Practice Path and Security Mechanism of “Internet + Education” in the Era of Artificial Intelligence

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Abstract. The intelligent age calls for comprehensively deepening the reform of basic education and teaching, reforming the traditional classroom and improving the students' core quality, which are the key tasks in the informatization construction and application of basic education. This paper proposes to gradually realize the precision education governance service based on big data from the Micro and macro perspectives: curriculum construction, demand-oriented, policy-oriented, multidisciplinary linkage, data governance, platform construction, and model development. The study also provides feasible implementation strategies for institutions of local education governance and management services, theoretical support for applied research and development of “Internet + education” in colleges and universities, and actively explores the difficult issues of promoting education data governance based on privacy protection and open sharing.

Keywords: Artificial intelligence · “Internet + Education” · Realization approach · Security mechanism

1 Introduction

Under the trend of explosive development of informatization, online education has increasingly highlighted its advantages. First, online education can break through the limitations of time and space and improve learning efficiency. Secondly, online education can transcend the unequal distribution of educational resources caused by geographical factors, make educational resources shared, and lower the threshold of learning. Because of this, online schools are gaining more and more recognition, and various kinds of open online education platforms are emerging, such as MOOC in Chinese universities, Cloud classroom of Netease, Baidu lecture, and so on. However, We must wake up to the fact that the biggest problem of China's online education and training industry lies in the serious backwardness of scientific and technological means, lack of talents, lack of innovation, and most importantly, the serious lack of in-depth teaching and research in China's education and training industry. It is worth mentioning that the COVID-19 outbreak in early 2020 has made “Internet + education” the only choice for “school suspension”. The nationwide implementation of network education is not only a major test of China's educational informatization practice, but also...
provides a rare opportunity for China’s “Internet + education” to practice, reflect, summarize and guide the next stage of development. The epidemic prevention and control is accelerating the comprehensive application of the Internet and related technologies in education, and providing a once-in-a-lifetime historical opportunity for the Internet to promote educational reform. The vigorous practice also reflects that the whole society is not well prepared in terms of the concept, method, ability and management of “Internet + education”, especially the lack of theoretical support in the research on how to make use of information technology to transform education into practical education.

Based on “Internet+” strategy, the blended learning originated in the field of western education. It is a combination of different teaching media and organically integrates face-to-face classroom learning and digital learning [2]. By studying the connotation, characteristics and implementation path of maker education in Primary and secondary schools in the United States, Zheng Yan found that the three key characteristics of maker education in primary and secondary schools in the United States are: the combination of educational target context and resources, the openness of learning process and teaching method, and the specialization of educational process [3]. Compared with developed countries, China's per capital investment in education is far lower than that of developed countries. Online education is still in its primary stage. “Education + Internet” is the trend of future education development, and online education still has a large space for future development. Luo Jie, President of Beijing Education Association, believes that “relevant studies have been conducted on the information technology-driven learning transformation from classroom learning to virtual learning, mobile learning to ubiquitous learning” [4]. Xu Fuyin concluded that the reform of “Internet+” education era is mainly reflected in the following aspects: learning concept, teaching content, educational organization form [5].

Therefore, Artificial intelligence is not only a technological and industrial revolution, but also a data revolution. Whether accepted or not, data is becoming an indispensable basic living resource like air and water, and every virtual or entity will become a data-based information complex [1]. In the field of education, schools, teachers and students and other related subjects have been involved in the massive data revolution, based on the data analysis of electronic schoolbag, smart classrooms, campus wisdom related application is penetrating into the whole process of education teaching reform, and reshape education management in all aspects of concept, method and path. It is obvious that with the continuous enrichment and deepening of intelligent application scenarios and the addition of business capital, the impact of the data revolution on schools, teachers and students will continue to deepen, so it’s essential and significant to gradually realize the precision education governance service based on big data and actively explore the difficult issues of promoting education data governance based on privacy protection and open sharing.
2 The Practical Path of “Internet + Education” Governance Transformation

At present, with the rapid development of mobile Internet technology, the proposal of “Internet+” strategy has a revolutionary impact on models in different fields. “Internet+” education is bound to change the traditional education mode, which will have an important impact on the traditional education and teaching in China for thousands of years. The application of information technology in education and teaching has brought new opportunities and challenges for improving education quality and promoting education equity.

2.1 The Construction of the Offline and Offline Mixed Teaching Mode at the Micro Level

The innovation of information technology also gives birth to different learning styles, and at the same time gives unlimited impetus to the construction of new teaching modes. The research on learning support reform and teaching mode innovation under the “Internet+” classroom teaching innovation is mainly reflected in two aspects: (1) The research on learning mode reform; (2) Research on the reform of teaching methods. In the era of big data, the educational data and demands of students, teachers, schools, and other subjects are increasingly diverse.

Based on the question “How to effectively implement high quality online teaching and student learning?” “What kind of online education model should we follow?” “How to adjust the teacher-student relationship under the state of spatio-temporal separation?” As a consequence, the main research is as follows:

2.1.1 Constructing Online Classroom Teaching Mode and Its Value to Teaching

Use big data and cloud technology network tools to actively build the “three classroom” module. The first class is “students' independent class”, which can arrange students to preview before class and practice after class online using the network platform, set students' independent study time, and cultivate students' self-study ability. The second class is the “online live class”. Therefore the blended teaching is carried out in the “three-three system”, that is, the one-way teaching time of teachers in a class is not more than one-third of the time. Students participate in the classroom independent learning demonstration activities for no less than one-third of the time, emphasizing the principal position of students; Students spend no less than one third of their time on practical assignments in class, which is systematic, interesting and targeted. The third class is the “teacher-student interaction class”, in the effective time, the teacher answers the students' questions online through the “chat room”, and carries on the emotional exchange or “ideological and moral” guidance on the theme of each unit. Through the construction and implementation of ecological classroom teaching mode, the fundamental change of teachers' teaching concept and teaching behavior is promoted, and the fundamental change of students' learning concept and learning behavior is promoted.
2.1.2 Explore the Operation Strategies and Methods of Online Classroom Teaching

In addition to the traditional teaching method, more methods such as discovery method, inducement method, discussion method, incentive method and experiment method should be used to promote the all-round development and individual development of students.

First, change “teaching plan design” to “learning plan design”, from the traditional emphasis on “teaching” to “learning”. Secondly, change the traditional “unit” learning mode, change the “subject” as the learning content, and establish an online learning group to facilitate students' mutual assistance, cooperation and communication, and realize the “interaction” in the real sense. Finally, pay attention to the ecological cultivation of online learning ability, change the state of “listening, speaking, reading, writing and practicing” learning skills in online learning, and enable students to conduct overall learning and practice more comprehensively.

2.1.3 Improve the Evaluation Methods of Online Classroom Teaching and Ecological Learning

On the one hand, a high-quality teaching team and reasonable teaching tasks are the basis to ensure the smooth development of all teaching activities. By investigating the practical cases of English teaching in our school and learning from each other, we can share and exchange early practical experience and strengthen online teaching training for teachers. To provide free online training courses for teachers, so that teachers continue to enrich themselves; On the other hand, the traditional exam-based learning evaluation model should be changed to combine students' online assessment, online practice, online participation and ultimate exam evaluation, so as to implement diversified evaluation.

To summarize, we should seize the opportunity, meet the test of the special period, fully understand the role of network education in the development of College English teaching mode, and construct the mixed online and offline teaching mode as follows (Fig. 1).
2.2 Education System Management at the Macro Level

At present, China is facing the transformation of education governance, not only in the micro level of schools, but also in the scientific, refined and personalized transformation of the entire education system. The transformation from education system management to governance is not a simple upgrade technology, nor is it the result of data collection and visual presentation. Transformation is a systematic transformation. The underlying structure and process supporting the educational management system must be deconstructed and reorganized on the basis of technological upgrading, so as to adapt to the new educational transformation. In the era of big data, educational governance needs to serve the following educational needs: to control the current situation of education, evaluate educational development, assist educational decision-making and facilitate resource allocation. Specifically, when building or optimizing the regional education governance service system, six strategic directions need to be improved, including planning, team building, platform building, data aggregation, application deepening and mechanism guarantee, as shown in the Fig. 2.

2.2.1 Make Plans According to Local Conditions

As we all know, demand is the core starting point of education governance system, which determines whether the system itself points to the real education problem. Education needs have regional characteristics, which cannot be stereotyped or copied from successful experience, and various plans should be formulated according to local conditions. In general, requirements can be grouped into four categories. The first is the descriptive demand, which emphasizes on presenting the overall perspective of education in an explicit way. For example, during the epidemic period, how many students, how many teachers and how many schools carried out online learning, their teaching and learning status, the use of the platform, regional equilibrium, etc. Such demands are the first step in the current practice of “Internet + education”. The second is the diagnostic requirement, which emphasizes value judgment and problem discovery on the basis of overall presentation. The third is the demand for predictability, which emphasizes the study and prediction of future development on the basis of diagnosis. The fourth is the need for intervention, which emphasizes the identification of key elements and nodes on the basis of prediction, and the discovery of intervention points.
and intervention Suggestions. It is found that the teaching mode is the key to affect the learning results, then it organizes and carries out teacher training and so on.

2.2.2 Discipline Integration and Team Building
The education governance service team is the skeleton supporting the operation of the entire education governance system, which determines whether the system can guarantee professionalism in both education and governance. On the basis of the establishment of the mission objectives of educational governance, the competencies required for the responsible team should be considered and matched with the various disciplines and specialties to achieve the “specially-assigned person”. In a complete educational governance plan, at least an educational and teaching team, a data management team, an expert consulting team and an educational technology team should be equipped to ensure the scientific nature of the educational theory followed and the feasibility of the implementation of the work. The expert consulting team demonstrates the consistency between the governance plan and the scientific education concept and the regional education policy to avoid fundamental deviation. As the promoter of the educational governance plan, the educational technical team connects the requirements and results of each link, improves the efficiency of mechanism operation, and constantly optimizes the team collaboration and platform functions.

2.2.3 Data Center and Platform
Data center platform is the core axis to realize scientific education governance and the technical key to ensure the stable operation of the whole education governance system. With data as the core, it is necessary to develop a hardware and software system of regional education governance and build a data governance platform based on it. Education governance platform based on data center should include two basic platforms: data governance platform and comprehensive application platform. Data governance is to solve the problem of regional information system connectivity, centralized management of data in a unified standard, break the data islands between different departments and levels in the region, and form a data governance platform with an overall planning role. Integrated application of practical governance solutions, linking application solutions and education issues, to form a data-based central management system. Therefore, data governance is not just a simple data description and visual presentation, but a functional orientation that serves the dynamic quality monitoring of regional educational needs and can further provide data support for educational decision-making.

2.2.4 Multi-dimensional Layering, Data Aggregation
Clear, multi-dimensional and comprehensive data is the basis to support the transformation of scientific education governance. The structural degree of the database in the education governance system determines the degree to which the education governance system can be implemented. Education and teaching data are directly from the classroom teaching process, is a direct reflection of the teaching quality; In the era of big data, educational data from personnel, materials and other educational management data in the management system of schools and other educational institutions can enter into the practice path of “Internet + education” governance transformation, educational
data and educational demands carried by students, teachers, families, schools, enterprises and other subjects are increasingly diverse. At present, China is facing the transformation of education governance, not only in the micro level of schools, but also in the scientific, refined and personalized transformation of the entire education system. The transformation from education system management to governance is not a simple upgrade technology, nor is it the result of data collection and visual presentation. Transformation is a systematic transformation. The underlying structure and process supporting the educational management system must be deconstructed and reorganized on the basis of technological upgrading, so as to adapt to the new educational transformation.

2.2.5 Build the Model and Deepen the Application
Data-based education modeling is an important factor to distinguish education management from education governance, determines the height and depth of educational governance in the application level, and is the fundamental basis to ensure that data promotes scientific education governance. In order to establish a scientific education governance mechanism, the information provided by the platform and data needs to be further processed, so as to dig out the complex reasons behind the simple phenomenon: under the guidance of relevant theories of education modeling, model support should be provided for each education scene to serve regional education governance in a longer term; Provide empirical evidence for relevant academic theories, enrich or adjust academic logic, and facilitate the implementation of various educational research results; The education model will be connected with the education management system to assist the education and teaching quality testing, performance evaluation, academic early warning and other work.

2.2.6 Standard Specification, Mechanism Guarantee
A standardized data governance process is the guarantee for the long-term operation of the entire educational governance system and determines whether the educational governance system can remain stable in the continuous iteration of data and technology. A standardized data governance process should move away from a simple description of the use of the system's hardware facilities, and stand at the height of the system to provide implementation standards for each link and even constrain the boundaries of sensitive social issues. In addition to the standardized governance process, we also need to improve various safeguard mechanisms: optimize the data flow mechanism, unify data standards, divide authority and supervision responsibilities, and ensure the orderly conduct of data exchange; Establish a security mechanism, adhere to the people-oriented, personalized development of students first, respect for data ethics, and promote the technical protection of data privacy and legal and regulatory protection; Improve the supporting teaching reform mechanism, fully consider the complexity of the education system, and escort the improvement of regional education quality from the policy level, so as to prevent regional education governance in the era of big data from becoming a “technology island”. At present, due to the lack of relevant data standards and data flow specifications, evidence-based education governance decisions fall into the contradiction of “data deficiency” and “data overload”. Therefore, the governance of “Internet + education” must be relatively solidified through standards
and norms, so as to realize the continuous accumulation of experience and wisdom and build a governance system that can be repeated and applied in a true sense.

3 Construction of Security Mechanism of “Internet + Education”

According to founder Norbert Wiener, “The development of technology opens up infinite possibilities for both good and evil” [6]. On the one hand, people are enjoying all kinds of convenience and benefits brought by data application; on the other hand, they are suffering from the troubles and disadvantages of the continuous compression of personal privacy space. According to Luciano Floridi, “AI enables data traces to be recorded, monitored, processed and used for a wide range of social, political or commercial purposes” [7]. Due to the anomy of educational data governance, the phenomenon of students’ and teachers’ data information being openly peddled and the privacy of students’ and teachers’ data being violated frequently occurs, and many problems such as data monopoly and limited application scenarios of authorization are also emerging constantly. Promoting the privacy protection and open access of education data has become an urgent task to be solved in the reform of education governance, but the existing researches have paid insufficient attention to this issue.

3.1 Optimize the Security Protection Mechanism of Educational Data Privacy and Reconstruct the Institutional Ethics of Data Governance

In order to ensure the security of data privacy, European Union as early as the mid-1990s introduced the data protection directive (DPD), established the “data subject should notice when data collection” “data” shall not be disclosed without the permission of the data subjects agreed to seven to promote personal data protection principles and the basis of institutional ethics.

At the same time, domestic scholars are constantly calling for the establishment of a three-dimensional and multi-level educational data security management mechanism, such as the formulation of the “Law on the Rights of Big Data in Education”, “Law on the Protection of Individual Educational Data” and “Convention on the Industry of Big Data in Education” [8]. However, from the perspective of actual policy actions, relevant appeals have not received enough attention and response, and the issue of data privacy leakage of teachers and students still occurs frequently [9]. It will be more and more urgent to reconstruct the institutional ethics based on the safety protection of educational data.

3.2 Enhance the Data Governance Ability of Educational Decision-Making Bodies and Strengthen the Awareness of Data Security Protection for Teachers and Students

Look from the relative development, application of artificial intelligence in education scene update faster than education data management system reconstruction. Teachers and students must have the ability to communicate with people, scientific and
technological literacy, data quality and humanistic accomplishment will become essential basic literacy for people to make full use of the digital world [10].

How to train teachers and students' data literacy and strengthen their awareness of data security on the basis of improving the ability of educational data governance is also the internal requirement of the traditional educational content system to make further breakthroughs and innovations. The first is to improve the status of data literacy in the system of education and teaching, promote data literacy education into textbooks and classrooms, and cultivate citizens to the development of artificial intelligence, so as to make up for the lack of data security awareness education in traditional education and teaching. The second is to optimize the process guarantee mechanism of data literacy education, define the boundaries of rights and obligations of application subjects in the process of data use, and provide three-dimensional and all-round support for the improvement of data literacy ability of teachers and students. Finally, it is necessary to vigorously promote the formulation and implementation of policies and regulations on data privacy protection for teachers and students, and accordingly improve the corresponding relief rules for the protection of legitimate rights and interests, and punish violations of data security for teachers and students according to law.

4 Conclusion

The future education will be scientifically and precisely monitored and managed by big data under the support of artificial intelligence technology. However, the current education management mode must be transformed to further realize the optimal allocation of resources, so as to better adapt to the flexible and open education system in the future. However, educational governance and security is a large conceptual system that involves the integration of various organizational systems, which means it is a complex and difficult process. Further discussion and research are needed on how to correctly understand the opportunities and challenges brought by big data to education management and how to restructure the education management system in order to achieve better transformation.

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