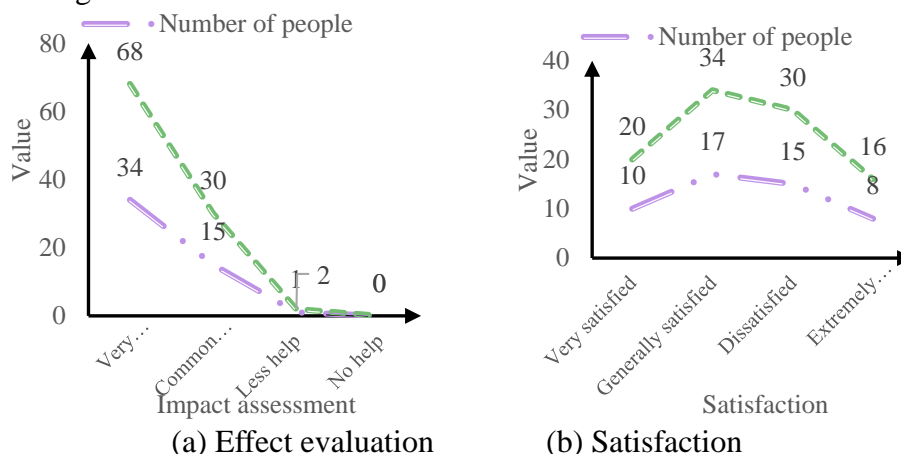(a) Effect evaluation (b) Satisfaction

Figure 3: Evaluation and satisfaction of digital education resources on teaching effect

It could be seen from Figure 3 (a) that 34 teachers felt that the application of digital education resources in the teaching of ideological and political disciplines was of great help to the improvement of teaching effect, accounting for 68.00%; 15 teachers felt that the level of help was common, accounting for 30.00%; 1 teacher felt less helpful, accounting for 2.00%; no teacher thought it would help. The results showed that most teachers achieved positive results in the use of digital resources, but only a few people were not satisfied with this.

It could be seen from Figure 3 (b) that 10 teachers were very satisfied with the application of digital education resources in the teaching of ideological and political disciplines, accounting for 20.00%; 17 teachers expressed general satisfaction, accounting for 34.00%; 15 teachers expressed dissatisfaction, accounting for 30.00%; 8 teachers expressed extreme dissatisfaction, accounting for 16.00%. It could be seen from the data that most teachers were not very satisfied with the existing application of digital education resources in IPE, indicating that digital education resources needed to be further improved.

3.3 Application Effect Evaluation of Intelligent Platform

The intelligent platform built in this paper was applied to IPE. A group experiment was conducted on 200 students, with 100 students in the experimental group and 100 students in the control group. The difference was that the experimental group used the intellectual platform of IPE resources for teaching. After the experiment, 200 students were given questionnaires. A total of 200 questionnaires were distributed and 200 valid questionnaires were retrieved.

The teaching was scored from five aspects: resource abundance, learning initiative, learning ability, learning efficiency and learning achievement. The scoring of the two groups before and after the experiment was shown in Figure 4:

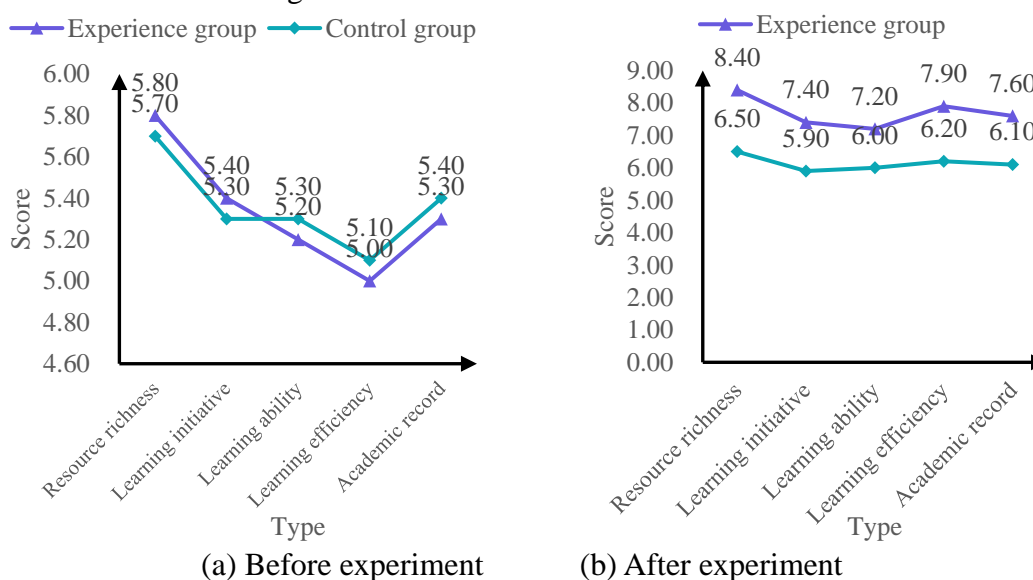(a) Before experiment   (b) After experiment

Figure 4: Comparison before and after the experiment

It could be seen from Figure 4 (a) that the average scores given by the experimental group for resource abundance, learning initiative, learning ability, learning efficiency and learning achievement were 5.80, 5.40, 5.20, 5.00 and 5.30 respectively. The average scores given by the control group were 5.70, 5.30, 5.30, 5.10 and 5.40 respectively. According to the data, before the experiment, the score difference between the two groups was not very large.

It could be seen from Figure 4 (b) that the average scores given by the experimental group for resource abundance, learning initiative, learning ability, learning efficiency and learning achievement were 8.40, 7.40, 7.20, 7.90 and 7.60 respectively. The average scores given by the control group were 6.50, 5.90, 6.00, 6.20 and 6.10 respectively. According to the data, the scores of the experimental group were significantly improved through the intervention of the intelligent platform of IPE resources.

In addition, some strategies for implementing digital teaching resources of IPE were also proposed:

(1) Further promoting and attaching importance to resources

Therefore, the leaders of universities must clearly realize that the building and application research of digital resources played an important role in the development of education informatization, and must take the lead in carrying out the building and application research of digital education resources. Only in this way could university administrators truly realized the role of digital resources in school education informatization. As the subject teachers of digital resources application, they could have more space and motivation to practice.

(2) Strengthening the building and sharing of teaching resources and providing high-quality education resources for teachers and students

High-quality digital IPE resources should have the following characteristics: The first was targeted teaching; the second was to meet the curriculum standards; the third was to share and carry out personalized design [11]. Schools should strengthen their own development and enrich their own resources. At the same time, they should actively absorb excellent resources from other countries, and constantly explore new ways, so as to strengthen the building and sharing of resources.

In addition to summary and research, the following points needed to be done in the use of resources:

First, some valuable and valuable courses were displayed to students outside the school, so that teachers could observe and discuss the advantages and disadvantages of these courses. Teachers could play their role in the classroom to achieve better teaching results.

Second, schools should regularly organize public class evaluation of various courses, and publicize and promote digital education resources in better classrooms. Through certain incentives, teachers were organized to observe and learn. Teachers thought in class and then discussed in the grade group and teaching research group. In this way, teachers would accumulate a lot of digital education resources in teaching, and realize the advantages of digital education resources in teaching, so as to combine the use of digital resources with daily education and teaching work.

(3) Strengthening teaching and scientific research and promoting the combination of teaching and scientific research

Education and teaching ability was the basic quality that teachers must have, which was also an important part of teachers' professional skills. The cultivation of education and teaching ability could be reflected in the research of teachers' projects. The selection of research projects, the implementation of plans, the research of documents, the operation of practical courses, the summary, the report, and the writing of cases were all the process of continuous improvement.

(4) Strengthening technical support and optimizing the environment for resource utilization

In the process of implementing digital educational resources, subject teachers often encountered problems that some equipment could not be used normally. If these problems could not be solved in time, teachers would lose their confidence in information technology, which would cause students to be discouraged and affect subject teaching. At present, in the era of vigorously advocating education informatization, schools should establish a professional information technology department, and pay attention to the building and treatment of teachers. They needed to make full use of the role of this department and improve the working ability of this department, so as to cultivate a group of teachers with high information technology, strong subject teaching informatization ability, and strong service awareness.

4. Conclusions

In China, as a pioneer in the development of education informatization, various resource libraries have sprung up and various resource theme websites have emerged. In this regard, the enthusiasm

of educators and schools in this regard has been increasing, which has significantly driven the thirst of front-line teachers for high-quality digital teaching resources with high availability. It is necessary to take various effective measures to promote teachers to make full use of digital resources for teaching. For example, rules and regulations can be formulated to take the degree of resource utilization as an indicator of evaluation and the use of digital resources as an indicator of evaluation, so that teachers can actively learn and use the resources of digital education. Under certain conditions, the application of digital education has become a habit.

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