Research on the Creative Path of Digital Education Resource Services in the Context of Double-Reduction

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Abstract. This study presents a set of measures in the context of Double-Reduction, based on an explanation of how digital education resources might facilitate the implementation of Double-Reduction. For example, developing a personalized learning recommendation system based on an online learning space, integrating data concepts to improve classroom teaching quality, investigating intelligent and accurate homework based on an intelligent homework system, utilizing education informatization technology to promote digital after-school teaching, and promoting the transformation of the way quality digital resources are served in out-of-school institutions.

Keywords: "double reduction" · digital education resources · education informatization · after-school services

1 Introduction

The Internet is used to rebuild the educational model of the Double-Reduction classroom, improve instructors' teaching techniques, increase teaching quality, and compensate for the deficiencies of after-school service resources [1]. Design tasks are intelligently standardized, and improvements to the assessment system are implemented thoroughly, providing a new route for digital education resource services and supporting more successful Double-Reduction implementation.

2 The Practical Dilemma of Digital Education Resources Empowering Double-Reduction Implementation

Through a combination of fieldwork, literature research, and online research, we discovered that there are still deficiencies and challenges in certain areas of China, including digital education resources empowering Double-Reduction education classroom teaching, after-school services, homework design, personalized learning for students, and precision teaching for teachers [1].

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2.1 Shortage of Teaching Resources to Support Teachers' Classroom Quality Improvement

Our research revealed that online teaching and learning at the elementary level is characterized by outdated retrieval resources, incompatibility with new curriculum standards and programs, and disparity with textbook versions. These issues make it challenging or impossible to maintain an effective teaching and learning environment [2]. In addition, some teachers encountered difficulties retrieving resources and varying quality when utilizing existing digital materials for teaching and learning, as well as difficulties matching resource materials to classroom instruction. The development of digital resource platforms by schools is also problematic.

2.2 Lack of Personalized Resources Available for Students to Learn Independently and Effectively

It employs text materials, multimedia information, and learning resource combinations to input into the recommendation object model for improved data analysis and analytics. It can eventually model users and recommendation items. They are primarily focused to providing instructors with more accessible and rich teaching tools for classroom instruction. Few are particularly designed for students' learning platforms, such as knowledge acquisition and extracurricular learning. The majority of students enhance their curriculum and develop their interests via off-campus training courses and tutorials.

2.3 Improve the Shortage of Intelligent Tools for Scientific Design and Evaluation of Assignments

Conventional written assignments, simple automated tasks, and homogenized assignments no longer fulfill the Double-Reduction requirement. We discovered from our summer practical study in primary and secondary schools and interviews with grassroots front-line teachers that the present digital education resource websites are mostly of the question bank, online class, and media platform types. There are few systems with systematic functionality for assignment creation, administration, and analysis.

2.4 A Precise Resource Supply Chain to Empower After-School Services has yet to Be Developed

In provinces with abundant educational resources, after-school programs are in full swing in elementary and secondary schools. The methods they encourage Double-Reduction are distinct and diverse, including several local peculiarities and school cultures. Unfortunately, in certain children the most educationally disadvantaged communities, particularly in isolated rural areas, the after-school 3:30 program is plagued by insufficient measures, inadequate service capacity, low quality, and a lack of instructors. Several educational tools also show the educational gaps and digital divide across schools.

3 The Way of Digital Education Resource Service Innovation in the Context of Double-Reduction

Developing an innovative development model for digital education resource services and increasing the availability of digital quality education materials is a critical undertaking for promoting Double-Reduction [3].

3.1 Integrate Smart Data Concepts to Improve the Quality of Classroom Teaching

Due to the various educational conditions across the globe, high level education regions may pilot the development of introducing new ways to developing classroom teaching quality enhancement. Using educational technologies such as 5G, artificial intelligence, big data, cloud computing, AIOT, block chain, and digital twin to realize a classroom environment with complete field integration, encompassing digital field, physical field, and information field. By awareness cultivation and thinking innovation, we will establish the notion of all-data classroom and build data classroom awareness. Based on classroom space and classroom awareness, we encourage the cooperation of all aspects of teaching goal customisation, teaching activity flexibility, teaching material adaptation, and teaching evaluation diagnosis and improvement to enable Double-Reduction classes increase in quality. As demonstrated in Fig. 1:

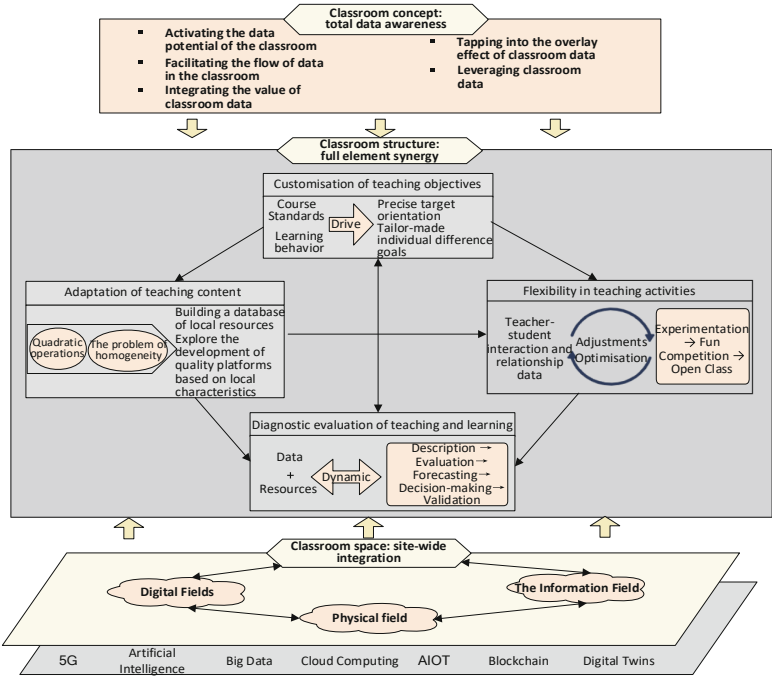

Fig. 1. Building an all-data philosophy model for the classroom

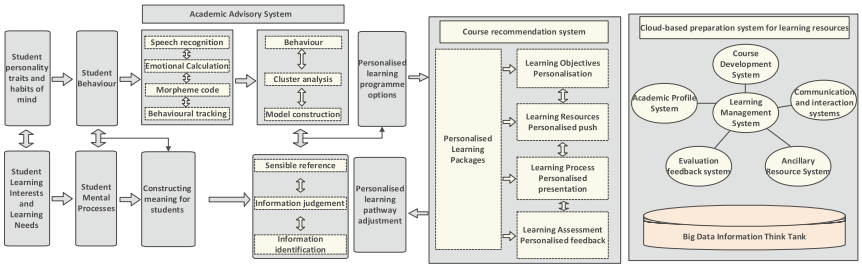

Fig. 2. A personalised learning system based on an online learning space

3.2 Build a Personalized Learning Recommendation System Based on Online Learning Space

We can build speech recognition, emotion calculation, word coding, behavior tracking, data portraiture, cluster analysis, and model construction by collecting students' character traits, thinking habits, learning interests and learning needs, learners' behavioral performance, and learners' mental processes for learner meaning construction. Then, we utilize these as logical reference, information judgment, and information identification for the learning consultation system to create individualized learning programs for educators and educated people to pick from. A comprehensive learning resource cloud preparation system based on a big data information think tank, with a learning management system at its core, a curriculum development system, a learning profile management system, an evaluation and feedback system, a communication and interaction system, and an auxiliary resource system interconnected. The learning consultation system and the learning resource cloud system together serve the personalized learning package recommended by the learning consultation system for personalized setting of learning goals, personalized pushing of learning resources, personalized presentation of learning process, and personalized feedback of learning evaluation to form the learning program recommendation system. As demonstrated in Fig. 2:

3.3 Explore Intelligent and Precise Operations Based on Intelligent Operation System

The intelligent homework system comprises of "homework assignment + intelligent correction + micro-class materials." It creates instructor activity modules and student activity modules, and it ensures assignment correctness via intelligent techniques. It is mostly represented in the following features. For starters, it is accomplished via a universal level exam for students. Finally, it conducts intelligent and exact analysis and placement depending on the test findings to accomplish tiered management. Ultimately, it will be able to accurately identify relevant homework answers for associated practice talks and further growth. Second, it tests instructors on the complexity of their assignments. Then, it gets precise level diagnostic findings and reports for standard entry [4]. Moreover, it summarizes and improves the assignment design skill and design level in order to accomplish growth and strengthening. Ultimately, it pushes correctly via two

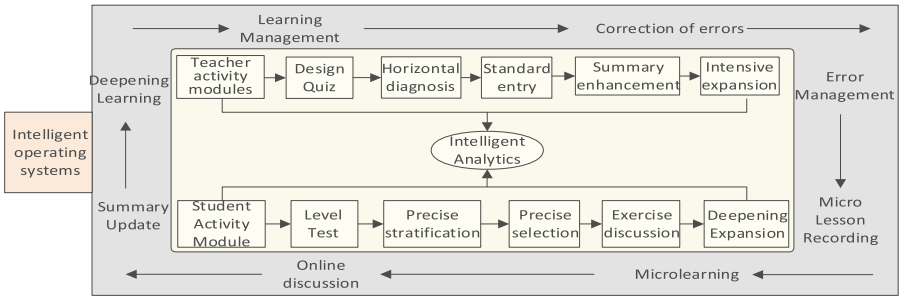

Fig. 3. Intelligent operating systems

modules. It then controls students' learning, assignment mistakes, revision, and management. The system then creates micro-lesson recordings of the errors for students to view and learn from over and again. Moreover, it enables for online interaction and further learning via the system. It also summarizes and updates incorrect questions and relevant micro-lesson learning materials. All of the aforementioned functions combine to create a circular system. Ultimately, it will be able to recognize the intelligence and accuracy of homework, design, and feedback, and so increase the quality of homework. As demonstrated in Fig. 3:

3.4 Apply Educational Information Technology to Promote Digital After-School Teaching

To begin, based on the school scenario, school features, kids' characteristics, and education level, we need create a database of "after-school service resources." Next, on a regular basis, we will send out after-school service materials that are appropriate for children' development stages, learning levels, and individual growth requirements based on grades and courses. Then, in the course of providing after-school services, we deploy intelligence analysis and monitoring technology to detect and record children' learning habits. From there, we dynamically and thoroughly track children' learning and adaption in after-school programs. Second, when introducing advanced teaching contents, we can draw on STEAM advanced online teaching concept and education teaching mode of makerspace to incorporate appealing and science-based classroom and after-school service content, such as visualization software, robotics courses, programming, and so on. They are used to enrich and enliven the after-school programs. Lastly, we may employ data models to describe and forecast the behavioral performance of students in after-school programs. We may utilize them to tackle issues like knowledge imbalance produced by individual differences, find students' strengths, and boost students' enthusiasm and focus in participation in after-school programs. Then, I will be able to assist instructors more precisely modify their teaching tactics, improve the teaching process of after-school service, and offer an effective reference foundation for the accuracy of after-school service. As demonstrated in Fig. 4:

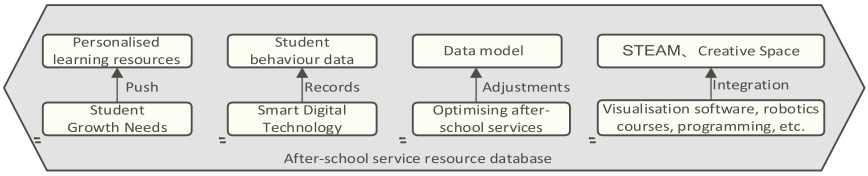

Fig. 4. Database of digital resources for after-school services

4 Conclusion

Double-Reduction is a significant strategic architecture of basic education reform in the modern century. Completing Double-Reduction is a significant undertaking on the path to achieving the great rejuvenation of the Chinese nation via Chinese-style modernity [5]. It demands close attention from all education administration divisions. It also necessitates basic education schools doing a good job of coordinating and managing, accelerating the development of a new educational development pattern, promoting the upgrading of educational strategies, expanding the supply of high-quality digital resources, and innovating the service model of online education resources.

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