Curriculum and Teaching Methodology (2022)
Clausius Scientific Press, Canada

DOI: 10.23977/curtm.2022.051411
ISSN 2616-2261 Vol. 5 Num. 14

Investigation and Research of Mathematics Academic Quality Evaluation in Ordinary Senior High School

Jingmei Yang

School of Teacher Education, Qujing Normal University, Qujing, 655011 China

Keywords: Core literacy, High school math, Evaluation of academic quality

Abstract: Under the background of the new curriculum reform of mathematics in ordinary high school, the evaluation of academic quality plays a decisive role in teaching evaluation as a means of testing and controlling the quality of classroom teaching. The evaluation of academic quality is a hot topic after the new curriculum reform. The study of the evaluation of academic quality of high school mathematics meets the needs of the current situation and is the inevitable requirement of the educational reform and development in the new era. Taking some high schools in Yunnan Province as an example and combining with the contents of the questionnaire survey, this paper finds out the existing problems in the current high school mathematics academic quality evaluation from three aspects: ignoring the guiding function of evaluation, ignoring the requirement of the diversification of evaluation subjects, and the evaluation index is not specific and comprehensive enough, and puts forward the corresponding improvement measures: building a scientific academic quality evaluation system; To carry out training for teachers to evaluate the academic quality of the new curriculum. In order to promote the implementation and achievement of students' mathematical core literacy through evaluation, focus on cultivating qualified talents with mathematical literacy.

1. Background

1.1 Research Background and Significance

Since the promulgating of the 2017 edition of ordinary high school mathematics curriculum standards, all over the country have been developing local academic quality analysis and feedback systems, and began to pay attention to the quality monitoring of high school education. Teachers generally reflect: the national and provincial academic quality monitoring questions are more flexible, testing students' ability in all aspects, while the usual academic level tests are still mainly knowledge-oriented, there is a wide gap. However, the slow progress of evaluation reform restricts the development of students' core literacy to a certain extent and becomes a stumbling block of education reform and curriculum reform. How to ensure the scientific and professional evaluation of mathematics academic quality is a practical problem that every mathematics educator should devote himself to studying and solving, and it is also the inherent requirement of deepening the reform of education evaluation. The evaluation of academic quality has the function of feedback, regulation and control of teaching, and promoting the all-round development of students. It is also

an important index to measure the effectiveness of teaching. Therefore, it is of great significance to study the theory and method of high school mathematics academic quality evaluation.

1.2 The Connotation of Mathematics Academic Quality Evaluation

In the definition of academic quality evaluation, scholars have different understandings. It is widely believed that academic quality assessment is an activity aimed at promoting students' learning. By measuring, analyzing and comparing students' academic performance or behavioral results, we can find problems in teaching and put forward suggestions for improvement [1]. The collected information and data are used to judge the changes and development of students after completing learning activities, and value judgment is made on students' cognition, emotion and skills based on the collected information and evidence [2]. From this perspective, academic quality is to determine the state and development trend of students reaching or exceeding a certain level by measuring the corresponding information obtained by students in a certain period of time [3].

1.3 Research Status

Although domestic research progress in the evaluation of academic quality is slow, but with the reference of foreign research results, some Chinese experts and scholars have gradually made some progress in the research.

First, theoretical research. Guided by core literacy, Xin Tao et al. emphasize the integration and integration of various disciplines and attach importance to the evaluation of new technology fields [4]. Wang Guangming et al. pointed out that the actual implementation of core literacy is closely related to the implementation of the requirements of core literacy in the assessment field. Core literacy is one of the most basic and valuable elements in subject education. It not only reflects the direction and goal of one's learning and development, but also reflects the key ability of an individual to achieve the result in a specific situation [5]. Dong Huan firstly explained the importance of the assessment of students' core literacy, which is one of the most basic and valuable elements in subject education. It not only reflects the direction and goal of a person's learning and development, but also reflects the key ability of an individual to achieve the result in a specific situation [6].

Second, practical research. We should follow the principle of multi-subject participation in evaluation and respect the characteristics and features of different types of schools. Yang Xiangdong pointed out that only through the analysis of specific problems or situations and the construction of an evaluation system, can an accurate conclusion be reached. He suggested that the level of individual core literacy should be reasonably measured, and the measured level of core literacy should be connected with the real performance of individuals in specific work [7]. Du Lingling et al. pointed out that the proposition in the evaluation is not based on simple knowledge and skills, but focuses on the skills shown after the accumulation of knowledge and skills, as well as the combination of discipline function and education value [8].

The ability oriented mathematics teaching and evaluation has formed the academic consensus [9], and the construction of the index system framework of mathematics subject ability performance has become the core issue of the construction of the monitoring framework. During the construction of the index system, it is based on the theoretical and practical achievements of mathematics education research in China, as well as the relevant experience of international curriculum and large-scale assessment projects [10].

2. Subjects and Methods

2.1 Research Objects

This study selected some high school mathematics teachers in Yunnan Province to carry out a survey, in order to have a deeper understanding of the evaluation status of high school mathematics academic quality.

2.2 Research Methods

2.2.1 Literature Analysis

According to the research needs, the relevant literature was searched through the database of China National Knowledge Network, and the key words were mainly "mathematics academic quality evaluation" and "high school mathematics academic quality", and the network reference materials were obtained. At the same time, I also collected some domestic and foreign scholars on the evaluation of high school mathematics academic quality literature, in order to learn from and absorb the previous research results, and provide a literature basis for the research of this paper.

2.2.2 Questionnaire Survey

Based on literature review and the need for the research on the topic of this paper, the Questionnaire for the Evaluation of the quality of high school mathematics education in Yunnan Province was formulated in view of the evaluation of the quality of high school mathematics education. 200 high school mathematics teachers from various cities and counties in Yunnan Province were selected to conduct a questionnaire survey. A total of 200 network questionnaires were sent out, and 185 effective questionnaires were recovered with an effective recovery rate of 92.5%.

2.2.3 Mathematical Statistics

After sorting, classifying and archiving the recovered questionnaire data, Excel 2022 was used for statistical processing of the data, and a three-line table meeting the requirements of this study was made, which laid a reliable foundation for accurate analysis of the final obtained results.

3. Results

Combined with the contents of the questionnaire survey, the analysis is mainly carried out from five aspects: teachers' understanding of the evaluation purpose, teachers' understanding of the evaluation methods, teachers' understanding of the evaluation indicators, teachers' understanding of the evaluation standards and evaluation suggestions, and teachers' selection of the evaluation time point.

3.1 Teachers' Understanding of the Purpose of Academic Quality Evaluation

The evaluation of academic quality is based on the teaching objectives, using a variety of effective methods and means to determine or diagnose whether the students have achieved the teaching objectives, and to evaluate the achievement of the objectives. Therefore, teachers' understanding of the purpose of evaluation is the key to carry out evaluation work. If the understanding is in place, the thinking method will not be biased.

Table 1: Teachers' Understanding of the purpose of academic quality Evaluation (N=185)

options	number of people	Proportion (%)
Feedback students' learning in a certain period of time, understand their own strengths and weaknesses for improvement	123	66.48
Report to school and parents	17	9.18
Distinguish the level of student learning	22	11.89
Give the students a grade	23	12.43

As shown in Table 1, according to the survey of teachers' views on the purpose of academic quality evaluation, 123 teachers chose to evaluate students' academic quality to understand their knowledge mastery in a certain period of time and to know their strengths and weaknesses so as to improve their study, accounting for 66.48%; 17 teachers chose to evaluate students' academic quality mainly to report the situation to the school and parents, accounting for 9.18%; 22 teachers chose to evaluate students' academic quality mainly to distinguish the level of students' learning, accounting for 11.89%; 23 teachers chose to evaluate students' academic quality in order to give students a math score and let them know their own math level, accounting for 12.43%. It can be seen from the survey results that most teachers have a good understanding of the purpose of "guiding teaching and learning" in the evaluation of academic quality. Through the evaluation, teachers can clarify the problems and obstacles in students' learning so as to improve the teaching methods and strategies.

3.2 Teachers' Understanding of Evaluation Methods

Teachers' different evaluation methods will have a great impact on students' learning results. The incentive evaluation can make the students energetic, combative and invigorated. If the negative evaluation method is adopted, it will not only fail to play the role of motivation, but also lead to the students' rebellious psychology. Therefore, it is an art for teachers to evaluate students. Different evaluation methods have different influences on students' learning results. Therefore, every teacher should follow the evaluation concept of "people-oriented" in order to promote students' learning through evaluation.

Table 2: Teachers' understanding of evaluation methods (N=185)

options	number of people	Proportion (%)
oral test	23	0.54
Growth record bag	32	17.30
Teachers write comments	45	24.32
Students evaluate each other	33	17.83
Student self-evaluation	56	30.27
Based on normal performance	68	36.21
paper and pencil test	180	97.29

As shown in Table 2, there are 7 teaching evaluation methods generally adopted by teachers. It can be seen that teachers' teaching evaluation methods have developed in the direction of diversification. Among these different types and functions of evaluation methods, almost all teachers are inclined to adopt "paper-and-pencil test", accounting for 97.29%. According to the data, 68 teachers adopted the evaluation method of "according to the usual performance", accounting for 36.21%. However, only 23 teachers expressed the use of "oral examination" evaluation method, accounting for 0.54%, which is the lowest among the 7 methods. It can be seen from the survey results that most teachers still use the way of "doing problems" to test students' assessment of basic

mathematical knowledge, basic skills, mathematical thinking and problem-solving ability. This evaluation mainly applies the traditional assessment mode, which is difficult for high school innovation and breakthrough.

3.3 Teachers' Understanding of Evaluation Indicators

One of the principles for teachers to evaluate students is to treat each student objectively and fairly. Once the evaluation index is not selected properly, the evaluation will lose its pertinence and authority, as well as its significance, and it will have an adverse impact on the development of students. Therefore, in order to improve students' learning quality and comprehensive quality, we must choose a scientific and reasonable evaluation index. However, only evaluation indicators are far from enough. At the same time, students' acceptance should also be taken into consideration. Real teaching can make students resonate, make them confident, and turn confidence into motivation, so as to achieve the desired effect.

Table 3: Teachers' understanding of evaluation indicators (N=185)

options	number of people	Proportion (%)
Classroom discipline	39	21.08
Activity experience shown by students while learning	45	24.32
Mathematical thought methods constructed by students	87	47.03
Emotion and attitude in Mathematics learning	66	35.67
The method and ability to solve problems are shown in mathematics learning	105	56.75
The mastery of basic mathematical knowledge and basic skills	139	75.13

As shown in Table 3, most teachers can evaluate students' learning according to the detailed index of teaching objectives. 139 teachers choose evaluation to test students' mastery of mathematics double bases, accounting for 75.13%. Due to the characteristics of mathematics, such as application and problem, 105 teachers expressed that they attach importance to "cultivating students' learning ability to discover and solve problems", accounting for 56.75%. 39 teachers, accounting for 21.08%, said they attached importance to students' "classroom discipline". At the same time, some teachers take "emotion and attitude shown in mathematics learning" as the index to evaluate students' learning results. It can be seen that teachers' evaluation of students does not only focus on the mastery of "double basics", but also look at students' gains in "four basics" and "four abilities" with The Times.

3.4 Teachers' Understanding of Curriculum Standard Evaluation Suggestions

The evaluation of mathematics curriculum standards should fully reflect the orientation of curriculum objectives and the evaluation idea of curriculum standards. Therefore, in the actual evaluation process, teachers should not only examine students' foundation, but also examine students' performance in acquiring knowledge and skills, and fully adhere to the teaching objectives.

As shown in Table 4, there are 13 teachers who think the evaluation suggestions of the curriculum standards are important and easy to operate, accounting for 7.02%; 35 teachers believed that the evaluation suggestions were important and operable, accounting for 18.91%; Most of the teachers thought that the evaluation suggestions were important but not easy to operate, accounting

for 56.21%; 33 teachers, accounting for 17.83%, thought that the evaluation suggestions were important but impossible to operate. From the above survey data, it can be seen that teachers all agree with the suggestion of developmental evaluation of math curriculum standards, but due to the pressure of examination, the limitation of class time, the heavy teaching tasks and other reasons, the evaluation is more important than the process.

Table 4: Teachers' Understanding of curriculum standard evaluation Suggestions (N=185)

options	number of people	Proportion (%)
Important and well operated	13	7.02
Major and operable	35	18.91
Important but not so good operation	104	56.21
Important but fundamentally inoperable	33	17.83

3.5 Teachers' Choice of Evaluation Time Point

At present, as for the selection of evaluation time point, most teachers say that they pay more attention to the final examination of each semester, in addition to the mid-term examination, monthly examination, joint examination, unified examination, as well as various unit detection and mock examination at ordinary times. It can be seen that the teachers' choice of evaluation time point is flexible, but it only focuses on the time arrangement of the examination paper, and does not involve the time of other evaluation forms.

Table 5: Teachers' choice of evaluation time point (N=185)

options	number of people	Proportion (%)
The beginning of each semester is	17	9.18
at any time during the semester	105	56.75
At the end of the semester	45	24.3
for every chapter learned	18	9.72

As shown in Table 5, 17 teachers said that they would evaluate students' academic quality "at the beginning of each semester", accounting for 9.18%, which is the smallest among the four options. These teachers mainly want to know the basic level of students through pre-test. 105 teachers chose the second option, "any time in every semester", accounting for 56.75%. Combining evaluation in teaching, grasping the opportunity of teaching evaluation, adjusting teaching design timely according to evaluation results, and giving play to the function of evaluation "improving teacher teaching".

4. Conclusions

4.1 Research Conclusions

Through the analysis of the above survey results, it can be seen that the evaluation of the academic quality of high school mathematics has been trying to explore the practice. While the evaluation of the academic quality has achieved some results, there are also some problems.

4.1.1 Ignoring the Guiding Function of Evaluation.

In the mathematics curriculum standard, it is proposed that: for the daily behaviors of students in the learning process, the positive assessment methods such as praise and encouragement should be used to arouse their learning enthusiasm, and the incentive role of assessment should be given full

play to actively guide and mobilize their confidence and enthusiasm. However, some teachers use qualitative descriptions like "very good", "very good" and "excellent" to evaluate students' learning without looking at the real situation of students' answers in daily teaching evaluation. For example, some students do not have a clear idea to solve the problem, and the process is not specific, but the result is correct. Some teachers use such complimentary comments as "great" and "very good". If there are too many blind "praise" and "encouragement", students can easily get the teacher's praise, which is against the spirit of the evaluation of the curriculum standard. It neglects the function of evaluation, motivation and promoting the development of students, and is not conducive to the growth of students.

4.1.2 Ignoring the Requirement of Diversification of Evaluation Subjects.

At present, the main body of academic quality evaluation is mathematics teachers, which lacks the participation of social level, parents level, school management level and students' self-evaluation and mutual evaluation. However, the evaluation made by teachers is subjective and one-sided, and cannot reflect the objectivity and fairness of the evaluation. This will lead to students' motivation to study only for exams, which dissimilates the orientation of evaluation to promote students' all-round development of body and mind. Teachers should pay attention not only to the change of students' academic achievement in mathematics, but also to the evaluation of the formative process of acquiring knowledge and skills. Therefore, we must adhere to the principle of "development", take development as the main line, pay attention to the combination of process and result, attach importance to the participation of multiple subjects, and construct the evaluation mode of diversified evaluation target system.

4.1.3 Evaluation Indicators Are Not Specific and Comprehensive Enough.

According to the survey results, among the "four bases" stipulated by the teaching objectives, teachers attach more importance to the acquisition of knowledge and ability, followed by the accumulation of mathematical thinking methods and basic activity experience. Most teachers mainly use the combination of "paper-and-pencil test" and "daily homework" to evaluate students. It is easy to determine the ranking of students in the class simply by the test results, which is likely to produce the terminal "label effect". Quantifiable factors should be fully explored in the classroom teaching process, such as refining indicators that can evaluate students' performance in classroom observation, teacher-student interaction, classroom discussion, speech communication, practical activities and other links, so as to pay attention to both the result and the process.

4.2 Teaching Suggestions

To sum up, in the actual evaluation process, high school mathematics teachers are blind to the implementation of academic quality evaluation. Under the influence of examination, students' achievement is the main concern of the school and the society, which is bound to make the reform of academic quality evaluation difficult to break the traditional mode. At the same time, due to the influence of exam-oriented education, some mathematics teachers still adopt the single and mechanical teaching means and methods in the past, which makes the teaching quality can not be improved. In order to optimize the evaluation method and realize the evaluation function of "promoting teaching by evaluation and learning by evaluation", the following teaching suggestions are put forward.

4.2.1 Establish a Scientific Evaluation System of Academic Quality.

This is one of the important contents of the implementation of academic evaluation, and the evaluation mechanism is the key to ensure the realization of this goal. The design of observable and quantifiable evaluation indicators is a very important step to ensure the scientific and reasonable evaluation results. This requires us to start from the teaching practice, combined with the learning situation to carry out effective rectification and optimization. According to different grades, different areas of the students to set different proportion, not only to evaluate the learning results of students, but also to show in the process of learning the core quality of mathematics assessment, and give specific measures.

4.2.2 Conduct Relevant Training for Teachers on the Evaluation of the Academic Quality of the New Curriculum.

Questionnaire analysis shows that one of the reasons hindering the implementation of academic quality evaluation is that teachers lack understanding and cognition of the evaluation concept of academic quality of the new curriculum, let alone the practical operation. In order to improve teachers' participation in the evaluation process of the academic quality of the new curriculum and promote teachers to effectively carry out the inspection work of the academic quality of the new curriculum, the content of the training should not only pay attention to the theoretical learning, but also pay attention to the practical training. By changing the traditional evaluation mode and introducing modern teaching information collection equipment, teachers should not only accept the baptism of new evaluation concepts, but also learn advanced technical means, obtain the dynamic process data of students' learning based on massive information of big data, and then analyze students' mastery of "four basics", "four abilities" and "six cores". Truly do "speak with data, with facts to prove", to achieve a basis for improvement measures, rectification effect with reference to the normal management.

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