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Integration Capability Evaluation and Digital System Design of "Job Course Competition Certificate" Based on Cloud Platform

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Abstract: In response to the significant needs of the rapid development of information technology and the reform and development of application-oriented universities, this article conducts a comprehensive quality assessment and data system research on vocational college students based on the "job course competition certificate" and cloud computing platform. The system is of great significance for improving students' knowledge mastery, skill application, and comprehensive literacy. The research methods include user needs analysis, system architecture design, and data collection method construction. User needs are analyzed through questionnaire surveys, interviews, focus group discussions, and other methods. Based on the curriculum group design architecture in the field of software engineering, in the design and implementation of the experiment, the control group is compared with the control group to collect data on learning performance, participation level, satisfaction, and comprehensive quality. The research results show that the "job course competition certificate" integration ability evaluation based on cloud platform design in this article has better learning outcomes for students under the digital system. The average satisfaction scores for system usability and functional satisfaction are 4.2 and 4.1 points, respectively (out of a total of 5 points), both higher than traditional methods. The research findings of this article can improve students' academic performance and participation, enhance user satisfaction, and ultimately improve their overall quality. This system provides an innovative digital transformation approach for applied education.

1. Introduction

In the era of rapid development of information technology, applied higher education institutions are at the forefront of transformation, facing opportunities and challenges. The integrated ability training of "job course competition certificate" is a new educational model that meets the needs of the times and aims to provide students with practical and innovative applied talents through the integration of "industry university research". However, there are still many problems in the

implementation process, such as unclear collaboration mechanisms, a single evaluation system, and a lack of developmental evaluation, which greatly hinder the construction of the teaching staff and the improvement of students' comprehensive quality. At present, some universities in China have conducted relevant research, but the evaluation system is not yet sound, and the results are unsatisfactory, especially the lack of an assessment method that is organically combined with the "on-the-job course competition certificate". This system is based on the course group of software engineering major, and designs a new educational model through the process of students' learning planning and teaching activities, allowing students to effectively match the knowledge in the classroom with job abilities, skills required for vocational skills competitions, and abilities required for high-level certificates, achieving consistency with the requirements of vocational positions.

This article is based on the "RF5E" evaluation model and designs a comprehensive evaluation system based on it. This system can not only achieve real-time monitoring and evaluation of learning situations, but also provide targeted learning guidance based on the evaluation results, thereby improving its learning efficiency. Subsequently, this article conducted an in-depth analysis of the current situation of the comprehensive teaching of "on-the-job course competition certificate", clarified the main content and purpose of the project research, and proposed measures to solve the problems. In terms of technology, this article provides a detailed introduction to the system architecture, key technologies, and implementation methods to ensure the innovation and practicality of the project.

2. Related Works

Scholars have conducted in-depth research on the integration of higher education and science and technology from different perspectives. Ouyang, Zheng and Jiao [1] took the education in 2011-2020 years as a case to conduct an in-depth analysis of online teaching under the Internet environment, and found that AI has a far-reaching guiding role for online teaching. Cumming and Rose [2] explored the role of general design courses in enhancing university access capacity, and clarified the importance and potential of general design courses in enhancing university access capacity through corresponding research. Li et al. [3] conducted "action research" at the University of Hong Kong and conducted practical research on the "blended learning" model. Hoidn and Gambastn ć [4] used a comparative research approach to analyze the labor market success rates of vocational education and training graduates in the education systems of China and Europe, providing a good theoretical basis for the implementation of vocational education. Chuan and Ibsen [5] examined vocational education and training systems from a lifecycle perspective and provided insights into future skill demands. Li and Pilz [6] focused their research on the issue of cross-border mobility in higher vocational schools and explored how to strengthen cooperation in higher vocational education. As a new vocational education model, the "on-the-job course competition certificate" has received widespread attention in higher vocational education. Jing H [7] conducted an in-depth analysis of job positions, courses, competitions, and certificate integration, and believed that vocational colleges should adopt a teaching mode of professional training based on the actual needs of enterprises. Cao Q [8] conducted a general education teaching activity based on the "on-the-job course competition certificate" and explored the promotion effect of this activity on cultivating students' comprehensive qualities. Tao L [9] used vocational engineering colleges as an example to discuss the comprehensive education model combining "on-the-job courses, competitions, and certifications" for the moral education of college students, as well as some problems that exist in its implementation. In addition, Liu S et al. [10] constructed an effective student attribution assessment system based on the characteristics of Chinese junior high school students, and conducted an experimental study under the guidance of the system.

These scholars' research elaborates on the importance of higher vocational education in improving teaching quality and talent quality from three perspectives: educational technology, innovative teaching models, and the development of higher vocational education. The existing research results provide a good basis for a better understanding of the application of educational technology and the development of vocational schools in this article. However, in the teaching of "job course competition certificate" combination, research on students' comprehensive literacy assessment and curriculum system construction has just begun. Current research mainly focuses on theoretical exploration and empirical analysis, lacking systematic research on the construction and implementation of evaluation index systems for cloud computing. In addition, there is no clear answer on how to combine modern technologies such as cloud computing and big data with technology. In response to the above issues, this article has developed a cloud based talent training model and a comprehensive literacy evaluation system for students based on the "on-the-job course competition certificate" and cloud computing technology, laying the foundation for the deepening and development of higher vocational education.

3. Methods

3.1. User Requirements Analysis

When studying the needs of university users, this article first identified the service targets of universities, including students, teachers, and administrative staff. Due to the different responsibilities and roles of different users, their requirements for this system are also different. In order to better understand these needs, this article adopts online and written questionnaire methods to comprehensively understand the basic information and expectations of users. This study uses the Likert scale to explore the level of user demand for various features, and includes open-ended questions to collect user opinions and expectations. The user demand analysis results obtained are shown in Figure 1:

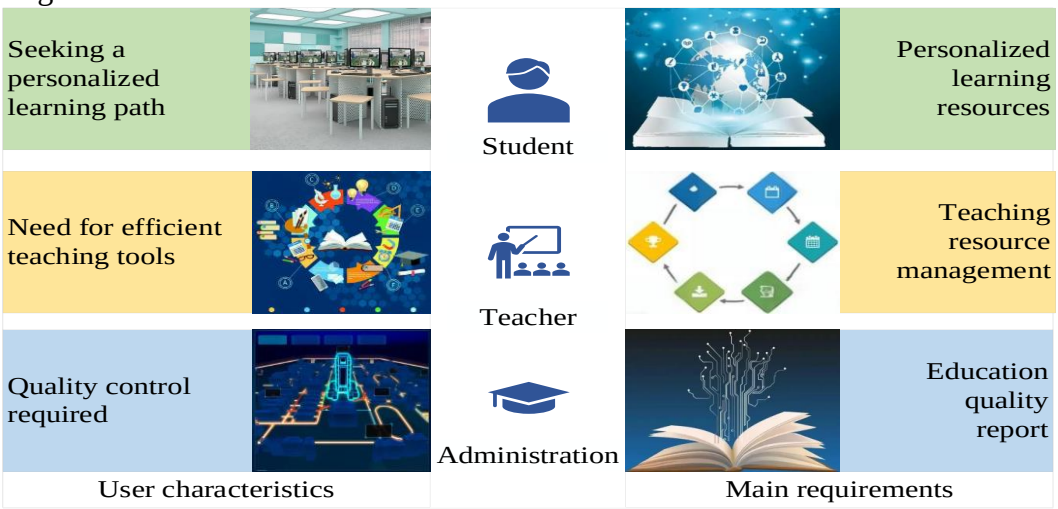

Figure 1: User requirements analysis

Students expect the system to provide personalized learning paths and timely feedback, teachers hope the system can assist in teaching and evaluation, and administrative personnel need the system to provide decision support and quality monitoring [11-12]. When integrating user feedback, the team analyzes the content of user feedback to identify common themes and styles. Through coding and thematic research, they translate user opinions and suggestions into specific requirements. Its characteristics are: on the one hand, students have strong interactivity with this platform, and on the

other hand, teachers' evaluation and analysis abilities are becoming stronger, so as to better grasp students' learning situation. Starting from the analysis of user needs, combined with the characteristics of "on-the-job course competition certificate", ensure that the curriculum system can not only meet the needs of teachers and students, but also promote the reform and development of educational methods.

3.2. System Architecture Design

At present, it is difficult to evaluate the effectiveness of the integrated teaching of "post course competition certificate" implemented in some application-oriented universities, and the training mode and effectiveness of "post course competition certificate" are also different, lacking effective evaluation modes and systems. Some universities are also actively exploring the establishment of models and evaluation systems for student quality assessment, but their completeness and effectiveness still need to be further improved. Especially the connection between the "on-the-job course competition certificate" and the assessment methods and systems is not close enough. To this end, this article organically links teaching with the work context of students, establishes an evaluation index and digital system for the integration of industry and education based on "job course competition certificate", takes "job course competition certificate" as guidance, and the course group of software engineering major as the research and practice basis. Through the design of students' learning projects and classroom learning activities, a learning mode is established to effectively integrate what students learn in the classroom with job abilities, skills required for skill competitions, and abilities required for high skill level certificates, and achieve effective docking with job requirements. The overall framework of the RF5E evaluation model is shown in Figure 2:

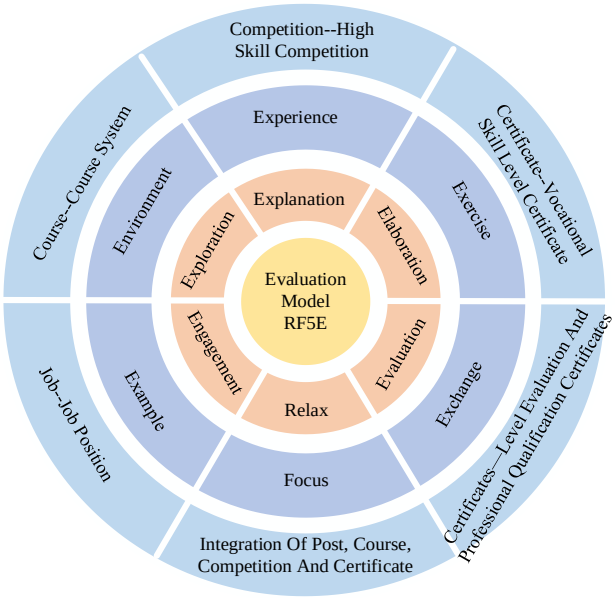

Figure 2: Evaluation Model - RF5E

In order to achieve quality evaluation and digital application of the comprehensive teaching of "job course competition certificate", this article designs a teaching and management system with high integration, user friendliness, and multifunctional integration functions. This architecture closely integrates the specific needs of practical application fields, ensuring that it can support all aspects from education to skill assessment. This article is based on cloud computing, utilizing the elasticity and scalability of cloud computing to solve the problems of large-scale user parallel access and efficient data processing. In terms of selection methods, mainstream web development

technologies and corresponding reactive design concepts were chosen to ensure compatibility between multiple terminals and access for multiple users [13]. The core functions of the system are distributed in three main modules, among which the "Post Course Competition Certificate" high skill management module is a basic architecture of this system, which can help teachers and managers set and adjust course learning according to industry standards and educational needs. The plan also provides detailed requirements for advanced technical skills, including supervision of students' competition skills and qualification recognition for "1+X". In addition, through a simple interface, teachers can add, modify, query, as well as input and output data. The training project management module focuses on developing and managing training programs, enabling teachers to efficiently combine training programs according to specific skill requirements. By using this system, teachers can have a clear understanding of the implementation of training programs and better guide students' learning. The assessment and portrait module of the "job course competition certificate" is an important component of this system, providing personalized and individualized learning and training for students, and offering comprehensive evaluation tools for their learning and training. This system can not only provide students with specific coaching suggestions, but also enable them to understand the shortcomings of the course as a whole and make improvements. In addition, this module will conduct appropriate analysis for different positions to help students understand that their skills match the needs of the company.

In addition, the system also focuses on user experience settings, allowing students to learn independently based on their own learning process and through the provided teaching materials. Teachers can monitor students' learning progress through this system and provide timely feedback. The system adopts high-level technical means such as encryption technology, access control technology, and security auditing to ensure the security and confidentiality of the system.

3.3. Data Collection Methods

This article uses data collection to comprehensively present the effectiveness of the "job course competition certificate" and digital scoring system, as well as user feedback. Therefore, the project intends to comprehensively utilize various data collection tools and techniques to ensure the accuracy and credibility of research results. Firstly, a questionnaire survey was conducted on users' first impressions, user experience, and comments on the questionnaire. The Likert scale was used to quantitatively evaluate users' satisfaction and usage behavior, and qualitative questions such as open-ended questions were used to obtain users' evaluations of the system [14-15]. In addition, we conducted semi-structured interviews and invited users from different roles such as students, teachers, and educational administrators to participate, mainly focusing on students' practical experience and the impact of the system on teaching and learning, and put forward some improvement suggestions.

4. Results and Discussion

4.1. Experimental Design and Implementation

In order to comprehensively examine the teaching quality assessment indicators of the "on-the-job course competition certificate" and its application effect in practical work, a combination of experimental method and practical operation is adopted to comprehensively examine its effectiveness. This article selects students and teachers from different majors in self applied universities and divides them into two groups according to a certain ratio. The experimental group uses newly developed multimedia teaching software, while the control group still uses traditional teaching methods. By evaluating students' classroom participation, learning outcomes,

and teachers, relevant data can be obtained. Based on the principle of student-centered approach, we will establish a capability evaluation model and digital system for the integration of industry, education, competition, and certification, as shown in Figure 3.

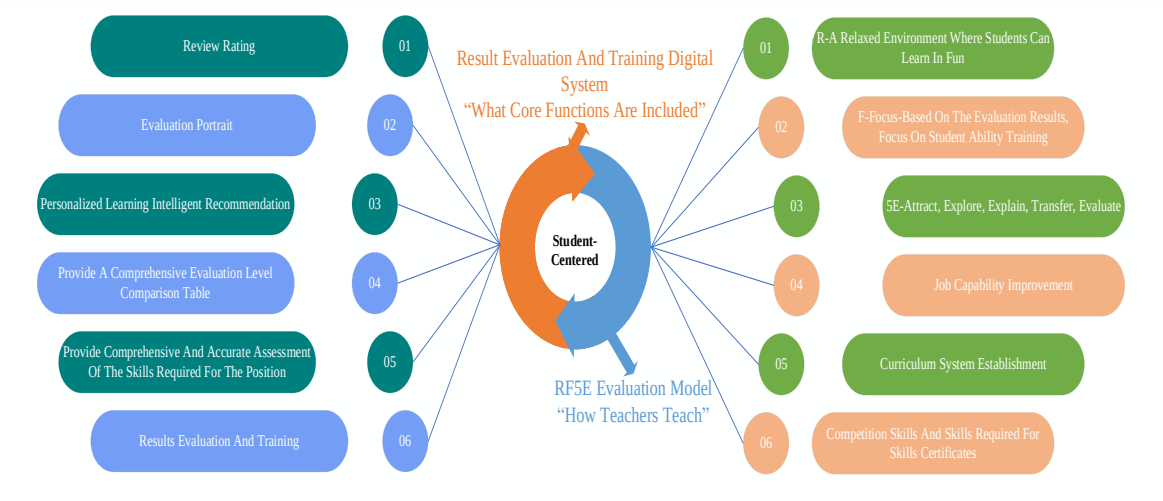

Figure 3: Capability evaluation model and digital system concept

Based on the quantitative and qualitative data of the evaluation research, the following mathematical methods are used for analysis and research, and an evaluation result analysis method is established. Firstly, establishing a fuzzy set and define a first level indicator set $X=\{x_1,x_2,...,\ x_k,...,x_n\}$, corresponding to a weight set of $W=\{w_1,w_2,....w_k,...,w_n\}$, where w_k represents the weight value of x_k in X, $\sum_{k=1}^{n} w_k (k=1,2,...,n)$. Defining secondary indicator set $X_k=\{x_{k1},x_{k2},...,x_{ki},...,x_{km}\}$, corresponding to weight set $U_k=\{u_{k1},u_{k2},...,u_{ki},...,u_{km}\}$, where u_{ki} represents the weight value of x_{ki} in X_k, and $\sum_{i=1}^{m} u_{ki} (i=1,2,..,m)$. Defining the evaluation set as $E=\{e_1,e_2,...,e_k,...,e_n\}$, where e_k represents different evaluation levels. Afterwards, the evaluation matrix is determined, and the fuzzy evaluation matrix from the secondary indicator set X_k to E is:

$$R_k=\begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix} \tag{1}$$

Among them, r_{ij} represents the membership degree of a certain secondary indicator X_{ki} in the secondary indicator set X_k to the j-th evaluation level e_j:

$$r_{ij}=\frac{e_{rj}}{\sum_{j=1}^{n} e_{rj}(j=1,2,...,n)} \tag{2}$$

This article is based on the quasi experimental research method and conducts research according to the original teaching organization, because the original teaching organization is relatively unified,

the course arrangement is consistent, and the learning characteristics are consistent, which facilitates the accuracy of the research. In the application of the evaluation system, teachers, students, and learning experts evaluated the use of the evaluation system and obtained data from feedback on its use.

4.2. Student Learning Outcomes

This article focuses on the evaluation of the teaching quality of "on-the-job course competition certificate" and the role of the teaching quality evaluation system in teaching effectiveness. Table 1 is a detailed data analysis of the learning outcomes of the experimental group students. These data were obtained through carefully designed questionnaire surveys, classroom observations, and grade records, aiming to comprehensively reflect students' learning performance and system usage effects.

Table 1: Analysis of student learning achievement data

Indicator category	Indicator name	The average value of experimental group	The average value of the control group
Academic performance	Test scores	85.6	78.2
	Assignment completion	92.1	84.3
Participation	Average number of logins per day	4.7	1.9
	Task completion speed (days)	2.9	4.1
Satisfaction	System usability	4.2	3.4
	Functional satisfaction	4.1	3.5
Comprehensive quality	Creativity	3.9	3.2
	Teamwork	4	3.3

By comparing the data of the experimental group and the control group, it can be seen that the "on-the-job course competition certificate" system has a significant promoting effect on students' academic performance. In terms of academic performance, the average score of the experimental group's students in the exam is 85.6 points, which is 7.4 points higher than the control group's 78.2 points. This reflects that the ability evaluation model based on cloud platforms and digital systems can help improve students' exam scores. The average completion rate of homework in the experimental group is 92.1%, which is also higher than the 84.3% in the control group, further confirming the effectiveness of the system in promoting student learning task completion. In addition, in terms of participation indicators and task completion speed, the experimental group of students still showed higher frequency use and active participation in the system compared to the control group, indicating that the system can improve students' efficiency in completing tasks. In terms of cultivating comprehensive qualities, this teaching model has played a positive role in promoting students' abilities such as innovative thinking and cooperative spirit. On the basis of the "on-the-job course competition certificate", the average scores of the experimental group students in innovation ability and teamwork ability are 3.9 points and 4 points, respectively, both higher than the control group. The cloud based teaching quality evaluation system established in this article has significantly improved students' academic performance, participation, user satisfaction, and overall quality.

4.3. System Usage

When exploring the integration ability evaluation of "job course competition certificate" based on cloud platforms and the impact of digital systems on students' learning outcomes, system usage as a key indicator provides an opportunity to gain insight into the frequency and depth of interaction between students and the system. The quantitative data of system usage not only reflects students' acceptance of digital learning tools, but also reveals the potential impact of system design on students' learning behavior. Table 2 shows the application of the system in actual teaching:

Table 2: Analysis of system usage data

User target audience	Evaluation metrics	Login frequency (times/week)	Online time (minutes/time)	Interactive module usage rate (%)
Student	Minimum	5	15.7	67.4
	Maximum	9	50.6	92.3
	Mean	7.4	35.2	82.6
Teacher	Minimum	3	16.8	70.4
	Maximum	8	78.4	89.6
	Mean	5.2	48.6	78.9

Among the student population, their system usage data shows a high level of motivation, with login frequencies ranging from a minimum of 5 to a maximum of 9, indicating a higher degree of dependence on the system. The average online duration of students is 35.2 minutes, reflecting an improvement in their focus and communication skills in the classroom. In addition, the utilization rate of the interactive module reaches 82.6%, demonstrating active participation of students in class interactive activities, including discussions, feedback, and collaborative learning. From the usage data of the teacher group, although the login frequency of teachers is slightly lower than that of students, the average is also 5.2 times per week. Teachers have a significant investment in organizing classes and communicating with students. From the statistical data of teachers and students, this system plays an important role in promoting teaching interaction and student participation.

4.4. User Satisfaction

The most important aspect when evaluating the comprehensive quality assessment and digital platform of "job course competition certificate" is user satisfaction. This article takes system usability, functional completeness, interactive experience, and learning support as research objects, selecting 10 students, 10 teachers, and 10 management personnel. A satisfaction survey (with a total score of 100) was conducted to address different needs. The survey results are shown in Figure 4:

The research results show that users who participated in the questionnaire survey have a higher overall evaluation of the system's performance. The average usability score of the system is 86.73 points, and most users believe that the interface of this system is friendly and the evaluation is simple and intuitive. The minimum value of functional completeness is 72 points, the maximum value is 87 points, and the average value of functional completeness is 79.77 points. Although its functions have been widely recognized, it still cannot fully meet the needs in certain specific functions. In terms of interactive experience, the average score for interactive experience is 83.50, indicating that users identify with interactive tools and platforms. But the minimum value for interactive experience is 78 points, indicating that the system can effectively promote interaction between users, but attention should also be paid to users with low satisfaction. The average score

for learning support is 83.83, indicating that users have a positive attitude towards the school's educational resources and support services. From the four dimensions of evaluation, the overall performance of the "on-the-job course competition certificate" course and the teacher quality evaluation system is very good. A high mean score indicates that the system has met user expectations in most critical areas.

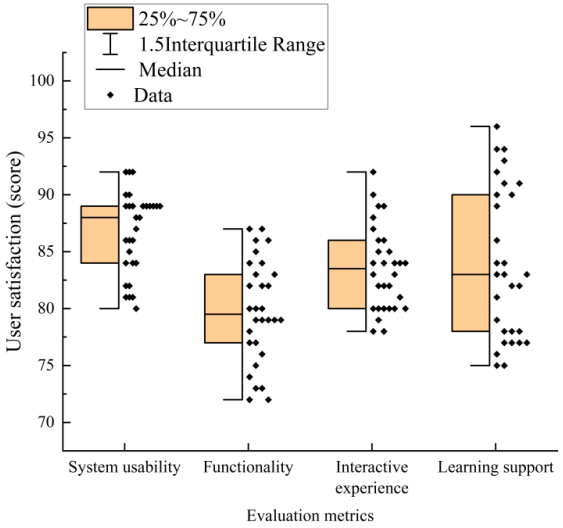

Figure 4: User satisfaction

4.5. Results and Discussion

From the design and implementation of the experiment, students' learning enthusiasm and academic performance have been greatly improved. The test scores and task completion of the experimental group students were significantly better than those of the control group, reflecting to some extent the positive role of this teaching method in improving students' learning and application. In addition, the research results also show that in terms of improving students' educational performance, their potential is significantly enhanced. The experimental results show that the quality evaluation system of the integrated teaching of "job course competition certificate" has a very positive effect on improving students' learning effectiveness, participation, user satisfaction, and overall quality. Therefore, it provides theoretical basis and technical support for realizing the digital transformation of higher vocational education, promoting innovation in higher vocational education, and improving the quality of higher vocational education. However, to achieve this goal, continuous evaluation and improvement are still needed. The project focuses on long-term impact and explores deep integration based on this system to achieve functional design that meets user needs. In this process, a new generation of vocational college teachers with strong influence will gradually form.

5. Conclusion

This article constructs and implements a cloud platform based "job course competition certificate" integration capability evaluation and digitalization system, and comprehensively evaluates the system through questionnaires and experiments. The results of the experiment indicate that the system has played a positive role in improving students' academic performance, participation, satisfaction, and overall quality. The system monitors and evaluates students' learning process to achieve personalized teaching guidance, in order to improve the quality of classroom

teaching. Through the innovative RF5E evaluation model, promote university teaching reform and improve teaching quality. Research has important guiding significance for improving the teaching quality of vocational colleges, promoting the integration of industry and education, and cultivating high-quality and skilled talents that meet the needs of the times. However, current research has problems such as small sample size, incomplete system functionality, and different user experiences, which require further research and improvement. With the continuous updating of science and technology and teaching concepts, future research will conduct systematic studies from three aspects: long-term effects, integration of emerging technologies, and customized functions, in order to meet the growing demand for education and promote balanced and high-quality development of education.

Acknowledgment

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