Research Article

Design of Auxiliary Teaching System for Preschool Education Specialty Courses Based on Artificial Intelligence

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1. Introduction

Preschool education refers to providing scientific guidance and education for infants aged 0 to 6 in order to promote children’s physical, mental, and healthy development. In 1964, Benjamin Bloom, a famous American psychologist and child educator, published his follow-up research results on nearly 1000 children in the United States from infancy to adulthood, which showed that 0 to 4 years old is the fastest stage of intellectual development in life, and the brain development speed in this stage is the fastest stage in human life, and it is also a key stage for cultivating all aspects of ability [1]. With the introduction of China’s second child policy and the improvement of people’s cultural level, preschool education has gradually attracted the attention of China’s elders. At present, the main parents of the post-80s and 90s have higher and higher requirements on all aspects of child rearing. Parents hope not to miss the golden development stage before the age of 6 and hope to find good educational methods at this stage to guide them to raise children [2, 3]. In addition, with the improvement of the popularity of electronic products, children’s entertainment culture and learning life are becoming richer and richer. In order to prevent children from indulging in electronic products, parents have higher and higher requirements for the choice of children’s entertainment methods. More parents begin to pay attention to the learning of preschool education courses for children aged 0 to 6. Therefore, the demand for preschool education will gradually increase and has a very broad prospect.

The progress of network technology has promoted the development of all walks of life. The combination of artificial intelligence technology and network technology can provide teaching resources for teachers, students, and all kinds of people so that students can break through the restrictions of geographical location and teaching time and have a freer learning environment [4]. Qin Xiaoyan proposed a P2P network-based preschool education curriculum assisted...
teaching system [5], which uses P2P network to connect preschool education curriculum resources and school information resource database, build resource relationship networks between different schools and different teachers, and design teaching guidance function modules. This system can improve the utilization of teaching resources. However, the response efficiency is low when retrieving the curriculum information of preschool education specialty. Shen zilei designed a web-based auxiliary teaching system for preschool education courses [6], constructed the auxiliary teaching framework of preschool education courses by using web technology, realized the classification of preschool education course resources through extensible markup language, and realized the modular management of preschool education courses. This system can improve the retrieval effect of teaching resources. However, the retrieval time of curriculum resources of preschool education specialty is long.

Therefore, this paper designs an auxiliary teaching system for preschool education specialty courses based on artificial intelligence which improves the resource retrieval efficiency of preschool education professional course teaching system and improves the resource retrieval accuracy of preschool education professional course teaching system through artificial intelligence technology.

2. Analysis of Artificial Intelligence Technology

In order to improve the teaching quality of preschool education courses, artificial intelligence technology is used to improve the shortcomings of existing preschool education courses. It is analyzed through the questionnaire to analyze the application status, advantages, and disadvantages of artificial intelligence technology.

2000 preschool education teachers and 3000 students in M city were selected for a questionnaire survey to analyze the application status of artificial intelligence technology, the advantages and disadvantages of auxiliary teaching, the obstacles and training intention of auxiliary teaching, and the impact on the personal development of teachers and students.

2.1. Application Status of Artificial Intelligence Technology

Aim is to investigate the frequency, timing, and purpose of using artificial intelligence technology to assist teaching in preschool education and comprehensively analyze the survey results to obtain Table 1.

It can be seen from Table 1 that 58.82% of teachers often use artificial intelligence technology in the teaching process, 23.53% of teachers only use artificial intelligence technology in some specific classes, 22.76% of teachers occasionally use artificial intelligence technology in teaching, and 5.88% of teachers do not use artificial intelligence technology. As for the timing of use, 76.47% of teachers use artificial intelligence technology in teaching new classes, and 58.82% of teachers use artificial intelligence technology in open classes or competition classes. 64.71% of teachers used artificial intelligence technology to conduct simulation experiments, 41.18% of teachers used artificial intelligence technology to show exercises, and 23.53% of teachers used artificial intelligence technology to record micro classes.

Through the longitudinal analysis of each questionnaire, it is known that young teachers like to use artificial intelligence technology, which is related to their mastery of artificial intelligence technology. Young and middle-aged teachers have a better mastery of artificial intelligence technology, so it is easier for them to retrieve the relevant information required for auxiliary teaching. In daily teaching, artificial intelligence technology is used more frequently. Table 1 also reflects the unbalanced application of artificial intelligence technology in the teaching of various stages of preschool education. In the application, 88.24% of teachers use artificial intelligence technology to play animation and video, and only 23.53% of teachers use artificial intelligence technology to record micro classes. This phenomenon reflects that at present, teachers have not achieved the deep integration of artificial intelligence technology and preschool education classroom. In the final analysis, teachers’ mastery of artificial intelligence technology is not comprehensive enough.

Based on the comprehensive analysis of the above problems, it can be seen that the teachers of the school have not fully applied the artificial intelligence technology. On the one hand, the teachers still lack the mastery of the artificial intelligence technology and do not make deep use of the artificial intelligence technology. On the other hand, the integration of the artificial intelligence technology of the teachers of the school with the preschool education classroom is not very high, artificial intelligence technology is only used in some specific classes, and the whole process of information-based preschool education classroom has not been formed.

2.2. Advantages and Disadvantages of Artificial Intelligence Technology Assisted Teaching

According to the survey results of teachers’ views on the advantages and disadvantages of using artificial intelligence technology to assist preschool education and teaching, Table 2 is obtained.

Statistical analysis of teachers’ problems encountered in using artificial intelligence technology to assist preschool education and teaching and their training intention are shown in Table 3.

The impact of the application of statistical artificial intelligence technology to teaching on the personal development of teachers and students is shown in Table 4.

According to the comprehensive analysis, Tables 2–4, it can be seen that most teachers believe that the advantages of applying artificial intelligence technology in preschool education outweigh the disadvantages. It can not only contribute to the realization of teaching objectives but also be of great benefit to the personal development of teachers and students. In the current teaching, there are still some shortcomings in the application of artificial intelligence technology in teaching, which is mainly manifested in that the application of artificial intelligence technology is easy to distract students’ attention and make teaching too formal.
64.71% of teachers believe that the use of artificial intelligence technology will reduce their workload, and 11.76% of teachers believe that the use of artificial intelligence technology will increase their workload. According to the author’s longitudinal comparative analysis of the questionnaire, most young teachers believe that the application of artificial intelligence technology will reduce their workload and older teachers believe that the application of artificial intelligence technology will increase their workload. After comprehensive analysis, it is found that the following two factors mainly lead to this result: firstly, young teachers have a higher mastery of artificial intelligence technology, and they are easier to obtain the relevant resources needed for teaching. Secondly, young teachers prefer to try new teaching models, while most of the older teachers’ teaching models have been fixed, and their mastery of artificial intelligence technology is not good. Therefore, for them, the integration of artificial intelligence technology and preschool education curriculum has increased their workload to a certain extent.

The survey results also show that 94.12% of teachers are willing to use artificial intelligence technology to integrate with preschool education courses, but some teachers still have obstacles in using artificial intelligence technology to assist teaching. The main obstacle for 82.35% of teachers to use artificial intelligence technology to assist teaching is that they know too little about artificial intelligence technology. The main obstacle for 41.18% of teachers to use artificial intelligence technology to assist teaching is that they know too little about artificial intelligence technology.

| Table 1: Application status of artificial intelligence technology. |
|------------------------|------------------------|------------------------|------------------------|
| Use frequency | Use time | Purpose |
| Frequently use | 58.82% | Interpretation of the new lesson | 76.47% | Play video | 88.24% |
| For specific classes | 23.53% | Open class | 58.82% | Simulation experiment | 64.71% |
| Occasionally use | 22.76% | Experimental lesson | 47.06% | Display problem | 41.18% |
| Not applicable | 5.88% | Exercise class | 23.53% | Recording micro class | 23.35% |
| Review lessons | 11.76% | Else | 5.88% |

<p>| Table 2: Advantages and disadvantages of artificial intelligence technology assisted teaching. |</p>
<table>
<thead>
<tr>
<th>Advantages and share</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages &gt; disadvantages</td>
<td>76.47%</td>
<td>Stimulate students’ interest</td>
</tr>
<tr>
<td>Advantages = disadvantages</td>
<td>17.65%</td>
<td>Enrich classroom teaching content</td>
</tr>
<tr>
<td>Advantages &lt; disadvantages</td>
<td>5.88%</td>
<td>Improve teaching efficiency</td>
</tr>
<tr>
<td>Improve students’ information literacy</td>
<td>29.41%</td>
<td>Low teaching efficiency</td>
</tr>
<tr>
<td>Meet the individual needs of students</td>
<td>23.53%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Are you willing to integrate artificial intelligence technology into preschool education</th>
<th>The main obstacle of artificial intelligence technology assisted teaching</th>
<th>Training intention for the integration of artificial intelligence technology and teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>94.12%</td>
<td>Too little knowledge of artificial intelligence technology</td>
</tr>
<tr>
<td>No</td>
<td>5.88%</td>
<td>There are limited resources to collect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The teaching model has been formed and is not easy to change</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software or platform introduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The study of courseware making</td>
</tr>
</tbody>
</table>

<p>| Table 3: Obstacles and training intention of using artificial intelligence technology to assist teaching. |</p>
<table>
<thead>
<tr>
<th>The impact on teachers</th>
<th>The impact on students</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is beneficial for teachers to understand the educational teaching concept of cash</td>
<td>It is beneficial to cultivate students’ information literacy</td>
</tr>
<tr>
<td>71.43%</td>
<td>85.71%</td>
</tr>
<tr>
<td>It can promote the development of teachers’ professional knowledge and skills</td>
<td>It is beneficial to cultivate students’ preschool education subject quality</td>
</tr>
<tr>
<td>57.14%</td>
<td>28.57%</td>
</tr>
<tr>
<td>It provides more opportunities for teachers to challenge themselves and improve themselves</td>
<td>It is beneficial to broaden students’ horizons and help them develop in an all-round way</td>
</tr>
<tr>
<td>28.57%</td>
<td>42.86%</td>
</tr>
</tbody>
</table>
intelligence technology to assist teaching is the limited teaching resources they can search. Facing the difficulties encountered in the integration of artificial intelligence technology and preschool education curriculum, 82.35% of teachers want to train in the teaching mode and method of the integration of artificial intelligence technology and middle school preschool education curriculum, 70.59% of teachers want to train in the integration skills of artificial intelligence technology and traditional preschool education, and 41.18% of teachers want to study excellent cases. It is necessary for us to study the construction of preschool education and teaching mode supported by artificial intelligence technology. In addition, we should also establish a standardized preschool education artificial intelligence technology teaching database and carry out various relevant training for teachers, so as to facilitate teachers’ retrieval and application of relevant information, so as to ensure that teachers have sufficient application ability of artificial intelligence technology and help teachers complete the effective integration of artificial intelligence technology and preschool education and teaching.

3. System Hardware Design

3.1. Front-End and Visualization-Related Technologies. The release of JavaScript (a programming language) marks an important step in the development of the web development industry, especially in recent years. Vue.js is one of the most popular JavaScript projects in recent years. The emergence of Vue can have a positive impact on the development process. Vue is different from other well-known front-end frameworks in that Vue is an open-source progressive JavaScript framework for building user interfaces for gradual adoption. Because of its flexibility, it is adopted by most communities. Its vision first focuses on the ideal of progressive adoptability, that is, Vue.js can be used as a library, as a decorator of the user interface, or as a complete framework for a highly controversial architecture. However, Vue is more invasive to the project, and users should develop according to a specific specification specified in the framework.

Someone has compared the performance of the popular JavaScript frameworks angular and Vue.js in the development environment. The comparison criteria are as follows: the time to exchange data with the server and present various application components, refresh the current game information, and restore the user to the memory consumption during the current game, the browser load level, and the size of the final application file. The test results show that Vue.js framework is more efficient. Vue.js is also a new framework of MVVM module. The MVVM mode diagram is shown in Figure 1.

Realize the MVVM mode preschool education professional course sharing through Vue.js, as shown in Figure 2.

3.2. MySQL Data Design. MySQL is the most widely used open-source database in the world. Because of its excellent performance, stable service, low cost, very active community, and easy maintenance, it is widely used in various web applications on the Internet. MySQL supports the development of multiple programming languages and can run on multiple platforms [7]. MySQL uses an optimized query algorithm. Compared with other databases, the query time is shorter and the query speed is faster [8–11]. MySQL supports multiuser and multithreaded operations, which can make greater use of resources.

MySQL also has a three-tier logical architecture: the first layer is the response layer, which is used for connection processing, authorization, security, and other functions. It is responsible for processing the user’s request and transmitting the request to the core word [12]. The second layer is the core layer, which is used for storage, view, parsing, optimization, and other functions. The third layer is the storage engine, which is used to obtain and store the received data. Because of the flexibility and scalability of MySQL, MySQL is used to store data in this project [13].

The logical architecture of MySQL is shown in Figure 3.

To this end, this paper introduces the preschool education course learning module of the preschool education course auxiliary system based on artificial intelligence, as shown in Figure 4.

3.3. Software Function Design of Preschool Education Curriculum System. The whole system design scheme is completely based on artificial intelligence. The system background uses MySQL as the database server, Internet information server 5.1 as the information server, and C# as the design language. The system adopts browser mode and is not restricted by hardware conditions. It can realize cross platform application and provide various support services for students’ learning on the network, which plays a key role in improving students’ learning effect [14–17]. The software function design is shown in Figure 5.

The specific flow of the software design of the curriculum evaluation module of preschool education is shown in Figure 6.

Assuming that the data collected from the student learning module and the teacher teaching module is \( m \), the data storage speed is \( v \), and the student learning speed is \( v_1, v_2, ..., v_n \), the data attributes of preschool education courses are as follows:

\[
\frac{m}{v} = \{v_1, v_2, ..., v_n\}, \{v_2, v_3, ..., v_n\}, \{v_3, ..., v_n\}, \{v_n\}. \quad (1)
\]

According to the learning progress of different students, online evaluation can only be carried out after being recorded by the system. The system memo stores the above
attribute data, mines it, normalizes the mined data, and then obtains the initial value of online evaluation through analysis, so as to complete data online evaluation [18–20].

In the network environment, personalized teaching is fully realized to facilitate students' autonomous learning. It has a certain pertinence to guide students, can
reasonably adjust learning content, and has the function of reasoning and diagnosis [21]. Through artificial intelligence, distance education can provide personalized interface, combine with network technology, greatly stimulate students’ sensory thinking, and improve students’ enthusiasm. The modular structure is used to make the shared databases in the system independent of each other, so as to improve the maintainability of the system [22–25].

4. Experiment

4.1. Experimental Parameters. In order to verify the performance of the preschool education course assisted instruction system based on artificial intelligence, the reference [5] system, the reference [6] system, and the design system are used to carry out the preschool education course resource retrieval performance experiment. The experimental parameter settings are shown in Table 5.

Set the experimental environment according to the above contents, as shown in Figure 7.

If criminals want to invade the system, they need to obtain access rights before entering the system. However, restricted by the firewall, criminals cannot access the host server at will.

4.2. Result Analysis

4.2.1. Retrieval Efficiency of Auxiliary Teaching Resources for Preschool Education Courses. In the experiment, the response time of the analysis and design system, the reference [5] system, and the reference [6] system to the retrieval of auxiliary teaching resources of preschool education courses is tested to verify the effectiveness of the design system. The experimental results are shown in Figure 8.

By analyzing the experimental results in Figure 8, it can be seen that there are some differences in the retrieval response time of auxiliary teaching resources of education professional courses before using the design system, reference [5] system, and reference [6] system. When the retrieval
volume of preschool education curriculum resources is 100 GB, the resource retrieval response time of reference [5] system is 72 s, the resource retrieval response time of reference [6] system is 61 s, and the resource retrieval response time of the design system is 6 s. When the retrieval volume of preschool education curriculum resources is 300 GB, the resource retrieval response time of reference [5] system is 76 s, the resource retrieval response time of reference [6] system is 60 s, and the resource retrieval response time of the design system is 7 s. When the retrieval volume of preschool education curriculum resources is 700 GB, the resource retrieval response time of reference [5] system is 75 s, the resource retrieval response time of reference [6] system is 68 s, and the resource retrieval response time of the design system is 9 s. The resource retrieval response time of the designed preschool education curriculum auxiliary teaching system is less than that of the other two systems, which shows that the retrieval efficiency of the designed system is higher.

4.2.2. Data Retrieval Accuracy of Curriculum Assistant Teaching System for Preschool Education. Based on the above determination of the response effect of preschool education curriculum resource retrieval of the design system, reference [5] system, and reference [6] system, it is analyzed that the preschool education curriculum resource retrieval efficiency is higher under the three systems. Therefore, the experiment analyzes the data retrieval accuracy of the proposed method, reference [5] system, and reference [6] system for preschool education courses, and the results are shown in Figure 9.

By analyzing the experimental results in Figure 9, it can be seen that the data retrieval accuracy of the preschool education curriculum auxiliary teaching system using the design system, reference [5] system, and reference [6] system is different. When the amount of preschool education curriculum resource data is 100 GB, the preschool education curriculum data retrieval accuracy of reference [5] system is 67%, the preschool education curriculum data retrieval accuracy of reference [6] system is 50%, and the preschool education curriculum data retrieval accuracy of the design system is 88%. The retrieval accuracy of preschool education course data is 88%. When the amount of preschool education curriculum resource data is 300 GB, the preschool education curriculum data retrieval accuracy of reference [5]...
system is 78%, the preschool education curriculum data retrieval accuracy of reference [6] system is 55%, and the preschool education curriculum data retrieval accuracy of the design system is 94%. When the amount of preschool education curriculum resource data is 600 GB, the preschool education curriculum data retrieval accuracy of reference [5] system is 83%, the preschool education curriculum data retrieval accuracy of reference [6] system is 54%, and the preschool education curriculum data retrieval accuracy of the design system is 95%. According to the comprehensive analysis of Figure 9, the highest retrieval accuracy of preschool education curriculum data of the design system is about 95%, while the retrieval accuracy of preschool education curriculum data of the other two systems varies greatly and is significantly lower than the proposed method.

5. Conclusion

This paper designs a preschool education course assistant teaching system based on artificial intelligence. Using artificial intelligence technology to improve the shortcomings of existing preschool education courses, realizing MVVM mode sharing of preschool education courses through Vue.js technology in artificial intelligence method, using MySQL data to complete data storage, and designing preschool education course learning module with C# as programming language, complete the design of preschool education course auxiliary teaching system based on artificial intelligence. The following conclusions are drawn through experiments:

(1) When the amount of curriculum resource retrieval of preschool education specialty is 700 GB, the response time of resource retrieval of the design system is 9 s. This shows that the retrieval efficiency of the designed system is higher.

(2) When the amount of preschool education curriculum resource data is 600 GB, the retrieval accuracy of preschool education curriculum data of the design system is 95%.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author declares no conflicts of interest.

References


