Construction of Big Data Research Platform for Chinese Reading Ability of School-age Children Based on Artificial Intelligence Technology

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Abstract: The reading ability of school-age children has been highly concerned by many acadamic disciplines and the social public. However, with the deepening influence of the information technology revolution on social life, the research concepts and methods under the division of disciplines have been unable to cope with the increasingly complex social development trends and influencing factors, and many research directions have entered a bottleneck state. This paper sorts out and summarizes the existing results and problems of school-age children's reading ability researches, and puts forward the idea of designing an online scientific researching platform of Chinese reading ability with the help of emerging networks and new technologies. And further strengthen the communication and integration of different disciplines by obtaining more comprehensive, systematic and real-time reading ability big data samples. So as to continuously improve the research level of children's Chinese reading ability and achieve a qualitative leap.

1. Introduction

Reading is one of the advanced cognitive activities and an important way for human beings to inherit social experience and theoretical knowledge. School-age children's reading ability has attracted much attention in the fields of psychology, linguistics, pedagogy, sociology and neuroscience. Since the 21st century, the information technology revolution has rapidly changed the ways, processes and results of people's access to and processing of external information resources, which has brought immeasurable influence on the development of school-age children's reading ability. The study of school-age children's Chinese reading ability, which is blocked by the wide gap of different disciplines, has been difficult to cope with the increasingly complicated new phenomena, problems and situations. Interdisciplinary researching is imperative. On the basis of in-depth investigation of the main achievements and existing problems in the current study of school-age children's reading ability, this paper puts forward the idea of designing and constructing an online research platform for school-age children's Chinese reading ability with the help of new technologies such as artificial intelligence and network big data, hoping to form an open research system, so as to continuously improve the reading ability test means and comprehensively enhance the research level.

2. Main achievements and existing problems in the study of Chinese reading ability of school-age children

Up to now, many international and domestic research institutions have conducted a large number of tests on the reading education quality and reading literacy level of school-age children in some areas of China. The test results show that the overall level of Chinese reading ability of school-age children in China is high in the east and low in the west, while the improvement speed is fast in the east and slow in the west. In the western regions and vast rural areas, where the regional traffic is not smooth, the economic development is relatively backward, and the educational concept is relatively backward, the overall level of Chinese reading ability of school-age children is poor, and the individual ability level is different greatly, so it is difficult to obtain significant improvement in

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actual teaching activities (Ma Xiaofa, 2011; Gong Jing, Luo Dehong, 2015; Liu Fang, 2017; Guan Yu, 2018; Ma Zhengkong, 2018; Chen Yanjie, Song Zhengli, 2019). In sharp contrast, the reading ability level of school-age children in economically developed eastern areas has shown an unconventional improvement speed in recent years. The survey results of PISA in Beijing, Jiangsu, Guangdong and Shanghai in 2015 show that the reading scores of students in these areas are only at the international average level (Yu Xiangjun, Ma Junjun, 2018). In 2018, the average reading scores of the above four provinces and cities ranked first in the world (Wang Xiaohua, 2020).

At the same time, the new media is changing the traditional reading mode. The survey showed that these new reading carrier, reading content and reading habits are constantly affecting the development of school-age children's reading ability. School-age children's reading activities have shown the tendency of fragmented reading time, random reading process, entertaining reading content and fast reading speed (Zhang Huihan, 2018; Hou Ying, Tan Yueyu, 2017; Zhao Xia, 2014). Many educational researchers and front-line Chinese teachers have analyzed the factors affecting the development of school-age children's reading ability and the problems existing in Chinese reading teaching activities from different angles, and some researchers have put forward some countermeasures. These results undoubtedly are good and instructive, but due to the amount of data collection, it is difficult to apply them to educational practices on a large scale. Only by implementing comprehensive, real time monitoring for Chinese reading level of school-age children, and obtaining the reading ability test data of children in different ages, can we discover and grasp the development law of Chinese reading ability of school-age children, and then evaluate the influence of various factors in the development process.

3. Thoughts on the construction of big data research platform for school-age children's reading ability

Traditional investigation and researching led by professional scientific research institutions or government agencies are easily affected by factors such as manpower, capital and workload, and researchers have limited investigation coverage, which makes it difficult to maintain long-term follow-up evaluation. These causes led to pointy and static research results, lacking universality and dynamics, which is not conducive to reflecting the development process of Chinese reading ability more comprehensively and accurately. Although front-line teachers have accumulated rich teaching experience, they can't get the existing testing resources and the latest basic research results, which makes it difficult to improve the teaching research of Chinese reading substantially. At the same time, due to the limitations of work nature, work content and workplace, it is difficult for researchers and front-line teachers to communicate and interact effectively, thus basic research and teaching research go their own way. Therefore, we must break through the geographical and temporal constraints, grasp the real-time trend of the development of school-age children's reading ability to the maximum extent, and carry out data retrieval and comparative research across time and region. Therefore, the test data will become the scientific basis and important foundation for the research about Chinese reading, the development of children's Chinese reading ability and Chinese classroom teaching reform. At the same time, we should get the feedback from front-line teachers on reading teaching in time, make the academic achievements of basic research fully tested in teaching practice, and establish a benign transformation mechanism of scientific research achievements, so as to provide fresh impetus for further improving the quality of Chinese teaching.

Mobile Internet platform has become an indispensable communication tool for people and an important technique to connect social forces in different fields. Online database technology is gradually becoming an important technical support for social science research with its powerful storage capacity, real-time updating and easy maintenance. Based on the requirements of children's reading ability research, combining platform technology with online database technology, designing and constructing children's reading ability big data research platform and applying it in practical research is undoubtedly the most reliable way to achieve the above objectives.

4. Construction and operation of big data research platform for Chinese reading ability

According to the above requirements, the platform will design the main functions and operation mechanism based on the basic concept of “resource sharing” and “deep cooperation”. “Resource sharing” means to share information to researchers and front-line teachers, including reading ability test data, cognitive skill test data and language background survey data, and relevant professional knowledge about pedagogy, psychology and statistics, as well as test standards, test operation guidelines and so on. On the basis of data sharing, “in-depth cooperation” enables general teaching units and research institutes to establish cooperative links in the process of sharing test data and professional knowledge through the data retrieval function and communication function of the platform. According to specific user requirements and basic design concepts, the platform should mainly include the following functional modules, as shown in Figure 1.

Data retrieval function module: Visitors can retrieve data of reading ability test, language cognitive skill test and subjects' language background information (excluding subjects' personal privacy information) collected by all testers at each test time on this platform.

Data management function module: testers who collect and upload data and managers of the platform can add, modify, delete and view data online.

Data table import and export module: Testers can directly import complete Excel files or text files when uploading data. After the visitor completes the data retrieval, he/she can also generate a table from the retrieved data online and export it as Excel file or text file.

Communication platform management module: manages the online communication platform of database users, including organizing discussion topics, creating research groups, publishing important information, providing download resources, etc.

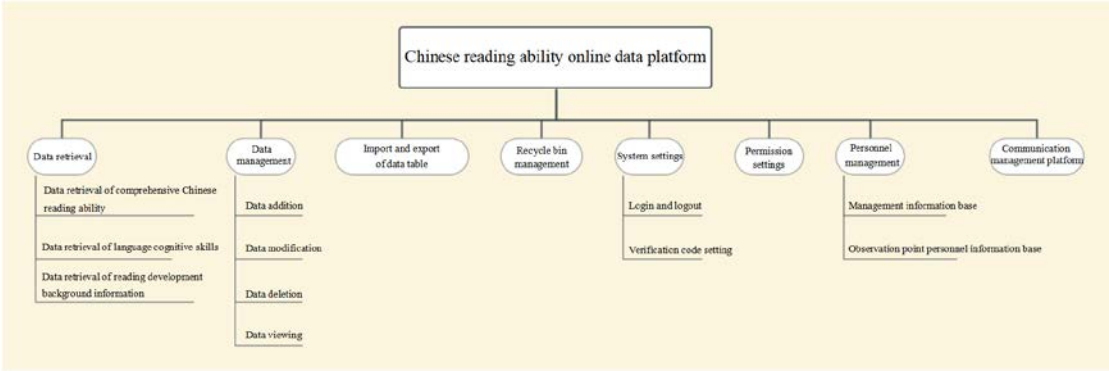

Figure 1 The main functions of the big data research platform for Chinese reading ability

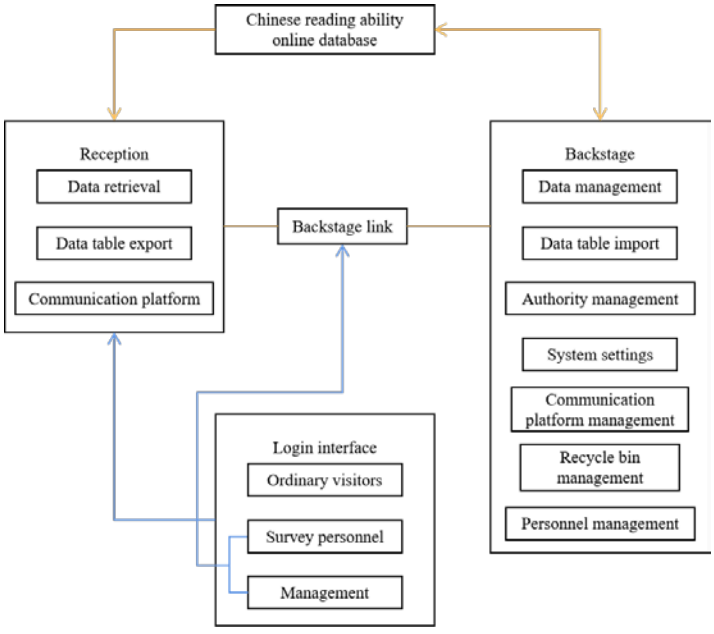

Figure 2 The overall structure design of a big data research platform for Chinese reading ability

After classifying and integrating the main functions, based on database technology, cloud storage technology and communication platform technology, the overall structure design of the platform is shown in Figure 2. It includes login interface, foreground, background and online database.

After the tester completes the data sorting work according to the requirements, he/she can log in to the platform system through the tester channel of the login interface, and upload data to the platform system by using the data management and data table import functions through the background link. Before the data is publicly shared, managers need to check and verify the uploaded data, then store it in the online database and open access rights, so that the data can be retrieved and downloaded. All test data open and shared on the platform will be accompanied by testers' user names and regions registered in the platform. In the process of data using, the user must first contact and obtain the consent of testers through the online communication platform before downloading the data for research, so as to prevent embezzlement and infringement of other people's data or research results.

5. Conclusions

To sum up, influenced by many factors, the research on Chinese reading ability and reading development of Chinese school-age children has become a bottleneck. By building a big data research platform for Chinese reading ability and establishing a cooperative link between researchers and teachers in primary and secondary schools, we can fully mobilize the teaching and scientific researching forces to realize an immediate, long-term and large-scale reading ability test. It can play an active role in improving the theoretical research level of reading education, implementing educational reform, improving the reading quality of whole people, and intervening training for developmental dyslexia.

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