### **RESEARCH ON THE STRATEGY OF AI ENABLED HIGH**

#### SCHOOL MATHEMATICS TEACHING EVALUATION

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#### ABSTRACT

Affected by the development of science and technology, artificial intelligence is penetrating into all fields of life, and the field of education will also be affected by it. In high school mathematics teaching, the traditional teaching evaluation method can not fully meet the needs of the development of the times, so it is urgent to improve and adjust with the help of artificial intelligence technology. At this stage, the evaluation of high school mathematics teaching mainly focuses on the test results, which has limitations. AI technology can collect and analyze data in teaching, and provide more comprehensive, objective and accurate data support for teaching evaluation. At the same time, it can improve the evaluation efficiency by providing intelligent teaching evaluation. Therefore, with the help of AI technology, we can improve the shortcomings of classical teaching evaluation, and provide a more scientific and personalized evaluation for high school mathematics teaching.

Keywords: AI empowerment, teaching evaluation, high school mathematics.

# INTRODUCTION: ANALYSIS ON THE CURRENT SITUATION OF MATHEMATICS TEACHING EVALUATION IN HIGH SCHOOL

#### 1. The Key Role Of Teaching Evaluation

As an important part of high school mathematics teaching, teaching evaluation comprehensively reflects the problems in the teaching process, and has far-reaching significance in the actual teaching.

First, teaching evaluation can promote students' development. In the process of teaching, teachers will ask questions in class, group discussion and report to master students' mastery of knowledge. Students can also constantly adjust to find their own way to learn targeted under the reminder of these teaching evaluation feedback.

Second, teaching evaluation can promote teachers' professional development. By correcting students' homework, observing classroom performance and analyzing exam results, teachers can have a deeper understanding of students' learning and problems, so as to reflect on their teaching process and improve their existing problems in time. Third, teaching evaluation can help education progress. By analyzing a large number

of teaching evaluation data, the education department can understand the overall situation of the current high school mathematics education, explore the universal problems existing in the process of education, and then formulate more scientific and reasonable education related policies. Schools and teachers can analyze students' learning status, and constantly adjust teaching content and optimize teaching methods according to students' more interested needs and entry points.

### 2. Development and problems of teaching evaluation at the present stage

Teaching evaluation plays an important role in high school mathematics teaching, but there are still problems in the form, standard and subject of teaching evaluation at this stage, which restricts the full play of the role of teaching evaluation. In general, it can be summarized as the following problems.

#### Single Evaluation Form

At present, the main evaluation form is still based on the examination results as the basis for measuring learning results and learning ability. This single examination evaluation method is easy to make students fall into the wrong zone of examination oriented learning and ignore the cultivation of mathematical thinking. Taking the chapter of sequence as an example, students may recite the general term formula and summation formula of sequence in order to cope with the exam, but in fact they do not understand the derivation process and application principle of these formulas.

#### The Evaluation Subject is not comprehensive

The main body of high school mathematics teaching evaluation is teachers. There are few opportunities for students' self-evaluation and mutual evaluation, which can not fully reflect the students' learning status. Students' self-evaluation and mutual evaluation can provide more authentic and specific feedback from the perspective of students themselves. Students adjust their learning strategies in a timely manner by self reflection and referring to the comments of teachers and other students, so as to adjust their learning strategies accordingly.

#### **Evaluation Feedback is not timely**

In the evaluation of high school mathematics teaching, it usually takes a period of time for teachers to feed back the evaluation results to students after correcting their homework and test papers. During this period, students may have forgotten their answer ideas and questions, leading to the distortion of the effect of evaluation feedback. In order to effectively achieve the goal of improving teaching quality and efficiency, it is urgent to use AI technology to innovate and optimize teaching evaluation.

## MODEL OPTIMIZATION OF AI ENABLED HIGH SCHOOL MATHEMATICS TEACHING EVALUATION

#### 1. Principles of teaching evaluation

#### **Principle of Objectivity**

The principle of objectivity requires that the real, effective and accurate evaluation results should be used to reflect the students' learning situation without any interference from subjective factors. With the introduction of AI technology, the objectivity of evaluation has been more strongly supported. AI can preset algorithms and standards to

conduct a comprehensive and systematic analysis of students' learning data, which will not be affected by teachers' personal emotions, preferences and other factors, making the score more fair and accurate. In addition, AI can also use intelligent monitoring equipment to record the data of each student's class participation, attention concentration, learning attitude and so on.

#### **Principle of Comprehensiveness**

The principle of comprehensiveness emphasizes that teaching evaluation should cover all aspects of students' mathematics learning to comprehensively evaluate students' mathematical literacy and ability development. The traditional high school mathematics teaching evaluation often focuses on the assessment of knowledge and skills, and the evaluation of students' comprehensive quality and ability is relatively insufficient. AI technology can collect and analyze multi-dimensional learning data to achieve comprehensive evaluation.

#### **Development Principle**

The developmental principle focuses on students' learning process and development potential, and emphasizes that evaluation is not only to judge students' learning achievements, but also to promote students' continuous progress. In high school mathematics teaching, each student has its own unique learning characteristics and development situation. The traditional summative evaluation method based on examination results can not fully reflect the students' learning process, nor can it show the students' development potential. The borrowing of AI technology can track and record the learning process of students in real time and realize developmental evaluation.

#### **Personalization Principle**

The principle of individuation pays attention to the individual differences of students, makes targeted evaluation according to the different characteristics of different students, provides personalized evaluation in time, and adapts to the development of students' personality. With its powerful data analysis and processing capabilities, AI technology can realize personalized evaluation. When evaluating students' homework and exams, AI can provide detailed analysis for students' specific problems on the basis of giving scores quickly and accurately, and can also provide improvement suggestions suitable for students. Taking a student's frequent lack of spatial imagination in solid geometry homework as an example, AI will point out this problem in the evaluation, and provide relevant practice questions and guidance on problem solving skills.

#### 2. The evaluation criteria are closely consistent with the curriculum objectives

In the process of AI enabled high school mathematics teaching evaluation, the close fit between evaluation criteria and curriculum objectives is the key to ensure the effectiveness and scientificity of teaching evaluation. With the powerful data analysis ability and intelligent processing function of AI technology, the evaluation criteria can be formulated more accurately, and the achievement degree of course objectives can be monitored in real time.

#### Evaluation Criteria should be formulated based on Curriculum Standards

High school mathematics curriculum standard is the basic basis of teaching, and also an important criterion for formulating teaching evaluation standards. Under the condition of AI empowerment, teachers can use AI technology to conduct in-depth analysis and effective interpretation of the curriculum standards, and refine the curriculum objectives into specific and measurable evaluation indicators. AI can carry out semantic analysis of the content in the curriculum standards, extract key knowledge points and ability requirements, and formulate standardized evaluation standards.

Taking the chapter of "sequence" in high school mathematics as an example, according to the curriculum standard of ordinary high school (2017 edition and 2020 Revision), students are required to understand the concept and representation of sequence, in addition to mastering the general term formula and the first n terms and formula of arithmetic sequence and proportional sequence, and also to be able to use these knowledge to solve some practical problems. Based on this, these goals can be transformed into specific evaluation indicators by using AI technology. At the knowledge level, set multiple-choice questions and fill in the blank questions about the concept of sequence, general term formula and summation formula to test the mastery of students' basic knowledge points; At the ability level, students are required to use the knowledge of sequence to solve practical problems, such as calculating the interest of their deposits in a bank and the production growth of a local enterprise. Through these means, students' knowledge application ability and problem-solving ability can be more effectively evaluated.

Of course, AI can also set the corresponding weight index for each evaluation index according to the requirements of different levels in the curriculum standard, such as "understanding", "understanding", "Mastering" and "application", so as to make the evaluation standard more scientific and reasonable. For the teaching goal of "Mastering the general term formula and the first N-term sum formula of the arithmetic and proportional sequence", according to its higher level requirements in the curriculum standard, a higher weight can be given in the evaluation standard to highlight its important role in teaching evaluation.

#### Real time monitoring of target Achievement with AI

AI technology can collect and analyze students' learning data in real time, and dynamically monitor the achievement of curriculum goals. Through the student's learning management system, AI can obtain the data of students' performance in various links, such as classroom learning, after-school homework, examination and evaluation, including students' answer, learning time, participation and other multidimensional information.

With the help of these data, AI can carry out data mining and provide computer learning algorithms, deeply analyze students' learning process and results, and timely judge whether students have mastered the course objectives comprehensively. By mastering and analyzing the answer data of each student in the unit test in the chapter of sequence, AI can understand the students' mastery of different knowledge points, quickly and effectively find out which students have difficulties in the application of the general term formula of arithmetic sequence, and which students have a deeper understanding of the summation formula of arithmetic sequence.

Once it is found that students' completion of some course objectives is low, AI can give an early warning in time. If AI detects that most students' scores on the practical application of sequence are not high, it can provide new suggestions to teachers, and teachers can appropriately increase the number of relevant exercises, or carry out review classes on special topics to help students consolidate and improve their abilities in this regard.

### 3. Implementation of process and performance evaluation

#### AI implementation strategy of process evaluation

In teaching evaluation, we should generally pay attention to students' learning dynamics, that is, we should carry out process evaluation. Through AI empowerment, we can more efficiently and comprehensively grasp students' learning data at this stage, and understand students' learning progress and learning ideas.

AI technology can collect the data of students' learning process in an all-round way with the help of various intelligent learning platforms and tools. During classroom learning, AI can use intelligent recording and broadcasting equipment and analysis software to record students' classroom participation, such as the number of speeches and performance, and the frequency of interaction with classmates, so as to evaluate students' classroom activity and learning enthusiasm. Taking the monotonicity of learning function as an example, teachers initiate classroom discussion through the online teaching platform, allowing students to freely discuss how to judge the monotonicity of function in a certain interval. The AI system can count each student's speech content and participation time in real time, and analyze students' understanding of knowledge points and thinking activity. If a student can accurately explain the method of using derivative to judge the monotonicity of a function, and can also analyze it in combination with specific functions, the AI system will record this positive performance; Similarly, the system can also identify students who have low participation or whose speech content deviates from the theme in time. In this way, teachers can play these contents after class, reflect on their own teaching problems, and correct the corresponding students' learning mistakes in time.

AI can also play a powerful role in homework after class. The intelligent homework correcting system can not only rapidly and accurately correct homework, but also deeply analyze students' problem-solving ideas and point out the causes of errors. When correcting problems, according to the problem solving steps written by students, the AI system can analyze the mastery of students' knowledge points, and judge whether students' errors are due to unclear concepts, calculation errors or improper problem solving methods. In addition, AI can also link the learning management system to record students' learning time, learning progress and the use of different learning resources. After understanding and analyzing these data, teachers can know the students' learning habits and learning rhythm, timely find out the difficulties and problems encountered by students in the learning process, and give guidance and help. **AI application innovation of performance evaluation** 

Performance evaluation is a teaching evaluation method to evaluate students' ability to solve problems by using the knowledge and skills they have learned in the real situation, focusing on the evaluation of students' comprehensive qualities such as practical ability and innovation ability. AI technology can provide diversified means and evaluation methods for performance evaluation, and make the evaluation more truly and

comprehensively reflect the ability level of students.

In recent years, mathematics experiment is also a hot topic in the field of education. With the help of AI technology, teachers can customize and create a virtual experimental environment, allowing students to carry out mathematical experiments and inquiry activities in the virtual scene. When learning to analyze, students can use the AI virtual experiment platform to draw various curves, adjust parameters, observe the change law of the curve, and then explore the nature of the curve. The AI system can record students' experimental operation process, experimental data and students' thinking and questioning in the experimental process in real time, and evaluate students' experimental ability, inquiry ability and problem solving ability according to these data. This is generally the evaluation content that teachers are not easy to notice and difficult to implement. If the student can accurately set parameters in the virtual experiment, observe the key characteristics of the curve, and reasonably analyze and explain the experimental results, it shows that the student has strong inquiry ability and application ability of knowledge.

In addition to using AI for evaluation in mathematical experiments, AI also plays an important role in project-based learning. When the teacher arranges mathematical projects based on practical problems, such as using mathematical modeling to solve the problem of urban traffic congestion, students need to collect data, establish mathematical models, solve models, and analyze and verify the results in the process of completing the project. AI can help students collect and organize data, use data analysis tools to process a large number of traffic data and extract useful information. Through the comprehensive evaluation of students' performance and use in project-based learning, we can more accurately grasp the development level of students' comprehensive literacy.

## DEFICIENCIEIS AND PROSPECTS OF AI ENABLED HIGH SCHOOL MATHEMATICS TEACHING EVALUATION

#### **1. Existing Deficiencies**

#### Data Quality and Data Privacy

AI enabled high school mathematics teaching evaluation highly depends on data, and the quality of data is directly related to the accuracy and reliability of the evaluation results. However, in practical application, the problem of data quality is more prominent. Due to the large number of students, the data may be incomplete. In the process of collecting these data, some data may be missing due to technical failures. When automatically collecting classroom performance data, it may not be able to fully record a student's speech due to equipment failures. These will seriously affect the results of AI analysis and lead to deviation in evaluation.

#### Short Board of teachers' Technical Application Ability

Teachers are the organizers and guides of school teaching activities, and play a key role in AI enabled high school mathematics teaching evaluation. At present, some teachers cannot skillfully use AI technology for teaching evaluation. AI teaching tools and platforms are constantly updated. Due to the lack of relevant technical training and learning opportunities, some teachers are difficult to skillfully use these tools for teaching evaluation. When using the intelligent scoring system, teachers may not be familiar with the operation process of the system and cannot accurately set scoring standards and parameters, resulting in deviation in scoring results. In addition, teachers also have difficulties in the deep integration of AI technology and teaching evaluation, which need to be solved urgently. Many teachers lack the ability to organically combine AI technology with teaching evaluation, and can not correctly use AI to analyze students' learning data, and can not deeply analyze students' learning problems reflected behind the data.

#### 2. Future Outlook

From the perspective of technology development trend, AI technology will continue to deepen its application in the field of education. AI teaching system will have stronger intelligent analysis ability and adaptive ability. Future AI teaching aids will be able to more accurately analyze students' learning behavior and even psychological state. In terms of application prospects, AI technology will play an important role in all aspects of high school mathematics teaching.

#### CONCLUSION

AI empowerment can promote the update and development of the field of high school mathematics teaching evaluation. With the development of the times, the traditional evaluation has not adapted to the efficient teaching process. Because the evaluation needs to follow the principles of objective, comprehensive, developmental and personalized development, and it also needs to build quantifiable indicators in line with the curriculum objectives, it is very important to collect the dynamic data of students' learning situation through the intelligent platform and carry out performance evaluation using AI virtual experimental environment. Of course, there are also some challenges in the evaluation of AI enabled teaching. Based on this, it is imperative to turn to the new strategy of AI enabled high school mathematics teaching evaluation.

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