

Study on the current situation and influencing factors of information teaching ability of junior middle school mathematics teachers

— Analysis of the data based on the SPSS

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Abstract. Under the background of information technology, the teaching ability of junior middle school mathematics teachers provides new information for the requirements of "The Times", and is an important driving force for the reform of teaching forms. Through the Yantai development zone of a junior high school in 105 junior high school mathematics teachers information teaching ability present situation and the investigation and analysis of the influencing factors, found that the junior middle school mathematics teacher information teaching implementation ability, innovation ability is not strong, junior middle school mathematics teachers' information teaching ability also have significant differences in teaching age, found self attitude, peer role, school environment factors have significant influence on information teaching ability, and put forward the corresponding improvement strategy.

Keywords: Junior high school mathematics teachers; information teaching ability; current situation and influencing factors.

1. Introduction

In April 2019, the Ministry of Education promulgated and implemented the Opinions on the National Information Technology Application Ability Improvement Project 2.0, emphasizing that the improvement of teachers' information-based teaching ability as one of the overall development goals. Junior high school mathematics teachers are an important force of teachers, and the level of their information teaching ability affects the shaping of the new relationship between teaching and learning in the future and the improvement of classroom teaching effect. Under the information environment, as applied talents, junior middle school mathematics teachers have been given a new mission. In this paper through the questionnaire, understand the junior middle school mathematics analysis of the information teaching ability of junior middle school mathematics teachers in different grade differences, found the existing problems and influencing factors, put forward the junior middle school mathematics teachers effective strategy of information teaching ability, for the cultivation of junior middle school mathematics teachers' information teaching ability to provide reference.

2. Research design

2.1 Subject investigated

The object of this study is 205 junior middle school mathematics teachers in Yantai Development Zone. Among them, there are 65 teachers in grade one, 68 teachers in grade two and 72 teachers in grade three.

2.2 Questionnaire design and composition

Taking the requirements of The Educational Technology Ability Standard of Junior High School Teachers as the benchmark level, the questionnaire on the current situation and influencing factors of the information teaching ability of junior middle school mathematics teachers was compiled. The questionnaire is mainly divided into the first part: including basic information, mainly understand the grade of junior high school mathematics teachers, teaching age; the second part is the status survey of information teaching ability, including information teaching consciousness level, information resource integration ability, information teaching design ability, information teaching implementation ability and information teaching innovation ability, the purpose is to understand the real situation of the information teaching ability, including self-awareness, peer role, curriculum implementation, school environment, used to explore the information teaching The close relationship between learning ability and influence factors. The questionnaire is presented in the form of a 5-level Likert scale, and each statement is divided into five grades: complete, comparative, general, inconsistent, and completely incomplete.

2.3 Credit and validity analysis of the questionnaire

Through the questionnaire compiled in the questionnaire, 240 junior middle school mathematics teachers in Yantai Development Zone were randomly selected, and 205 valid questionnaires were collected, and the recovery rate was 85.4%. 205 questionnaires were tested for validity by SPSS, and the results are as follows. If the reliability coefficient is above 0.7, the reliability of the questionnaire is good. By testing the questionnaire scale, the reliability test results are shown in Table 1: $\alpha = 0.825 > 0.7$, which indicates good reliability and high reliability. Factor analysis can be performed only if the KMO test coefficient is greater than 0.5 and the Bartlett spherical test statistical value Sig value is less than 0.05. The validity test results are shown in Table 2: KMO = 0.522 > 0.5, Sig value = 0.000, suitable for factor analysis.

Table 1. Reliability statistic

Cronbach's Alphas	quantity
0.825	16

Table 2. KMO and Bartlett

KMO	0.522
Bartlett spherical test statistical value	71.832
df	10
Sig.	0

3. Analysis of research results

3.1 Analysis of junior middle school mathematics teachers' information teaching ability

Descriptive statistical Analysis of information teaching Ability of junior middle school mathematics teachers This study conducts descriptive statistical analysis of information teaching awareness level, teaching integration ability, teaching design ability, teaching implementation ability and teaching innovation ability, as shown in Table 3.

As can be seen in the table, the average level of information teaching awareness level and resource integration ability is close to 4 points, which belongs to a good level. It can be seen that junior middle school mathematics teachers have strong basic information literacy. However, the average value of the latter three abilities is lower, which belongs to the general level, indicating that most junior middle school mathematics teachers can not make good use of information technology for teaching design, implementation and innovation, and they still need to be improved in these

aspects. On the whole, the overall average value of information teaching ability is not high, and there is room for further improvement.

Table 3. Describe statistics

	N	Mean	S
level of consciousness	105	4.05	.752
resources integration	105	3.81	.856
implement	105	3.67	.937
instructional design	105	3.71	.863
inaugurate	105	3.77	.880

3.2 Analysis of influencing factors

3.2.1 Descriptive statistical analysis of the influencing factors

The descriptive statistical analysis of the influencing factors, and the statistics shown in the following table are obtained.

According to the data in the table, the average value of consciousness level factors is 4.16, indicating that junior middle school mathematics teachers have good confidence in applying information technology to teaching and learning and good willingness to use information technology teaching. However, the average value of peer role and school environment factors is below 4 points, which can be seen that the demonstration role of teachers is not significant enough, and the construction of school information teaching environment is not very perfect.

Table 4. Describe statistics

	N	Min	Max	Mean	S
attitude	205	3	5	4.16	.586
Companion role	205	2	5	3.97	.753
School environment factors	205	2	5	3.90	.784
Information-technology teaching ability	205	2	5	3.74	.785

3.2.2 Correlation analysis

Through the correlation analysis of self-attitude, peer role, school environmental factors and the current situation of information teaching ability, so as to measure the correlation degree of each factor to information teaching ability, the specific results are shown in the table.

From the data in the table, self-attitude factors were significantly associated with school environmental factors, with a correlation of 0.741 and a good correlation. However, there is no significant relationship between peer role factors, school environment factors and the current status quo of information teaching ability.

Table 5. Relativity

control variable			attitude	Companion role	School environment factors
Information-technology teaching ability	attitude	relativity	1.000	.110	.032
		Sig		.264	.748
		df	0	102	102
	Companion role	relativity	.110	1.000	-.286
		Sig	.264		.003
		df	102	0	102
	School environment factors	relativity	.032	-.286	1.000
		Sig	.748	.003	
		df	102	102	0

3.2.3 Regression analysis

The current situation of information teaching ability of junior middle school mathematics teachers is taken as the dependent variable, and self-attitude, peer role and school environment factors are taken as the independent variables. The analysis between the two variables was performed by linear regression.

The regression coefficients of self-attitude, peer role and school environment factors were 0.68, 0.659 and 0.991 respectively, all of which were positive, which had a positive impact on the information teaching ability. The sig value of self-attitude, peer role and school environment factors is less than 0.05, indicating that these three independent variables can directly affect the ability of information teaching. In conclusion, the final regression equation is the informationized teaching ability = $0.68 \text{ self-attitude} + 0.659 \text{ peer role} + 0.481 \text{ school environment} + 3.088$.

4. Conclusion and improvement strategy

4.1 Conclusion

First of all, from the overall situation, the information teaching ability of the investigated objects is generally general, relatively speaking, the information teaching consciousness level is high, the information resource integration ability and the teaching design ability is good, but the ability to carry out the information teaching, the information teaching innovation ability needs to break through the dilemma. Through regression analysis, it is found that the three factors of self-attitude and peer function have a significant positive impact on the information teaching ability of junior middle school mathematics teachers. The regression equation is information teaching ability = $0.68 \text{ self-attitude} + 0.659 \text{ peer role} + 0.481 \text{ school environment} + 3.088$.

4.2 Improvement strategy

4.2.1 Correct your position and improve your self-awareness

Junior high school mathematics teachers are the main force of junior high school mathematics education, and it is a solid force to promote teaching innovation practice and guarantee the quality of basic education. In the wave of rapid development in the information age, we should grasp the new opportunities of education to digitalization and intelligence, improve the awareness and initiative of self-learning educational technology, and establish the advanced concept of intelligent technology to serve the high-quality development of education.

4.2.2 Improve the teacher training and optimize the teaching effect

The cultivation of the information teaching ability of junior middle school mathematics teachers is a systematic engineering, which involves all aspects of individual students and school training. High-quality curriculum implementation and teaching effect are a key link in the systematic engineering. The implementation of the curriculum must be based on the training of junior middle school mathematics teachers as the goal, focus on the training of junior middle school teachers as junior middle school mathematics teachers as the focus, focus on the application of information technology to classroom teaching practice ability and innovative teaching mode, and give students the opportunity to optimize the classroom teaching form to ensure good teaching effect.

4.2.3 Improve the network environment and ensure information sharing

A good network environment is the premise of improving the information teaching ability of junior high school mathematics teachers and realizing resource sharing. The school should increase the capital investment and upgrade the campus network to improve the network environment of students' learning. Moreover, we need to build smart classrooms. Establish a shared teaching resource center, ensure the interactive sharing of resources, open the innovative teaching of the

school, provide hardware support for expanding students' diversified learning methods, and provide multi-directional services for supporting the cultivation of the information teaching ability of junior middle school mathematics teachers.

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