

Application and Reflection of Big Data in the Primary Mathematics Curriculum

Yufei He

College of Education and Sports Sciences, Yangtze University, Jingzhou, 434023, Hubei, China

Abstract: With the vigorous development of science and technology in China, especially the wide application of big data, the concepts and practices of education and teaching are also being improved and optimized, and many new methods, strategies and means have emerged. In the primary school mathematics curriculum under the background of big data, teachers can make full and effective use of big data resources to provide students with more colorful teaching resources and bring students more lively classroom teaching. Based on the relevant understanding of big data and its development prospects, this paper introduces the application of big data in the primary school mathematics classroom, and combines reflection to put forward several suggestions for primary school mathematics teachers to use big data to improve teaching.

Keywords: Big Data, Primary Mathematics, Mathematics Curriculum, Teaching Resources.

1. Introduction

The concept of "big data" first appeared publicly in 1998, American scientist John Mashey proposed that with the rapid growth of data volume, there will be data difficult to understand, difficult to access, difficult to process, difficult to organize the four challenges, and use "big data" to express this challenge. Checking the information found that big data is a relative concept, so its definition is a qualitative description, not clear quantitative indicators, generally believe that big data refers to the collection of data that can not be captured, managed, and processed within a certain timeframe, using conventional software tools, is a need for a new processing mode of information assets. The "Big Data Era" derived from this is an era of rapid access to information in a wide range of data, which provides a new opportunity for education and teaching reform. In the primary school mathematics classroom in the era of big data, teachers will lead students to organize and carry out more efficient and interesting learning activities, comprehensive and effective stimulation of students' enthusiasm for learning so that students love to learn, to ensure that students participate in a broader, more active and in-depth, so that the effectiveness of primary school mathematics teaching and learning to get a greater improvement in the overall development of the overall quality of primary school students, and to learn better at the same time, but also to live better.

2. Overview of Big Data

Big data is a new type of production factor and an important basic strategic resource for China's development, which contains great value, and through in-depth excavation of data and its application, it can really promote the development of economic transformation and restore the advantages of country in international competition. The understanding of big data mainly includes the development history of the concept of big data, the concept of big data, the structure of big data, and the development trend of big data.

2.1. The concept of Big Data

The concept of "big data" first appeared publicly in 1998,

in 2007, Jim Gray, a pioneer in the field of databases, started the trend of examining big data from the perspective of scientific research; in 2011, the McKinsey Global Institute for the first time on the "big data" concept clearly explained; in 2012, Oxford University Professor Victor pointed out in his book "The Age of Big Data" that data analysis has entered a new paradigm in the era of big data; in the same year, the Obama administration invested \$200 million to launch the "Big Data" campaign. In 2011, the McKinsey Global Institute for the first time on the concept of "big data" for a clear explanation; in 2012, Oxford University Professor Victor in his book "big data era" pointed out that data analysis into the era of big data in the new model; the same year, the Obama administration invested 200 million U.S. dollars to start the "big data research and development programme". Driven by these events, big data has gradually become a popular concept of global concern, and 2012 is known as the "Year of Big Data".

Big data has three types of data structures, namely structured data, semi-structured data, and unstructured data. Structured data refers to data that can be represented and stored in relational databases and logically expressed in two-dimensional table structures; semi-structured data is in between, such as NOSQL databases, i.e., non-relational databases, which are created in the context of the era of big data, and can deal with distributed, large-scale, uncertainty in the type of data, and no guarantee of integrity. Unstructured data is data without a fixed structure, including all formats of images, audio, video, etc., including chatting records in QQ, Weibo and other software, browsing time and so on.

2.2. Development Trend of Big Data

There are four main trends in the development of big data, which are the resourcing of data, the deep combination with cloud computing, the breakthrough of scientific theories, and the establishment of data science and data alliance. The first is the resourcing of data, the economic value of big data is becoming more and more prominent, and it has become a strategic new resource for economic development; the second is the deep combination with cloud computing, cloud computing and cloud processing provide elastic and expandable infrastructure for big data, and it is one of the

platforms for generating big data, and at the same time, the Internet of Things, the mobile Internet and other emerging forms of computation will be in the process of helping to bring about a revolution in big data; and the third is the breakthrough of scientific theories, as the rapid development of big data, big data is likely to be a new round of technological revolution. Lastly, there is the establishment of data science and data alliance. In the future, data science will become a specialized discipline, which will be more and more recognized by more and more people. Various universities will set up this major, which will also give rise to several jobs.

3. The Application of Big Data in Primary School Mathematics Curriculum

Through finding and reading relevant literature, reading primary school mathematics textbooks, and exchanging classroom situations with primary school mathematics teachers, it is concluded that there are three main applications of big data in primary school mathematics curriculum, namely, using big data to link rich mathematical resources, applying big data to update efficient teaching mode, and obtaining accurate teaching evaluation with the help of big data.

3.1. Using Big Data to Link Rich Mathematical Resources

Using big data to link rich mathematical resources to build interesting classrooms and improve the effectiveness of primary school mathematics teaching. In the traditional teaching of primary school mathematics, teachers often carry out teaching activities based on their own personal understanding of the teaching materials, in addition to their own years of experience in teaching, coupled with the existing teaching materials on hand, and then design the content of the teaching activities and the form of the activities after the full integration of these. This will easily cause teachers to be completely absorbed in their own inherent teaching ideas and teaching modes, unable to observe their teaching from multiple perspectives, and unable to reflect on their teaching activities from more sides, not to mention that they do not have enough teaching resources to make use of. With the introduction of big data into primary school mathematics teaching, teachers can search for more references related to the teaching content through the Internet, and they can also observe the teaching videos of other teachers to learn from the improvement points to continuously improve the design of their own teaching activities, which will greatly improve the effect of classroom teaching. For example, in the teaching process of "axial symmetry and translation" in the third chapter of the first book of the fifth grade of primary school of the PEP mathematics textbook, the teacher first searched and collected a large number of corresponding knowledge related to the courseware and auxiliary teaching resources on the Internet, and in the classroom teaching to show the students a large number of axial symmetry and translation of graphics searched for on the network, so that students can intuitively observe Different kinds of shapes, comprehensive understanding of different definitions of various shapes, students can easily obtain the depth of knowledge of the teaching objectives, so as to achieve a significant increase in the effectiveness of teaching.

Some primary school students are not interested in digital, formulaic, and computational mathematics classes, which are

often boring. It is difficult to inspire students to learn actively, compared with the traditional teacher lecture student's rote memorization of a large number of problems in the mathematics classroom training, they prefer the classroom with the help of drawings, picture books, music, stories, and other elements of the classroom expression. The rational use of big data can link rich mathematical resources to the classroom to solve the problem of students' low motivation and loss of interest in learning mathematics. In the lecture stage under the background of big data, teachers can make the classroom interesting, storytelling and diversified by playing thematic handouts, video animation, question and answer games and other diversified teaching materials to make the classroom vivid and lively, fully mobilize all the learning enthusiasm, the teaching content is more in line with the taste of the students in the class, and is more targeted, so that the attention of the students can be more focused. Such as in the study of "the area of the triangle" in this section of the content, the teacher used big data link video animation, through the use of information technology, to show the concept of the area of the triangle, the problem put forward and the evolution of the process, so that the students of the content of the initial impression, followed by the use of aids to hands-on demonstration of the operation of the investigation, to enhance the student's experience sense and firmly grasp students' attention. Let students use rectangular pieces of paper to cut any triangle to feel the relationship between the triangle and the area of a rectangle with equal base and height, to deepen the understanding of the derivation process of the formula for the area of the triangle, and to have a deeper memory of the formula for the area of the triangle. Finally show their own cut triangles and explain to the classmates, in the class to fully mobilize the students' eyes, ears, hands, brain, mind all aspects of the ability, so that not only can effectively enhance the students' interest in learning, but also able to cultivate students' hands-on ability, and more importantly, for the cultivation of students' creativity and creativity laid the foundation.

3.2. Using Big Data to Update the Efficient Teaching Mode

Traditional primary school mathematics classroom teaching has numerous deficiencies that are difficult to compensate for using traditional teaching methods. The arrival of the big data era, the application of artificial intelligence technology, and the popularity of a variety of information terminal equipment provide unprecedented development momentum for today's education and teaching career. In primary school mathematics teaching, teachers can use big data information technology means to create a flipped classroom teaching mode, search for a large number of teaching resources on the Internet uploaded to the teacher's information platform, but also can be downloaded to the class WeChat group, the students in the classroom before the students can download the video to watch the video for pre-study learning content, the teacher only need to do in the process of classroom teaching to focus on the teaching of the key points of breakthroughs, or on the student The teacher only needs to explain the key teaching points in the classroom teaching process, or to explain the difficult points encountered by the students in the video pre-learning to answer questions. This intelligent classroom mode realizes the teaching resources system construction in the cloud, realizes the students learn first and teachers teach later,

promotes the intelligent development of the classroom, improves the teaching efficiency of the teachers and the learning effect of the students, avoids the whole lesson plane spreads out to take care of the overall progress and ignores the level difference between the individual students, in this mode, each student not only strengthens the ability of independent learning, at the same time, the mastery of knowledge will be more comprehensive and solid. In this mode, each student not only enhances the ability of independent learning, but also has a more comprehensive and solid grasp of knowledge.

Primary school mathematics has a strong abstraction, logic, thinking, for the cognitive level and psychological development of primary school students, learning mathematics is difficult. In the classroom, it is difficult to achieve good teaching results only by teachers' repeated explanations and students' self-comprehension of knowledge, especially in the learning of those knowledge points with a sense of space and direction, which is much more difficult for primary school students. Teachers can use AR/VR technology in teaching, which can make the students have the feeling of being in the realm, so that the students can get a more realistic learning experience to ensure that the students' learning effect is greatly enhanced. For example, in the teaching of the Humanistic Version of Primary Mathematics, Grade 3, Book 1, "Direction and Position" chapter, maths teachers use AR/VR technology to restore the real map to the students, so that the students in the real situation to carry out activities, identify the direction, to confirm the distance, planning routes, to achieve a real feeling of the direction and distance. The application of new information technology can greatly improve the teaching effect of primary school mathematics classroom, and at the same time, it also cultivates the observation ability and life ability of primary school students. In completing the question of how to plan the route to the destination, students have put forward different ideas to plan different routes, after practice with VR technology found that everyone planned routes can successfully reach the destination, realizing the cultivation of students' innovative ability.

In primary school mathematics teaching, teachers reasonably use the information technology provided by big data to change the traditional teaching mode, so that students' learning from the traditional sample mode to a holographic mode, to achieve personalized learning and cultivate students' interest in learning. It is also because of the effective integration of traditional teaching and big data resources that we can provide students with a broader space for development, promote the effective cultivation of students' core qualities, and enable the development of students and the development of teaching to form a trend that goes hand in hand and realize the smooth implementation of the national talent training strategy.

3.3. Accurate Teaching Evaluation with the Help of Big Data

Experienced teachers can rely on their own years of teaching experience, roughly understand the weakness of the students' knowledge system, young teachers want to understand the learning situation, mainly through the students' classroom performance, the completion of homework after class in order to accurately grasp. In the use of classroom webcast teaching, a teacher is facing the entire grade of students, want to quickly understand and analyze the learning situation of all students is very difficult. This time

the use of big data can be a good solution to this problem. The use of big data platform online in-class tests, after-school tests, unit tests and other tests at different time points, and then by the system of independent correction of the answer sheet, with the help of the data analysis system, the formation of process diagnostic report, including assessment profile, the overall situation of the students, the distribution of student grades and other achievements, the performance of the performance changes, the subject skills, the mastery of the subject competencies, through the platform embedded in the visualization of the big data module, the overall data and individual student answers can be real-time feedback to the teacher. Through the big data visualization module embedded in the platform, the overall data and students' individual answers can be fed back to teachers in real time, and teachers can carry out formative evaluation of students' knowledge mastery and ability development through data analysis, so as to make teaching feedback more accurate. Students will have statistical analyses to show whether they have mastered each knowledge block firmly or not, so it only takes a few minutes to diagnose the learning situation of a grade, and truly realize "teaching by learning". The use of big data can help teachers to change from traditional experience teaching to accurate teaching, and also help students to change from the previous fuzzy maths learning to accurate positioning, so as to adjust their own learning methods and learning status in a timely manner.

Teachers make effective use of data resources, through the big data report of statistical analysis of students in the teaching platform to form the degree of mastery of knowledge, individual student knowledge weaknesses and other detailed data, can help teachers to clarify the direction of instruction, to overcome the key points and difficulties in teaching. For example, in the study of "multiplying decimals", the use of big data to collect students in the learning process of the error points, analyze the reasons for the error, through the analysis found that in the process of multiplication calculations of small and medium-sized students are very easy to get confused with the direction of the movement of the decimal point and the distance of the movement, resulting in the calculation of the answer to point the decimal point of the position of the frequent errors, according to this situation to determine the focus of learning. According to this situation to determine the focus of learning is: to grasp the general algorithm of multiplying decimals by decimals, the difficulty is: to understand the arithmetic of multiplying decimals by decimals, so that students understand that two multipliers each have a few decimals, and the product of the decimals is the sum of the decimals of the two multipliers. In the specific teaching classroom for the difficult points to teach, to ensure that the classroom teaching arrangement is reasonable and efficient. In the after-school training exercises plate also do not have to refer to the fixed exercises in the book, to the topic of training in the wrong questions as a sample, the system will be looking for and push the relevant knowledge from the historical database, push the students to meet the degree of mastery of the similar difficulty, the type of the wrong questions, so that the students to re-answer, in order to test the students whether they are really through the above learning, training to solve the "historical legacy of issues ". Retrieve this very accurate information on the students can be more targeted, refusing to pass a large number of sea of questions, so as to shift to the weak points of the precision strike, through the whole process of monitoring, statistics, analysis, push for

student learning, to achieve the true meaning of precision, personalized teaching.

4. Reflections on Improvement Research of Primary School Mathematics Classroom Teaching in the Context of Big Data

4.1. Adhere to the Primary School Students as the Main Body

Primary school mathematics classroom under the background of big data needs to adhere to the primary school students as the main body, pay attention to the primary school students' learning interest, learning psychology, cognitive structure and learning methods. As teachers, they must be familiar with a series of curriculum development systems and models, and know how to develop a new and effective mathematics curriculum. Combined with the law of development of the growth stage of students and the specific physical and mental development of students to rationally develop and make use of the convenience provided by big data, from the perspective of the students, to change the traditional teaching mode of teachers teaching and students learning, to break the traditional stubborn dull classroom, to create a classroom that students like. In the classroom teaching of mathematics, the appropriate use of advanced teaching methods, from the reality of the actual situation to find the mathematical knowledge we want to learn, so that students learn to take the initiative to learn mathematics, rather than forced to learn by teachers and parents. Relieve students' passivity in learning mathematics and give full play to students' subjectivity in learning and teachers' guidance. With students as the main body, teachers should play their role in guiding students, actively guiding and encouraging students to collaborate with each other in exploring, cultivating children's creative ability and practical spirit, and being the master of learning.

4.2. Scientific and Comprehensive Understanding of Information Technology

Some teachers do not have a comprehensive understanding of information technology, they unilaterally think that as long as the class used multimedia equipment or the use of big data to search for the appropriate information, then this is a successful class, can reflect the advanced nature of teaching and learning, is big data teaching. Therefore, in the classroom every lesson with multimedia, and even think that the use of courseware in class can save themselves a lot of energy on the blackboard board, and then good multimedia courseware, but also can not save the board, especially in the mathematical calculation of this plate, the use of courseware to operate the calculation process will be directly reduce the space for students to think, inhibit their desire to think. Teachers should be fully aware of the application of big data in the classroom is better to improve the teaching effect of the auxiliary props, is not the only way to improve the effectiveness of teaching, only a clear understanding of the proportion of big data in the classroom should be occupied, in order to better use of big data in the classroom when the ease of big data, big data can not be completely occupied in the classroom, aptly interspersed with the classroom in order to play the best results.

4.3. Enhancement of Reflective Awareness and Reflective Sensitivity

In the use of big data to facilitate classroom teaching, teachers should often remind and emphasize reflection, big data in classroom teaching is not long enough, the use of the degree of maturity is not complete, in this stage teachers need to constantly reflect, and only constantly reflect to have a better enhancement, after each lesson you can communicate with students to the classroom experience, those places where students are very satisfied, those places where students feel less comfortable, what places where students feel less comfortable, what places where students feel less comfortable. After each lesson, you can communicate with your students about the experience of the lesson, which parts of the lesson they are satisfied with, which parts of the lesson they don't feel comfortable with, and which parts they don't like. Can also be exchanged with colleagues in the classroom after class teaching experience, sharing each other to learn from each other, observe the network of exemplary classroom may not be applicable to their own class of their own students, the use of big data in the classroom may not have played its best effect, these issues are in the classroom teachers need to go to the continuous reflection and summary, and continue to strengthen the perseverance of the reflection, to develop the habit of reflection.

4.4. Adhere to the Knowledge from the Point of Departure

Teaching courseware is an aid in the teaching process, so in the production and use of the process of all to teaching and student learning as the centre, not simply to attract students' attention to the courseware crafted fancy but not real, one of the important role of the courseware is indeed to attract the attention of students to improve students' interest in learning mathematics, but too much attention to the courseware itself and ignored the knowledge and students ontology is undoubtedly the Put the cart before the horse, courseware how to better show the knowledge to students so that students get better absorption and digestion is the fundamental purpose of the production and use of courseware. In the lesson "Hours, Minutes, Seconds", the teacher found a variety of clocks to show students the time. As a result, the students only marveled at the beauty of the clocks and watches, but did not observe and think about them. Though the teacher found a lot of examples of clocks and watches to explain, the students did not focus on observing the numbers corresponding to the hour, minute, and second hands and the changes in time brought about by the movement of the hands, but only thought that the clocks and watches looked good and wanted to do the same, and were deeply impressed by the interesting sounds made by the clocks and watches. When the teacher asks: "What law have you discovered?", no one can answer. Therefore, the design of maths teaching courseware should still highlight the knowledge points and avoid distracting students' attention with too delicate design.

In the context of the big data era, the improvement of the quality of primary school mathematics classroom requires the active participation of every teacher, who must change the traditional concept of teaching, innovate the teaching mode, continuously develop and apply the resources of the mathematics curriculum, and reasonably carry out the teaching evaluation, in order to achieve good teaching results and improve the quality of primary school mathematics

curriculum teaching.

References

- [1] Hu H. An empirical study of technology to promote deep learning in primary school mathematics [D]. Northeast Normal University, 2017.
- [2] Ningzhong Shi. Big data and primary school mathematics education [J]. People's Education, 2014(23):36-39.
- [3] Lili Sun. Research on the strategy of optimising primary school mathematics teaching under the background of big data[J]. Huaxia Teacher, 2019(05):34-35.DOI:10.16704/j.cnki.hxjs.2019.05.022.
- [4] Weiming Wen. An interactive primary school mathematics classroom based on big data analysis - The meaning of decimals as an example [J]. China Modern Education Equipment, 2016 (18): 32-34.DOI:10.13492/j.cnki.cmee.2016.18.012.
- [5] Shujun Li. Construction of personalised teaching mode of primary school mathematics based on big data[J]. Science and Education Wenhui (Zhongdian), 2019(12):145-146.DOI:10.16871/j.cnki.kjwhb.2019.12.065.
- [6] Tian H. Analysis of the application of modern educational technology in primary school mathematics teaching[J]. Curriculum Education Research, 2018(51):151.
- [7] Li Ruijun. Research on primary school mathematics teaching innovation under the support of information technology[J]. Academic Weekly, 2019 (31): 132.DOI:10.16657/j.cnki.issn1673-9132.2019.31.122.
- [8] Ting Chen. On the accurate teaching strategy of primary school mathematics based on big data[J]. Huaxia Teacher, 2020(01):91-92.DOI:10.16704/j.cnki.hxjs.2020.01.063.
- [9] Yi Chu. Research on the design and practice of smart classroom model in primary school mathematics teaching [D]. Anqing Normal University, 2020.DOI:10.27761/d.cnki.gaqsf.2020.000023.
- [10] Ji H. Primary School Mathematics Teaching in the Perspective of Big Data[J]. Primary school teaching reference, 2017(02):92.