Research Article

Construction of a Random Matrix Model of Curriculum System Based on Digital Technology in the Context of Smart Education

Jing Chen

Academic Affairs and Scientific Research Office, Zhengzhou Sias University, Xinzheng, Henan 451150, China

Correspondence should be addressed to Jing Chen; 10511@sias.edu.cn

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This paper adopts the method of digital technology fused with a random matrix to conduct in-depth research and analysis on the curriculum system under the context of smart education and designs a corresponding model for practical use. Firstly, we analyze the status of digital learning research, take the digital teaching model based on independent inquiry as the basis of teaching design, and carry out digital-based teaching experiments under the premise of fully examining the actual teaching conditions. The digital learning platform is designed to meet the teaching model, platform design, platform application, and implementation of the school, and the digital learning platform is designed and developed through PHP technology. Then, the matrix filling algorithm is used to fill in some of the missing data in the observation matrix to obtain the complete data matrix, and the Hankel matrix inverse transformation is used to finally obtain the reconstructed original signal, thereby forming the ability of innovative works. It is an important aspect of cultivating students’ innovative spirit and practical ability in the development of educational informatization. Ultimately, students use the platform to try out and be able to learn the knowledge. The experimental class and the control class experimented with a quasi-experimental research method, the experimental class used a digital teaching mode, and the control class used a traditional IT teaching mode. The digital learning ability of students was measured by a digital learning ability measurement scale before and after the experiment, and then the data before and after the experiment were analyzed by horizontal and vertical comparison to verify whether the digital teaching model can effectively cultivate junior high school students compared with the traditional teaching model. The digital learning ability of junior high school students was verified.

1. Introduction

For educators, the innovation potential is the most fundamental direction for students in their educational activities. Without innovation, there is no individuality, and education is the best way to develop human resources [1]. It is because of this difference that we can see that a school-based curriculum has emerged. In the context of education informatization, IT teaching changes from training students from users of digital tools to creators, developers, designers, etc.

For this reason, IT teaching will shift from teaching operations and skills to teaching students to learn to use tools wisely for creative digital expression, to develop not only students’ digital literacy but also the research results to provide a reference for other scholars in developing digital literacy methods [2]. Given the current characteristics of education data with multiple sources and high heterogeneity, we study the technique of quantifying teaching results for groups and individuals, focusing on teaching subjects and educational resources, cleaning, classifying, and labeling multiple data sources of teaching subjects and educational resources, and effectively fusing them to provide support for personalized assisted teaching platforms [3]. We also make full use of the existing data, call MySQL data through ECharts to visualize various kinds of data, and provide feedback to the front-end page, so that teachers can prepare lessons and give tutorials to students in a more targeted manner and achieve personalized teaching [4].

Firstly, we study and design the overall architecture of the hybrid teaching platform, establish the system-related standards, protocols, and interface specifications, lay the foundation for the establishment of the overall system, build
a high-quality education resource library, and construct a smart learning environment; according to the product architecture and technical requirements, rely on artificial intelligence and big data means, rely on the information platform, overcome some key technologies, carry out platform integration, and finally build a platform that supports matrix automatically. The platform supports automatic reasoning to solve problems, generate data-driven matrix of logical animation, simplify the drawing process, reduce the time cost of students’ learning, build intelligent teaching applications, and make use of the real-time dynamic characteristics of computer graphics to facilitate students’ observation and understanding and reduce the complexity of the teaching process.

2. Related Works

In recent years, big data, the Internet of Things, cloud computing, and other technologies are relatively mature, and there are many applications and aids for intelligent education, but there are still several shortcomings that are relatively obvious [5]. In the face of massive data, it is impossible to effectively fuse multiple different structures of data in various aspects of education; when constructing learner portraits for initial data, it is difficult to break through image semantic analysis, machine vision, etc., to complete the extraction of personalized learning features; it is difficult to diagnose teaching caused by high-dimensional data disasters [6]. Therefore, an intelligent education platform based on these artificial intelligence technologies is of great research value by using multi-source heterogeneous data fusion technology, conversion and merging technology of structured, semi-structured, and unstructured data, automatic generation technology of natural semantic logic, and intelligent recommendation algorithms based on knowledge graphs [7]. For data with inconsistent data descriptions, it needs to be judged and converted through manual inspection or through some custom rules. Based on the dynamic collection and quality assessment data of key indicators in the whole process of teaching consultation and reform, we complete the technical research on big data processing and feature extraction, modeling of matching models for education supply and demand services, efficient parallel training and normalization of big data in deep neural network models, database-oriented priority clustering algorithms, etc., to build intelligent teaching, intelligent management, and intelligent resource construction whole process teaching applications and establish [8]. They also proposed to establish “whole staff, the whole process, and all-round” intelligent teaching diagnosis and decision-making, to realize the innovative functions of education intelligent perception, intelligent analysis, intelligent diagnosis, intelligent warning, intelligent prediction, autonomous decision-making, and intelligent management of safety, to realize the intelligence and automation of daily teaching and stage decision-making activities, and to form large-scale production.

Chaudhari et al. proposed the compressive sensing (CS) theory, which is a new sampling recovery theory that combines the sampling and compression processes in traditional signal processing, and when the signal satisfies sparsity, the signal can be sampled at a much slower speed than the Nyquist sampling rate, mapping the signal from a high-dimensional space to a low-dimensional space, and can reconstruct the original with high probability from a small number of observations [9]. Wilson et al. proposed a CS-based random equivalent sampling method, which constructs a random equivalent sampling observation matrix and reconstructs the original signal from the finite sampled data by the greedy algorithm in the reconstruction algorithm [10]. The method can effectively improve the sampling reconstruction efficiency [11].

In the field of education big data integration and sharing technology, focus on the research of teaching topics and educational resources, and provide available and reliable data sources for the realization of digital education personalized services. The research is aimed at the identification technology of learning subjects based on computational vision, biometric recognition, and data fingerprinting to realize the association of multiple data sources of learning subjects in various educational contexts. Given the current characteristics of multiple sources and highly heterogeneous education data, research the quantification technology of teaching results for groups and individuals with teaching subjects and education resources as the center clean, classify, and mark multiple data sources of teaching subjects and education resources, effectively fuse them to provide support for personalized teaching platform, and provide the basis for intelligent teaching management normalization.

3. Digital Technology Integration Random Matrix Model Design

Among multiple dimensions, the use of playing information competence is at a relatively high level, which does not have measurement significance in junior high school teaching. As can be seen in the teaching process, IT classes are conducted in a collaborative group mode, which all play a role in the development of students’ collaborative skills, so the measurement dimension of information collaboration ability does not possess significant differences among students [12]. So, axioms are used as the basic request library framework, because axioms can provide adapters, interceptors, and other capabilities compared to Ajax, and it can switch between different platforms with the same API, such as node and browser support, respectively. Through an in-depth analysis of the eight dimensions of the original scale, we can see that information collaboration competency refers to the ability to communicate and express using information tools, which overlaps with the ability to use information tools. Each service can have its application configuration placed in the application class path. As the number of services grows, maintaining these configuration properties becomes very difficult.

The microservice architecture uses the shared space to process the configuration properties, and other services can use the configuration server to obtain the required configuration properties. Each service has a simple function, which can complete a single responsibility function and be
deployed separately without centralized management. Service interruption will not affect the work of other services, reduce the coupling between modules, and improve the system performance.

Often a system will face the input of data from multiple sources, but in most cases, the understanding and utilization of multi-source data are on the surface, and the depth of its utilization is insufficient [13]. This is mainly manifested in the tools for multi-source data processing which are not efficient enough, the data analysis is not intelligent enough, and the mining of invisible laws in a large amount of data is not deep enough. Through data collection, data description, data organization, data exchange, and data service, data fusion makes multi-dimensional and multi-source data fused, so that they have the same format and meaning, solving the problem of difficult unification and format specification, forming a unified data with multi-dimensionality, and providing a solid data foundation for subsequent data analysis. Figure 1 shows the data fusion model.

However, probably one of the most important research reasons for studying the matrix mechanics theory of random functions is that its scientific predictions may indeed not occur as directly in the whole human-natural system as in the study of nuclear energy, the zero primary directional tensors of random functions, and the zero infrasound of quartzite in crystal engineering, for example; the other research roles of the matrix mechanics theory of random functions are still mainly in quantum mechanics. The inseparable random functions have thus made a considerable research contribution.

\[
\det(AB) = \det(A^2)\det(B^2). \tag{1}
\]

To measure the digital learning ability of vocational school students, the research team designed a questionnaire about the digital learning ability questionnaire. The higher the test score, the higher the digital learning ability of the students [14]. Therefore, the scale was used as a reference scale in this study.

Database is the most important module of digital learning platform. Especially in the design of the data table, the data relationship is the core. For example, the realization of the administrator function, the teacher function, and the student function are all obtained from the database. The association data between the complete data tables is very large. In particular, when designing a database, we often use E-R charts to design data tables. We draw E-R charts according to categories and finally design the database, so that we can quickly query data relationships.

\[
\begin{align*}
A &= \{a_{i,j}\}C^{m\times n}\{b_{i,j}\}B^{n\times n}, \\
X &= W^HTW^TW. \quad (2)
\end{align*}
\]

Using the theorem of the central variable limit, this theorem has been established in many modern mathematical probability theories. In some special cases, many independent quantities and the means of random variables converge to the distribution of positive attitudes after appropriate normalization. This fundamental theorem has been widely recognized in much modern theoretical mathematics as an important key fundamental probability in the process of modern probabilistic mathematical research.

\[
s_n = \frac{1}{n} \sum_{i=1}^{n} x_i x_i^H. \tag{3}
\]

For the existing ADC sampling frequency in real-time sampling that cannot reach the high-speed signal Nyquist sampling rate, as well as the back-end storage and processing system pressure, the equivalent sampling method was born. This method samples the periodic signal several times at a rate much lower than the high-speed signal Nyquist sampling rate, to obtain the sampling data of different periods of the signal and reconstruct the signal waveform by the obtained sampling points, which can finally achieve the Nyquist sampling rate required for acquiring high-speed signals [15]. That is, the ability of students in these five aspects has been significantly improved after the experiment. However, the improvement of information innovation ability is not obvious. At the same time, the equivalent sampling method samples the signal multiple times in different cycles and stores the sampled data points sequentially in the back-end storage and processing system, which effectively relieves the pressure on the back-end storage system. However, in practical applications, it is usually necessary to increase the sampling time to obtain a large amount of sampled data in different periods of the signal, which leads to the poor real-time performance of the method and thus limits its application in engineering, as shown in Figure 2.

Digitization is a comprehensive technology that digitizes information such as language, text, sound, and images, and uses two digital codes, 0 and 1, to express and transmit information. Digital expression aims to cultivate students’ ability to form innovative works based on the learning environment of digital tools, through the proficient use of digital tools, choosing the appropriate tools for creative problem solving, and expressing their ideas skillfully [16]. The correlation is not strong, indicating that the improvement of information immunity and information innovation of students through the experiment is not obvious, and the improvement effect of information innovation ability is inferior to information immunity ability. It is an important aspect of the development of education information technology to cultivate students’ innovative spirit and practical skills.

The user sets off the front-end controller through the front-end page of the browser, the control layer calls the business logic layer for business processing, and then the business logic layer calls the Dao layer to access the database. The Dao initiates a data request to the database, the database returns the operation result to the Dao layer, and the Dao returns the result returned by the database to the business logic layer [17]. The business logic layer returns the processing result to the control layer, the control layer returns the received specific page and data to the view layer, and the user gets feedback to decide the next operation.
4. Course System Model Construction

The data sources involved in this system are topic data and user data. At present, there are mostly redundant and invalid data in the various matrix question databases, so we need to carry out data cleaning work on the original "dirty topic" data, and some of our common cleaning methods usually include the use of clustering algorithms to filter and clean the nonclustered data, duplicate value filtering and cleaning, abnormal data detection and processing, and missing values. After specific cleaning procedures, the quality of the data usually becomes high quality, which can ensure that the later processing and visualization of data classification and labeling can be a more reasonable, more intuitive, and accurate display of data visualization, to a certain degree of reliability [18]. When the original "dirty" data are cleaned, the cleaned data need to be partially reconstructed. Data reconstruction is the same as data cleaning, which are
important processing steps of data preprocessing, while data cleaning focuses on filtering duplicate data, correcting wrong data, and completing missing data.

Data reconstruction, on the other hand, is to reconstruct data for a series of problems such as inconsistent data descriptions, inconsistent data formats, and inconsistent data units, to ensure the consistency of data formats, descriptions, and meanings. For inconsistent data formats, especially for data types such as text and numbers, it is necessary to use regular matching to keep the data in the same format by using different processing methods for different formats of data.

For data with inconsistent data units, regular matching is also used for data with different data units to get the data in the same data unit by using data unit conversion. For the data with inconsistent data descriptions, it is necessary to perform the transformation process by manual inspection or through some custom rules. After data cleansing, the data are restored to the database by generating new key-value pairs after unifying the data format, data description, and data units, and completing the data reconstruction. After data reconstruction, the data can ensure the consistency of data format, description, and meaning, and after data reconstruction, the data can be processed to the last step of data processing and data fusion, as shown in Figure 3.

Data fusion is for different sources of question data, role data format is not uniform, and data meaning is not uniform, according to the role of the wrong questions, wrong knowledge points, and other dimensions to multiple sources of data for principal component analysis to reduce the dimensionality, and then to do data fusion based on its characteristics to complete the work of data fusion. The school has launched an information technology interest group, each class has many students signing up, and the attendance rate is very high. Explain that students are very interested in information technology, but lack of practice time. The fused data have multiple main dimensions, which can be called by each main dimensional feature data, providing a solid data foundation for subsequent data visualization.

In the initial design, we originally wanted to integrate the current advanced 2D/3D mapping open-source JS library and send requests to the server in real time using Ajax transmission technology, and the server would get the data from the database and then pass it to charts for drawing by Ajax and encapsulate different API commands in a unified way to realize the dynamic animation display of the solution logic [19]. However, in the later stage of the actual project, we found that the matrix is different from other kinds of mathematical problems, and it is more intuitive and easier to understand to show the solution steps of the matrix directly, so we adopted the way of generating all the operation steps to show the operation process of the matrix directly, which is intuitive and simple. However, the syntax of native LaTeX is complex, so in practice, we used the built-in JS command, which is more concise in terms of semantics and simple character length, which not only reduces the amount of code, but also reduces the amount of data transferred during the interaction between the front and back ends of Axios, optimizes performance, and achieves the original goal of displaying the matrix steps in branches. Therefore, database design is related to the quality of the functional relationship of the digital learning platform. This not only reduces the amount of code and data transferred during the front- and back-end interactions with Axios but also optimizes performance and achieves the original purpose of showing the steps of the matrix operation in separate lines.

After the operation is completed, the system outputs the correct result of the question and the matrix inference steps. At present, the output of the system can support txt plain text format output, matrix-matrix output, det row-column output, row vector output, and column vector output, five kinds of output, and the default output of the system is matrix-matrix, as shown in Table 1.

The system is developed using a front-end and back-end separation, so it involves front-end and back-end data interaction scenarios, so Axios is used as the basic request library framework because Axios can provide adapters, interceptors, and other capabilities compared to Ajax, it can switch between different platforms with the same API, such as node and browser support, respectively, and in addition, we can use Axios’ configuration adapter feature to achieve local mock data functionality when doing local development, which is more convenient and better for development and debugging. The new curriculum standard for information technology also clearly puts forward the goal of cultivating students’ core literacy and improving students’ practical spirit and innovation ability.

In addition to the node and browser support, we can use the Axios configuration adapter feature to implement local mock data functionality for better development and debugging when doing local development. The teaching contents of the control class and the experimental class are the same [20]. When evaluating the learning outcomes of students in both classes, we mainly evaluate them based on the completion of assignments for each topic and their performance before and during, and after class. The experimental classes were carried out by analyzing the teaching contents, collecting or making teaching resources suitable for each topic, designing teaching activities based on digital learning, and then carrying out teaching experiments, as shown in Figure 4.

The comprehensive total score of the digital learning ability of the two classes is 0.476, which is far greater than 0.05, which indicates that the digital learning ability of the two classes is not significantly different. We can think that the average value of the digital learning ability of the students in the two classes is almost the same [21]. The analysis of the digital learning ability pretest results concluded that the students’ digital learning ability was low and uneven. This also illustrates the need to develop students’ digital learning skills in a junior high school IT and to lay the foundation for this subject matter literacy at the junior high school level.

5. Analysis of Results

5.1. Analysis of the Performance of the Digital Random Matrix of the Curriculum. The number of sampled data points was
set to 30, which were randomly selected from the CS-based random equivalent sampling method. The proposed method and the other two SL0-based random equivalent sampling reconstruction methods reconstruct the signal waveform close to the original signal and can accurately reconstruct the original signal waveform. Therefore, it is confirmed that the proposed method is feasible to reconstruct the original signal with fewer sampling points obtained by random equivalent sampling.

The number of sampling points is set from 20 to 45 in steps of 5, and 10,000 Monte Carlo experiments are conducted. Therefore, the proposed algorithm is optimal, as shown in Figure 5.

Specifically, the significant differences between the two classes before and after the experiment are the ability to use information tools, acquire information, and express information, which shows that the students in the experimental class have significantly improved this ability under the digital learning method; the experimental class has also improved the ability of information processing, while the improvement of the ability of information immunity and information innovation is not significant because of the short time of this experiment. Students’ information immunity ability needs students to develop long-term habits; information innovation also needs a long time of practice and creation to improve.

According to the random matrix single-loop theorem, the average spectral radius analysis index, and the pulse data processing model established based on the pulse data analysis, the calculation accuracy was set to divide by 100, and the processing results of the pulse data of 61 graduate student volunteers in two batches were obtained after the model calculation, as shown in Table 2.

This experiment was conducted from September 2021 to December 2021 for teaching experimental activities, and a total of 7 experimental classes were conducted. Research the quantification technology of teaching results for groups and individuals, clean, classify, and effectively integrate the multi-source data sources of teaching subjects and educational resources, and provide support for the personalized auxiliary teaching platform. Through these 7 lessons, students should achieve the mastery of the basic functions of Scratch and the basic skills of making programming works, be able to recognize the advantages and limitations of the digital learning environment, learn to select information, be able to start from the task, question, analyze the problem correctly, and solve the problem rationally, and the research focuses on how to improve students’ digital expression ability with the help of Scratch, to enhance information literacy.

The three phases of this experiment are intertwined. The first phase lays the foundation, providing basic theoretical knowledge for students to create, simple to operate, and suitable for the developmental laws of students’ bodies and

### Table 1: Matrix output implementation code.

| Def fun(file):
| start_time = time.time()
| Total = 0
| For i in range(start_time):
| Total += i
| list1 = [1, 2, 3]
| list2 = ['one', 'two', 'three']
| If n<=0:
| Yield list1
| list1 + list1
| I, div = 0, ceil(len(list1)/n)
| While i < n:
| Yield list2 [i * div: (i + 1) * div]
| i += 1
| Return result

Figure 3: Diagram of the backtracking process of problem-solving and reasoning.
minds, so students are more receptive and more interested in digital expression during the learning process. The second stage integrates information technology and physics subjects, and together they explore series and parallel connections in circuits so that students can accurately digitally express the knowledge of series and parallel connections in circuits through Scratch works and understand the importance of scientific expression in digital learning. In the third stage, the students will be able to design their games while studying the parabolic motion of objects in Scratch, so that they can personalize and creatively express their design ideas, thus enhancing their digital expression skills.

5.2. Analysis of the Curriculum System under Smart Education. The arrangement of the teaching content in the experiment adopts a new teaching model, project-based, with active participation, independent collaboration, and exploration and innovation by students. The first questionnaire was conducted before learning through the project, the second questionnaire was conducted at the end of the course, and the data associated with the two experiments before and after are now compared and analyzed. By comparing the data of the pretest and post-test, we found that 86% of students were interested in Scratch after learning Scratch programming this semester, with a 19% increase in learning interest; 88.6% of students were willing to cooperate and share with others, with a 28.6% increase; 88.6% were willing to express their creative intention of digital works, with a 30.6% increase; and students who could finish their homework on time accounted for 80%, an increase of 25%. The statistical results of the above data show that students’ interest in digital expression, communication, and efficiency has improved, as shown in Figure 6.
Looking at the two-tailed probabilities corresponding to the total score of each dimension individually, it is concluded that the five areas with significant differences before and after the experiment are using information tools, acquiring information, expressing information, processing information, and information immunity; that is,

<table>
<thead>
<tr>
<th>ID</th>
<th>Mean</th>
<th>Standard</th>
<th>Coefficient of variation</th>
<th>Expect</th>
<th>Error</th>
<th>MSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.567</td>
<td>0.624</td>
<td>0.437</td>
<td>0.972</td>
<td>0.659</td>
<td>0.715</td>
</tr>
<tr>
<td>2</td>
<td>0.755</td>
<td>0.441</td>
<td>0.574</td>
<td>0.422</td>
<td>0.468</td>
<td>0.841</td>
</tr>
<tr>
<td>3</td>
<td>0.486</td>
<td>0.651</td>
<td>0.722</td>
<td>0.406</td>
<td>0.614</td>
<td>0.441</td>
</tr>
<tr>
<td>4</td>
<td>0.872</td>
<td>0.878</td>
<td>0.661</td>
<td>0.666</td>
<td>0.412</td>
<td>0.703</td>
</tr>
<tr>
<td>5</td>
<td>0.623</td>
<td>0.88</td>
<td>0.729</td>
<td>0.401</td>
<td>0.536</td>
<td>0.806</td>
</tr>
<tr>
<td>6</td>
<td>0.906</td>
<td>0.727</td>
<td>0.569</td>
<td>0.701</td>
<td>0.821</td>
<td>0.838</td>
</tr>
<tr>
<td>7</td>
<td>0.53</td>
<td>0.531</td>
<td>0.631</td>
<td>0.841</td>
<td>0.632</td>
<td>0.665</td>
</tr>
</tbody>
</table>

Figure 6: Paired-sample t-test of digital learning ability measured before and after the experimental class.
these five areas of ability students have been significantly improved after the experiment. For the information innovation ability, the improvement was not significant. Overcome several key technologies, carry out platform integration, and finally build a data-driven matrix teaching assistant system that supports automatic matrix derivation and automatic generation of logical animation. Regarding the dimension of information innovation ability, the author took leave from other experts and concluded that the cultivation of innovation ability needs a long-term process, and it is difficult to achieve the effect of change in only a few weeks; in addition, the innovation consciousness of the first-year students is relatively weak, and they seldom focus on the innovation of their works in their study.

This evaluation quantity evaluates the digital works from four dimensions to test the digital expression ability of junior high school students; firstly, the scientific nature of the digital expression: the main evaluation content looks at whether there are intellectual expression errors in the works; secondly, the technical nature of the evaluation works: the main evaluation content looks at whether the works are created by integrating a variety of digital learning tools, again the expressiveness of the works. Excellent digital work has its soul, which can accurately express the author’s inner thoughts and is unique.

During the experiment, 8 groups were divided to cooperate in the learning task, each student in the group was required to participate in the digital expression, and eventually, they all had to submit their works online. 8 works from the students’ works are listed below for evaluation. When the digital learning ability of the students in the experimental class was tested in a pretest and post-test, the improvement of digital learning ability in each dimension was correlated with the intervention of the digital teaching model, and the data are shown in Figure 7.

Figure 7 shows the correlation coefficients of each of the six dimensions of digital learning ability of the students in the experimental class before and after the experiment. After the experiment, students have positive correlations for all six dimensions of competence. Each service can have its own application configuration placed in the application class path. Maintaining these configuration properties becomes very difficult as the number of services increases. However, the correlation between the two dimensions of information immunity and information innovation is close to 0, which is not strong, indicating that the improvement of students’ information immunity and information innovation is not obvious through the experiment, and the improvement of information innovation ability is second to the information immunity ability.

Traditionally, some teachers and parents have been treating IT classes as optional learning content. IT courses also do not carry weight in students’ entrance exams at all stages. Some students see IT class as a time to relax after other courses, and they do not pay enough attention to the knowledge and skills in IT class as their learning task from an ideological point of view. Overall, there is not enough emphasis on IT classes at all levels.

Students in traditional classrooms are completing tasks clearly defined by the teacher or imitating and practicing the teacher’s steps at a uniform pace, and they do not have time to study anything that interests them or that they are not good at. As a result, students complete their learning tasks, but their abilities are not necessarily enhanced. Students have a heavy burden outside the classroom, and the 45 minutes of class time is often just enough to complete the classroom tasks. Moreover, the time for IT courses is very limited, and many students who are interested in IT do not have time or channels to learn IT knowledge in depth. The school launched IT interest groups, many students enrolled in each class, and the attendance rate is very high. It shows that students are interested in IT, but they just lack time for practice.

6. Conclusion

At present, students’ digital learning ability is still at the stage of initiation, and digital learning has attracted much attention in the field of education and has been greatly affirmed by many scholars. In the middle school IT curriculum, the author experimented with the development of
digital learning skills of middle school students, expecting them to adapt to digital problem solving and develop digital learning habits. And its depth is underutilized. This is mainly manifested in that the tools for multi-source data processing are not efficient enough, the data analysis is not intelligent enough, and the mining of invisible laws in a large amount of data is not deep enough. This study provides an in-depth interpretation of the relevant literature, and under the guidance of scholars’ sound theoretical foundation as well as practical experience, this teaching experiment was successfully carried out, and the effects of this teaching experiment on the cultivation of students’ digital learning ability and reflections on the experience are discussed in depth. The students were encouraged to dare to express themselves digitally; to be familiar with the skills of using digital learning tools; to have information competence; to use digital learning tools creatively; and to master digital expression skills. And combined with the fact that the ability to use digital learning tools is a skill that must be acquired in a digital society, it is concluded that when choosing digital learning tools, try to choose the tools that they are proficient in, support media files in multiple formats in terms of functions, and recognize the characteristics of the digital learning environment.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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