

**PROFESSIONAL DEVELOPMENT OF NOVICE MATHEMATICS  
TEACHERS: PRESENT SITUATION AND GUIDANCE—A CASE STUDY OF  
8 MATHEMATICS TEACHERS**

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*Construct the analysis framework of novice mathematics teachers' professional development supported by 2 dimensions and 9 fields, and select 8 novice middle school mathematics teachers as cases to analyze their current situation. The study found that novice mathematics teachers generally struggle to self-improvement and work hard, but there may also be some problems, such as unclear career planning, fatigue of daily affairs, imperfect professional knowledge. teacher-apprentice pairs and teaching and research activities in serving schools can generally provide great help for novice teachers' professional development, but there is still a phenomenon of little care for growth and lack of expert guidance. The study suggests that novice mathematics teachers should have the planning of growth vision, the improvement of professional ability, the enhancement of awareness of reflection and the consciousness of action, and schools and education departments should also strive to create a good environment conducive to the professional development of novice teachers.*

Although novice teachers have enthusiasm and drive, they cannot effectively improve the teaching efficiency. At the same time of their own anxiety, they may also be questioned by the school, parents and students. This study focuses on empirical investigation, which selects 8 mathematics teachers who have been employed for 1-2 years to conduct semi-structured interviews, supplemented by questionnaires, in order to understand the current situation of their professional development more specifically in the initial stage, sort out their confusion, analyze the causes of these puzzles, and strive to find a way and ways to solve the confusion.

## **1 THE DESIGN OF THE STUDY**

### **1.1 The object of study**

"A novice teacher" generally refers to a teacher who has just worked. Combined with the views of relevant scholars at home and abroad, this study defines novice teachers as teachers who graduated from normal majors, or have relevant professional learning background, obtained the corresponding teacher qualification certificate, worked in the school and engaged in the education industry for 2 years or less.

According to the basic information such as the schools' location, the grade of teaching and gender, we selected 8 mathematics teachers randomly from the graduates of mathematics majors (It can be divided into normal school and non-normal school) of grades 2018 and 2019 from a normal university in Jiangsu, including 5 undergraduate graduates (A1, A2, A3, A4, A5) and 3 master's degree graduates (B1, B2, B3).

The summary information of 8 novice mathematics teachers is shown in Table 1

Variables		Number	Variables		Number
<b>Degree</b>	Undergraduate	5	<b>the grade of teaching</b>	Junior middle school	6
	Master	3		High school	2
<b>Gender</b>	Male	3	<b>pre-service major</b>	Normal major	6
	Female	5		Non-normal major	2
<b>Teaching age</b>	1 years	5	<b>location of the school</b>	City	6
	2 years	3		Country	2

Table 1 Summary of basic information of novice mathematics teachers interviewed

## 1.2 The method of research

First of all, the professional development of novice mathematics teachers is divided into two dimensions: self-growth and environmental assistance, under the dimension of self-growth, it is divided into 5 areas: belief attitude, professional knowledge, teaching skills, teaching reflection and student communication; under the dimension of environmental assistance, it is divided into 4 areas: master-apprentice pairing, teaching and research activities, school culture and expert guidance.

On this basis, we adopt the "one-to-one" semi-structured interview method, and establish that the topic of the interview is the growth, existing difficulties and environmental assistance of novice mathematics teachers, and compile the interview outline according to the dimensions and fields of the above table. During the interview, necessary adjustments and follow-up questions are allowed according to the actual situation, and the interview time is controlled within 60 minutes. In particular, the research on the environmental assistance of novice mathematics teachers' professional development is supplemented by a questionnaire survey.

## 2 THE PRESENT SITUATION OF PROFESSIONAL DEVELOPMENT OF NOVICE MATHEMATICS TEACHERS

Through the survey, we collected and sorted out the relevant interview texts, and made a statistical analysis of the questionnaire. On this basis, we analyze the current situation of novice mathematics teachers' professional development from the perspective of self-growth and environmental help.

### 2.1 Progress and predicament in the dimension of self-growth

Based on the analysis of the basic interview text, We find that although the two variables of education and gender affect the level of mathematics knowledge and way of thinking of novice mathematics teachers to a certain extent, they have little influence on their professional development. Whether or not to graduate from a normal major has a certain impact on the growth of novice mathematics teachers, especially in the first year of teaching, the difference is obvious. The teaching period and the

geographical location of the school are strongly related to the growth of novice mathematics teachers. Novice teachers who teach from the starting grade (The first year of junior high school or senior high school.) are more adaptable than those who are not in the starting grade. The professional development of novice teachers in remote villages and towns lags behind that of urban novice teachers. The difference of teaching age also has a significant impact on novice mathematics teachers, and the teachers who have worked for 2 years are obviously stronger than those who have worked for 1 year.

We can also see that the professional development of novice mathematics teachers, whether working for one year or two years, can make progress and growth with their own characteristics in their jobs, mainly in the following four aspects:

1. Novice mathematics teachers generally struggle to self-improvement, while they have feelings for mathematics education, and have lofty ideals.
2. Compared with pre-service, most novice teachers have made great progress in classroom teaching.
3. Some novice mathematics teachers have started to be student-centered.

At the same time, we also found that these eight novice mathematics teachers also have some shortcomings or difficulties in their professional development.

1. Lack of career planning, tired of daily affairs.
2. Professional knowledge is not perfect, especially lack of MPCK.
3. Inability to effectively organize students' study, teaching skills need to be improved.
4. There is no time for teaching reflection, and have a phenomenon of task-oriented or formal reflection.
5. The communication with the students is not smooth.

## **2.2 Support and deficiency in the dimension of environmental assistance**

Using interview materials and questionnaire survey data, we compared the effects of five areas of environmental assistance on the professional development of novice mathematics teachers.

The study found that the conclusions of the interview and the questionnaire tend to be the same.

Based on the interview materials and the analysis of figure 1, we can see that master-apprentice pairs and teaching and research activities are of great help to the professional development of novice mathematics teachers.

1. The pairing of master and apprentice brings highly targeted and personalized guidance to novice mathematics teachers.
2. Teaching and research activities effectively promote the professional development of novice teachers.

At the same time, we also see that there are more or less problems and deficiencies in the field of school culture and expert leadership.

1. A few schools do not pay enough humanistic care to novice teachers.
2. Expert guidance failed to play its due role.

### **3 THE GUIDANCE OF NOVICE MATHEMATICS TEACHERS IN PROFESSIONAL DEVELOPMENT**

To sum up, novice mathematics teachers' professional development depends more on the internal drive of self-growth. Therefore, we put forward the following suggestions for the professional development of novice mathematics teachers.

- 1.The planning of growth vision. Novice mathematics teachers should plan their own personal development vision, including self-cultivation, education and teaching, mathematics research and so on.
- 2.The improvement of professional ability. For novice mathematics teachers, the most urgent thing is to deepen the understanding of the nature of education and teaching, such as mastering the requirements of curriculum standards, understanding students, improving the processing and understanding ability of teaching materials and the basic skills of solving problems.
- 3.The enhancement of awareness of reflection. The reflection of novice mathematics teachers should focus on the cultivation of the consciousness of reflection.
4. The consciousness of action. The first is conscious action in teaching. The second is conscious action in learning. The third is the conscious action in educating students. The fourth is the conscious action of summary.
- 5.The help of the environment. Efforts should be made to create a good environment which conducive to the professional development of novice teachers, which is an important task within the scope of responsibilities of schools and education authorities.

Reviewing the research, we also feel that there are still some links and contents that need to be further deepened, such as the subject characteristics are not prominent enough, and the eight novice mathematics teachers selected all graduated from the same normal college, which has some limitations. In the future, we will strive to make our research more universal and worth popularizing and applying.

#### **References**

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