J. Korean Soc. Math. Ed. Ser. D. (2022) 25(4), 267–284 ISSN 1226-6191
https://doi.org/10.7468/jksmed.2022.25.4.267 Online ISSN 2287-9943

RESEARCH ARTICLE

Analysis of the Construction and Effectiveness of Precision-Targeted Classroom Based on Analysis of Students' Real Learning Situation

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Received: August 11, 2022 / Accepted: December 29, 2022 / Published online: December 31, 2022

Abstract

In response to the current educational situation of students' heavy workload, the author constructs the precision-targeted classroom based on Precision Teaching (PT), Network Pharmacology, and Treatment Based on Syndrome Differentiation. The precision-targeted classroom can solve the current problems of PT and the phenomenon of the heavy academic burden on students, achieve the reduction of the burden and increase the efficiency of education. The precision-targeted classroom includes five key points: targeted goals, childlike thinking, precise intervention, intelligent homework, and stereoscopic evaluation, and the implementation process of the precision-targeted classroom is built from three aspects: before, during and after class. In addition, the author applied it to the actual mathematics classroom to test its teaching effect, and the experimental results showed that: the precision-targeted classroom significantly improved students' academic performance and thinking level; considerably improved students' classroom learning status, and facilitated teaching personalization and realized homework quantity control and quality improvement.

Keywords The precision-targeted classroom, Precision teaching (PT), Reducing the burden of students and improving classroom efficiency, Based on the analysis of students' real learning situation, Education modernization

• This research was supported by a grant from Jiangxi Provincial Education Department Postgraduate Innovation Fund Project (Number: YC2021-S314). Achievement unit: Jiangxi Normal University.
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I. INTRODUCTION

Mathematics anxiety and heavy school workloads are common among students around the world. East Asian students are particularly anxious and burdened with mathematics due to the intense competition for employment opportunities and the cultural emphasis on academic achievement. Students in East Asia also spend significantly more time at school (generally 8.25 h per day in the case of China) and more time participating in extracurricular tutoring compared to students in Organisation for Economic Co-operation and Development (OECD) nations (OECD, 2016; Prendergast & Zhang, 2016). The fundamental solution to solving the schoolwork load lies in improving the quality of school education (Zhang, 2021) and teaching based on analysis of students' real learning situation. Precision teaching (PT) is based on the big data of students' learning conditions, which enables more accurate and personalized teaching (Zhu & Peng, 2016). And PT can achieve this very well.

II. LITERATURE REVIEW

Precision teaching (PT) has a long history in the fields of education (Evans et al., 2021). PT was first proposed by Ogden Lindsley in the 1960s based on Skinner's behavioral learning theory for tracking elementary school students' learning performance and supporting data decision making (Binder, 1988). Johnson and Street (2014) define PT is a monitoring, practice, and decision-making technology for improving performance of any kind. Zhiting Zhu, a professor at East China Normal University, formally proposed PT and built a PT model supported by information technology in 2016. PT includes target precision, problem precision, and precise intervention (Peng & Zhu, 2016). Some scholars have also practiced, for example, Stromgren et al. (2014) conducted a PT experiment using multiplication and division as an example, and the test results showed that students in the experimental group made more consistent progress than those in the control group. Wang et al. (2019) proposed seven aspects of PT with the help of an e-schoolbag. They conducted four class hours of teaching practice for a middle school mathematics review class, which tested that PT has a good teaching effect.

However, in practice, PT has the following problems (Qin & Zhang, 2019; Wang et al., 2019; Chen, 2021； Wang et al., 2021): 1. poor student autonomy and difficulty in using micro-lessons for pre-study before class. 2.high requirements for information technology. 3.Teachers tend to fall into the over-promotion of big data.

Therefore, based on the theories of PT, Network Pharmacology and Treatment Based on Syndrome Differentiation, the author proposes the precision-targeted classroom based on analysis of students' real learning situation. The aim is to solve the problems in PT and improve the quality of teaching, to solve the problem of heavy school workload fundamentally. The author defines the precision-targeted classroom as a teaching model that, with the help of information technology, diagnoses students' real learning situations

and sets precise teaching objectives within the students' nearest development zone, designs precise questions, monitors and intervenes precisely in real time, and conducts precise evaluation, so as to achieve high-quality, personalized teaching, which includes five key points: targeted objectives, Childlike thinking, precise intervention, intelligent homework, and three-dimensional evaluation.

Given this, this paper will focus on the following issues: 1. the construction of the precision-targeted classroom. 2. the implementation process of the precision-targeted classroom. 3. the teaching effect of the precision-targeted classroom.

III. THE CONSTRUCTION OF THE PRECISION-TARGETED CLASSROOM

Precision-Targeted Classroom Guideline

The precision-targeted classroom adheres to One-center and Two-basic-points to ensure that the teaching process does not get lost and does not deviate (Figure 1).

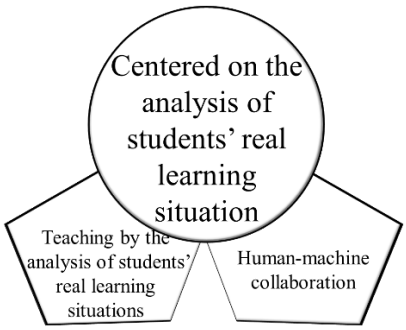

Figure 1. Precision-targeted classroom guidelines

Two-Basic-Points

Teaching by the Analysis of Students' Real Learning Situations. After understanding the analysis of students' real learning situations, teachers should take the analysis as the starting point, and insist on teaching should serve student learning and development. Students' active and practical learning is the ontological and purposeful activity in all teaching activities. Therefore, we need to teach by the analysis of students' real learning situations, so that teaching can be more relevant and selective, and teaching can genuinely promote the development of students and promote the growth of students.

Human-Machine Collaboration. With the help of information technology, teachers can collect data collections about students such as their knowledge mastery, thinking and methodological skills, and learning emotions. However, in the process of using big data to analyze students, teachers tend to fall into the over-promotion of big data and replace the leading and judging role of teachers in the teaching process with data decision-making (Chen, 2021). Teaching is an interactive process of knowledge building between students and teachers in a real-world environment, and students are not simply a

collection of data. Therefore, we use data as an intermediary force to achieve better teaching and learning in the precision-targeted classroom. The teacher's leading role in the whole teaching process is emphasized, and the teacher needs to take up the task of teaching the creative and emotional aspects of the process.

Centered on the Analysis of Students' Real Learning Situation

One-center means centering on the analysis of students' real learning situation. In teaching, students are not objects, but unique people with ideas, and the starting point for education should be the students, not the regularity of teaching. As the American educational psychologist David Pawl Ausubel suggested: the most crucial factor affecting learning is what students already know. Through the analysis of students' real learning situation before class, teachers can understand students' nearest development area, which is helpful for teachers to clarify the starting point of teaching, select teaching contents, and choose suitable teaching methods. Through the analysis of students' real learning situation during class, teachers can adjust teaching activities, which helps improve teaching quality. Through the analysis of students' real learning situation after class, teachers can understand students' learning situation, which is helpful for teachers to reflect and enhance teaching and can be used as part of the analysis of students' real learning situation when students learn the next new lesson. However, in the current classroom, many teachers rely on their own subjective experience when analyzing the students' learning situation, and analysis of students' learning situation is rather superficial and one-sided (Ma & Bao, 2013), only focusing on the study of the learning situation before the class (An, 2013). The analysis of students' learning situation should not be static and should be, but dynamic and real. The analysis of students' learning situation should not only be done before the lesson but also during and after the lesson (An, 2013). Therefore, the Precision-targeted classroom emphasizes the teaching based on analysis of students' **real** learning situation before, during, and after class to achieve an education that is truly fit for students.

Precision-Targeted Classroom Construction Process

Optimize PT and Propose Targeted Goals

To achieve a greater degree of organic combination of large-scale education and personalized training, the author has found a breakthrough in network pharmacology in medicine. Network pharmacology emphasizes that the development of disease is a long-term, complex and dynamic process (Tang et al., 2015), and the study of disease cannot be conducted simply from the thinking mode of one disease, one target and one drug (Xie et al., 2019), but we need to identify new drugs with high efficiency and low toxicity based on the disease-gene-target-drug interaction network (Wang & Li, 2010).

The same is true for students learning process in a classroom system with large numbers of students. With a large number of students, teaching from one person to one goal not only makes it difficult to achieve more precise goals in one lesson but also makes it challenging to cater to all students and to maximize the use of the 45 minutes of class. Although students are individuals with individual differences, they have a limited way of understanding something and can often be divided into a limited number of categories

(Chen, 2016).

Therefore, we look for the students' nearest development area to set different categories of targeted goals, and make one goal for more groups, which can maximize the personalized teaching. Targeted goals include essential targeted goals for all students, differential targeted goals above essential targeted goals for more able students, and compensatory targeted goals below essential targeted goals for less able students. Take targeted goals as the core of the precision-targeted classroom. And an important note here is that the differential and compensatory targeted goals do not refer to a single targeted goal but may be multiple targeted goal. It is also important to note that students' abilities are dynamic depending on the knowledge points, for example, students may be more capable for knowledge A but less capable for knowledge B. Therefore, it is important to analyze the students' real learning situation.

Then, how to set the targeted goal based on the analysis of students' real learning situations. The author proposed the process of targeted goals through the steps of Treatment Based on Syndrome Differentiation (Gao & Dong, 2019), and combined with Network Pharmacology (Figure 2). Firstly, we collect the analysis of students' real learning situations by pre-testing; secondly, we locate the students' nearest development area; thirdly, we find the students' cognitive impairment, and finally we set the targeted goals.

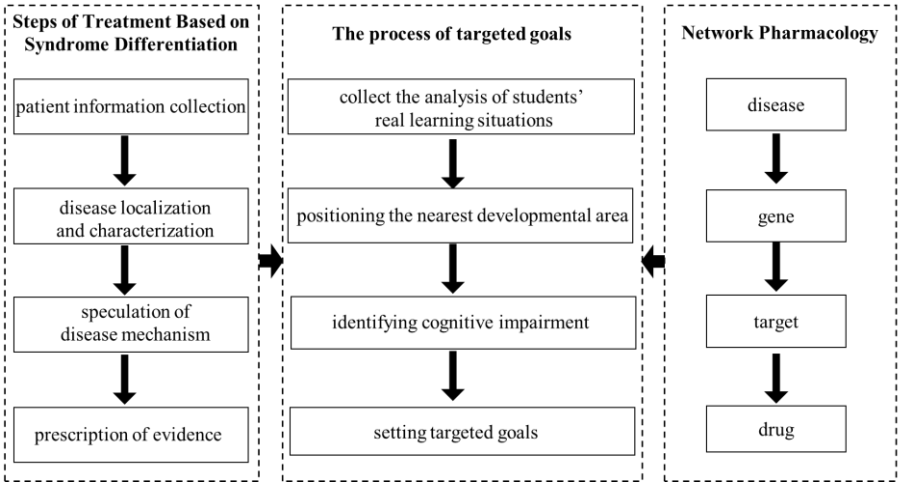

Figure 2. Flow of developing targeted goals

Four Strategies for Implementing Targeted Goals

After the targeted goals are set, how can we achieve this?

One is to promote the intellectualization of students' thinking with childlike thinking. Childlike thinking means that teachers should retreat to the level of students' thinking. Only by retreating to the level of students' thinking can we find out where students have doubts and can we design questions within the students' nearest developmental zone and after-school assignments that fit their personalities. When the questions and assignments are designed within the students' nearest developmental zone, students are motivated to reach their potential and move beyond their nearest

developmental zone to the next level of development. You can use childlike thinking to design classroom questions before class, childlike thinking to ask classroom questions during class, and childlike thinking to design intelligent homework after class.

The second lies in precise interventions to achieve accurate teaching and learning. Intervention can be divided into multiple levels. Such as the basic level for all students to promote completing the essential targeted goals. For a small number of students of the excellent and the poor level to promote differential and compensatory targeted goals. Teachers can carry out individual counseling for the extraordinary level that are not intervened to in class.

Through the above to achieve a more personalized and efficient classroom. In addition, teaching is a dynamic process. Teachers need to monitor the completion of targeted goals in real-time and then promptly adjust teaching according to the student's classroom generation so as not to be detached from students. This also reflects the fact that teaching is a dynamic process that requires analysis of students' real learning situation during the lesson. This facilitates a more personalized and tailored approach to teaching.

The third lies in intelligent homework, which can control the quantity of homework and improve quality of homework. Intelligent homework here is different from traditional homework, which does not consider students' real learning situation but sets the same after-school homework for all students. Intelligent homework, on the other hand, is designed according to students' ability stratification, with different homework. For example, the Smart Learning Network platform can be used to set essential homework for all students to promote their basic development. To select different supplementary homework for a few students in the excellent and the poor level to guide the excellent and compensate the poor, and meet student's individual needs. Set special homework for students in extraordinary level that are not intervened to in class to improve their effectiveness and push micro-lessons to help students better supplement and expand (Figure 3).

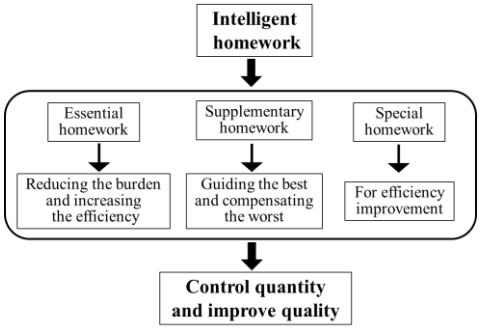

Figure 3. Intelligent homework

Finally, the Four-in-One stereoscopic evaluation of knowledge-based, ability-oriented, method-led, and literacy-oriented is used as the evaluation system to evaluate the completion of the targeted goals. The stereoscopic evaluation is not the traditional result-based evaluation, but based on the integration of the whole process of students' vertical learning and the whole elements of horizontal development, using big data analysis, listing

the relevant charts and graphs to show all the contents that need to be evaluated in the whole learning process of students, such as knowledge level, key ability level, thought and method level, literacy level, etc..

Targeted goals are the core of the precision-targeted classroom; childlike thinking is the cornerstone of the precision-targeted classroom; precise intervention is the soul of the precision-targeted classroom; intelligent homework is the key to the precision-targeted classroom; stereoscopic evaluation is the guarantee of the precision-targeted classroom. The targeted goals and the four strategies to achieve it are called the five critical points of the precision-targeted classroom, and they influence each other and reinforce each other (Figure 4).

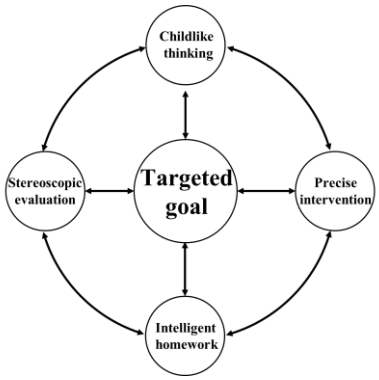

Figure 4. Five critical points for the precision-targeted classroom

IV. PRECISION-TARGETED CLASSROOM IMPLEMENTATION PROCESS

Based on the five critical points of the precision-targeted classroom, the author conducted a small-scale experiment from the end of September to the end of October 2021. And the author teams have continuously improved the process based on the experimental approach and the experimental results to establish the implementation process of the precision-targeted classroom (Figure 5). The units are divided into several items, and each item turns into a circular body structure between them. And the stereoscopic evaluation of the previous item can be used as the analysis of students' real learning situation of the next item. At the same time, the chapters can form a circular body between chapters. The author will discuss how to implement targeted goals from before, during and after the class.

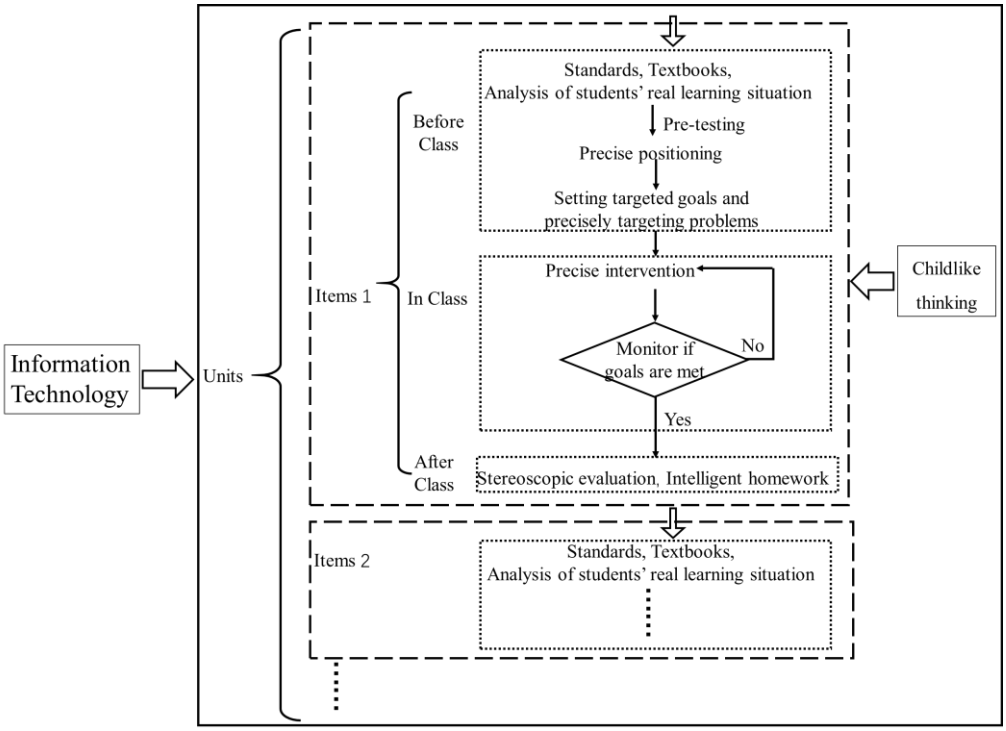

Figure 5. Precision-targeted classroom implementation process

Before Class: Data Consultation, Setting Targeted Goals, Designing Classroom Questions

Before the class, teachers use information technology platforms (such as Smart Learning Network platform) to collect the real learning situation of each student, such as what kind of mastery students have for the basic knowledge, key abilities, and ideas and methods needed to learn the lesson. Secondly, according to the big data collected, we can pinpoint students' starting points and set targeted goals. Finally, with the help of childlike thinking, we can design classroom questions, teaching strategies and teaching processes. It is important to note that it is not necessary to conduct pre-tests before every class, which is rather burdensome to students. Teachers should play the function of homework analysis, and can use homework to understand students' real learning situation.

The following is an example of *Linear Equation with One Unknown*. With the help of the Smart Learning Network platform, we can comprehensively collect information about students' performance, such as the correct rate and error rate of each question, the correct list and the error list, etc. The data collected from the pre-test revealed that 12.6% of the students forgot the concept of equation learned in elementary school; 24.1% of the students forgot the concept of simple equations with unknowns learned in elementary school; 34.7% of the students were not clear about the connection between equation and equations with unknowns; 45.3% of the students were weak in combining simple numbers and shapes. Therefore, we designed the targeted goals as follows.

- Essential targeted goals: Master the concept of linear equation with one unknown, be able to analyze practical problems by combining numbers and shapes, and be able to find out the equivalence and equations according to specific problems.
- Differential targeted goals: To be able to summarize the concept of linear equation with one unknown by oneself, to be able to use a variety of methods to find the equivalence and list the equations, and to master the method of combining numbers and shapes.
- Compensatory targeted goals: Master the concept of equation and equations with unknowns and be able to understand the difference and connection between them, be able to identify the equation from simple problems and list the equation, master the simple combination of number and shape method.

In Class: Precise Intervention, Childlike Thinking, Monitoring of Targeted Goals

During the lesson, we use classroom questions designed before the lesson based on childlike thinking and intervene precisely with the help of intervention strategies, which can make teaching more personalized, improve teaching quality and enhance learning efficiency.

For example, 45.3% of students are weak in number and shape combination, so we can use problem-driven interventions. For example, we can ask students who are good at combining numbers and shapes how they came up with this method, which can help students who have mastered it to improve their thinking and also help students who have not mastered it to understand it better. The questioning here also reflects childlike thinking, the difficulty of students is that they do not know how to think of using this method, so in the teaching process is not to give this method directly, but to teach students how to think of using this method. For some points with fewer errors, we can also ask questions to the students who made mistakes. For the 34.7% of students who are not clear about the connection between equations and equations with unknowns, we can use scaffolding interventions to build a framework for the concept and comparison of equations and equations to help students memorize in chunks.

we need to implement monitoring of students' learning status by precise interventions. The data collected from the students' classroom exercises can be used to diagnose what level the students are currently at and whether they have achieved their targeted goals, and the data obtained can be used to make a teaching adjustment so that the classroom is not detached from the students. This is what was said before that teaching is a dynamic process, which requires timely adjustment of teaching according to students' learning and requires in-class analysis of students' learning.

After Class: Intelligent Homework, Stereoscopic Evaluation, Implementation of Targeted Goals

After the lesson, teachers use platforms such as Smart Learning Network platform to assign intelligent homework to students based on their achievement of individual targeted goals. For example, in the teaching of *Linear Equation with One Unknown*,

through the classroom, it was found that the vast majority of students were able to achieve their essential targeted goals, differential targeted goals and compensatory targeted goals in class. However, there were three students who were not successfully intervened in class, i.e., extraordinary level students who needed special homework, so micro-lessons on simple equations in the fifth grade and linear equation with one unknown were pushed to these students. The remaining students were given essential homework, mainly to consolidate the concept of linear equation with one unknown and to find equations from specific problems with the help of number and shape combination. In addition, the supplementary homework for the better students is to try to find the equation from a variety of methods to list the equation and to spread students' thinking; the supplementary homework for the poorer students is the concept of equation and equations with unknowns, listing the equation from simple problems, mastering the simple number-shape combination method, and the main task of the students is to complete the supplementary homework, and those who have the ability can complete the essential homework again.

The results of intelligent homework review are also used as an aspect of student evaluation, forming stereoscopic evaluation of students, which can be used as an analysis of students' real learning situation for the next lesson, ultimately creating a circular structure between tasks. In addition, the evaluation can form the radar chart of students' overall knowledge, essential abilities, thinking and methods, and literacy. So that teachers can read the report and prescribe and students and parents can read the report and think of countermeasures, thus helping students, parents, and teachers to understand students from various aspects. And allows students, parents and teachers to understand students from multiple elements and promote students' personal development.

V. PRECISION-TARGETED CLASSROOM IMPLEMENTATION AND EFFECTIVENESS

Precision-Targeted Classroom Implementation

To test the effectiveness of the precision-targeted classroom, the author experimented for more than one month, from the end of October 2021 to the beginning of December 2021, using T School in Nanchang, Jiangxi Province, as the experimental school. And we selected Chapter 3 *Linear Equation with One Unknown* in the first book of Grade 7 as the teaching content. Through observing the preliminary lessons and the results of the tests (including the basic knowledge test and the thinking question test), the author selected three parallel classes from eight classes of the seventh grade as the experimental subjects. The number of students in all three classes was 46, the ratio of male and female students was basically the same, and the results of the basic knowledge test and the thinking question test were similar. One of the classes was used as the experimental class and was taught using the precision-targeted classroom implementation process through the Smart Learning Network platform. In contrast, the remaining two classes were used as control classes and taught as usual.

Since Chapter 3 of the first book of Grade 7, Linear Equation with One Unknown

consists of four sections, namely, Linear Equation with One Unknown, Solving Linear Equation with One Unknown (I), Solving Linear Equation with One Unknown (II), and Practical Problems and Linear Equation with One Unknown, the test questions are designed to test the effectiveness of precision-targeted classroom teaching. The author's team and the front-line teachers decided on the test questions. The test questions consisted of essential knowledge and thinking questions, with a ratio of 3:2 between essential knowledge and thinking questions. After the experiment, 46 questionnaires were distributed to the students in the experimental class to investigate the effect of precision-targeted classroom teaching further. 45 valid questionnaires were collected, with a reliability of 0.71 (Cronbach's Alpha) and validity of 0.76(KMO & Bartlett test). Then analyze the students' results and questionnaires using the SPSS 26.0 to test the effectiveness of precision-targeted classroom teaching.

Effectiveness of Precision-Targeted Classroom Implementation

Precision-Targeted Classrooms Significantly Improve Student Academic Achievement and Thinking

Students' total scores on the four posttests were analyzed, and the data met normality tests for repeated measures ANOVA. The four posttests were used as within-subject variables and the class as a between-subject factor. As can be seen through Table 1: the results of the sphericity test, $p>0.05$, satisfy the assumption of sphericity and do not require correction. As can be seen through Table 2: the significance of $p<0.05$ for the post-test in the between-subjects effect test indicates that there is a difference between the different post-tests; the significance of the interaction term between post-test and class $p<0.05$ indicates that there is a significant difference between the post-tests of the experimental and control classes, i.e., the difference in mean scores between the experimental and control groups is also different at different post-test points. From Table 3, we can find that the mean scores of the experimental class ranked first in all the post-tests except for the first post-test where the experimental class ranked second. From the second post-test to the fourth post-test, the experimental class mean was 4.07, 3.54, and 6.73 higher than the control class 1 mean; the experimental class mean was 2.94, 4.94, and 5.54 higher than the control class 2 mean, respectively. Above can indicate that the precision-targeted classroom significantly improved students' academic performance.

The following specific analysis of the student's results in the fundamental knowledge test questions and thinking questions (as shown in Table 4) reveals that: in terms of basic knowledge, except for the first post-test experimental class mean value ranked second, the rest of the post-test experimental class mean values were 2.01, 0.22, and 1.64 higher than the control class 1 mean values; experimental class mean values were 1.12, 1.72, and 1.6 more elevated than the control class 2 mean values. Regarding thinking questions, except for the first post-test, the experimental class mean was similar to the control class, and the rest of the post-test was 2.06, 3.32, and 5.09 higher than the control class 1 mean. The experimental class means were 1.82, 3.22, and 3.94 higher than the control class 2 mean.

As time progresses, the knowledge students learn becomes more integrated, so both

the basic knowledge test and the thinking question test included in the post-test are more integrated, and there will be a greater gap between the scores, and it will be easier to reflect students' thinking skills.

Table 1. Mauchly's Test of Sphericity[a]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Post-test	0.937	8.014	5	0.155	0.962	1.000	0.333

a. Design: Intercept + Classes

Within Subjects Design: Post-test

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Table 2. Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Post-test	Sphericity Assumed	30.729	3	10.243	2.343	0.042	0.730
Post-test * Class	Sphericity Assumed	337.725	6	56.287	3.887	0.032	0.730
Error (Post-test)	Sphericity Assumed	11094.763	372	29.825			

Table 3. Comparison of the total scores of the four post-tests in the experimental and control classes

	Experimental Class		Control 1 class		Control 2 class	
	Average value	Standard deviation	Average value	Standard deviation	Average value	Standard deviation
First post-test	29.93	10.107	27.13	8.719	30.47	9.351
Second post-test	32.29	6.560	28.22	7.132	29.35	7.255
Third post-test	34.12	7.038	30.58	7.939	29.18	8.162
Fourth post-test	35.43	6.482	28.70	7.916	29.89	7.248

Table 4. Comparison between the four post-test basic knowledge questions and thinking questions in the experimental and control classes

	Mean value of experimental class		Control 1 class mean value		Control 2 classes mean value	
	Basic knowledge questions	Thinking Questions	Basic knowledge questions	Thinking Questions	Basic knowledge questions	Thinking Questions
First post-test	19.79	10.14	17.11	10.02	20.28	10.19
Second post-test	20.04	12.25	18.03	10.19	18.92	10.43
Third post-test	19.67	14.45	19.45	11.13	17.95	11.23
Fourth post-test	19.86	15.57	18.22	10.48	18.26	11.63

The mastery of students' knowledge points (Table 5) and the mastery of mathematical ideas (Table 6) was calculated with the help of the Smart Learning Network platform. Table 5 shows that the experimental class generally mastered more knowledge points than the two control classes. Table 6 shows that the experimental class dominated more mathematical ideas than the control classes.

Table5. Comparison of knowledge mastery between the experimental class and the control class

Knowledge Points	Mastery of experimental class (%)	Control 1 class mastery (%)	Control 2 class mastery (%)
Abstraction of linear equation with one unknown from real problems	64.91	62.63	63.75
Solution of linear equation with one unknown	71.01	70.58	70.46
Two different equations with the same solution	76.67	60.67	63.04
Application of linear equation with one unknown	65.74	61.08	62.79

Table 6. Comparison of the mastery of mathematical thinking methods between the experimental and control classes

Mathematical thinking methods	Mastery of experimental class (%)	Control 1 class mastery (%)	Control 2 class mastery (%)
Transformation ideas	64.18	60.11	60.98
Combination of number and shape ideas	69.74	65.38	66.24
Equation Ideas	73.42	69.52	68.35
Analogical reasoning	65.62	62.15	61.77

In summary, it can be concluded that the precision-targeted classroom is significantly better than traditional teaching in terms of improving students' academic performance, facilitating their knowledge acquisition, and developing students' thinking.

Precision-Targeted Classroom Significantly Improves Students' Learning Status in the Classroom

The data in Table 7 shows that 88.9% of the students believed they could always keep their attention in the precision-targeted classroom compared to the previous classroom style. 77.8% of the students believed they could always respond to the teacher actively in the precision-targeted classroom compared to the previous classroom style. 82.1% of the students believed they experienced the joy of learning mathematics through the precision-targeted classroom. 77.8% of the students thought they were more interested in mathematics through the precision-targeted classroom. The data in Table 8 shows that 91.1% of the students liked the precision-targeted classroom.

From the above data, it can be concluded that the precision-targeted classroom with the analysis of students' real learning situation can design lessons that are within the students' nearest developmental zone and more appealing to students. The classroom allows them to discover more exciting and fun knowledge, stimulates their interest in learning mathematics, and cultivates positive motivation for learning mathematics.

Table 7. Student learning status in the precision-targeted classroom

	Strongly conform (%)	Comparative compliance (%)	Conformity (%)	Comparative non-conformity (%)	Very non-conforming (%)
Compared to the previous way of classes, I can always stay focused in the precision-targeted classroom	17.8	53.3	17.8	11.1	0.0
Compared to the previous way of classes, I always respond actively to the precision-targeted classroom	20.0	31.1	26.7	15.6	6.6
Through this course, I can enjoy learning mathematics	24.4	24.4	33.3	13.4	4.5
Through this course, I become more and more interested in mathematics	28.9	17.8	31.1	20.0	2.2

Table 8. Student favorability of precision-targeted classroom

	Like very much (%)	More like (%)	Like (%)	More dislike (%)	Dislike very much (%)
Whether you like the precision-targeted classroom	28.9	37.8	24.4	8.9	0

Table 9. Precision-targeted classroom instruction personalization

	Strongly conform (%)	Comparative compliance (%)	Conformity (%)	Comparative non-conformity (%)	Very non-conforming (%)
Compared to the previous way of classes, the precision-targeted classroom is more able to focus on what I don't know	24.4	20.0	35.6	15.6	4.4
Compared to the previous way of classes, the precision-targeted classroom is more capable of solving what I don't know	15.6	33.3	33.3	15.6	2.2
Compared to the previous way of classes, I feel like I am getting more attention in the precision-targeted classroom	24.4	28.9	28.9	13.3	4.5
Compared to the previous way of classes, I am more active in expressing my opinion in the precision-targeted classroom	20.0	26.7	35.6	11.1	6.6

Precision-Targeted Classroom is Conducive to the Personalization of Teaching and Achieving Quantity Control and Quality of Homework

Through the data in Table 9, it can be found that: 80% of the students think that compared with the previous classroom style, the precision-targeted classroom is more focused on what they do not know; 82.2% of the students believe that compared with the previous classroom style, the precision-targeted classroom is more able to address what they do not know; 82.2% of the students thought that they could get more attention in the

precision-targeted classroom than in the previous classroom; 82.3% of the students thought that they could express their opinions more actively in the precision-targeted classroom than in the previous classroom. The data in Table 10 shows that 88.9% of the students thought that the intelligent homework assigned in the precision-targeted classroom could also focus better on the areas they did not know or were weak. And 86.7% of the students thought the number of intelligent homework was less than the previous homework.

From the above data, we can conclude that the precision-targeted classroom can pay more attention to each student and provide a better platform for each student to show themselves and express themselves. At the same time, the precision-targeted classroom can also better improve the quality and efficiency of classroom teaching. In terms of homework, the intelligent homework of the precision-targeted classroom can also target students' doubts well. And the quantity of homework is also less than traditional homework, which can reduce the amount of homework while ensuring the quality of homework and achieving the effect of controlling quantity and improving quality.

Table 10. Intelligent homework to control quantity and improve quality

	Strongly conform (%)	Comparative compliance (%)	Conformity (%)	Comparative non-conformity (%)	Very non-conforming (%)
intelligent homework is more focused on the areas I don't know or am weak in	24.4	35.6	28.9	8.9	2.2
Compared to the previous classes, the intelligent homework is less	22.2	44.4	20.1	13.3	0

VI. CONCLUSION

In order to promote mathematical thinking, students need to be able to really think and adopt mathematical habits of mind (Cuoco et al., 2010). For teachers, then, they need to design classroom questions that get students thinking. When classroom questions are designed to return students to their level of thinking and within their zone of recent development (Liu & Yu, 2020), they are well suited to provoke students' thinking and engage their interest in learning. Precision-targeted classrooms can do exactly that, and therefore can significantly improve students' thinking and learning status. In addition, the balance between large class sizes and individualized instruction is an ongoing effort in education (Zhu & Peng, 2020), and precision-targeted classrooms can achieve this with

targeted goals and interventions. All of these can help students reduce their academic load in terms of improving the efficiency of classroom instruction (Zhang, 2021). Another direct way to help students reduce their academic burden is to improve the quality of homework while reducing the quantity of homework (Li & Li, 2022), which can also be achieved by using intelligent homework in the precision-targeted classroom.

The author's team is still studying and exploring the precision-targeted classroom and developing more case studies to help front-line teachers better understand the precision-targeted classroom and improve teaching effectiveness.

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