





# An Investigation on Mathematics Teachers' Professional Development in Rural China

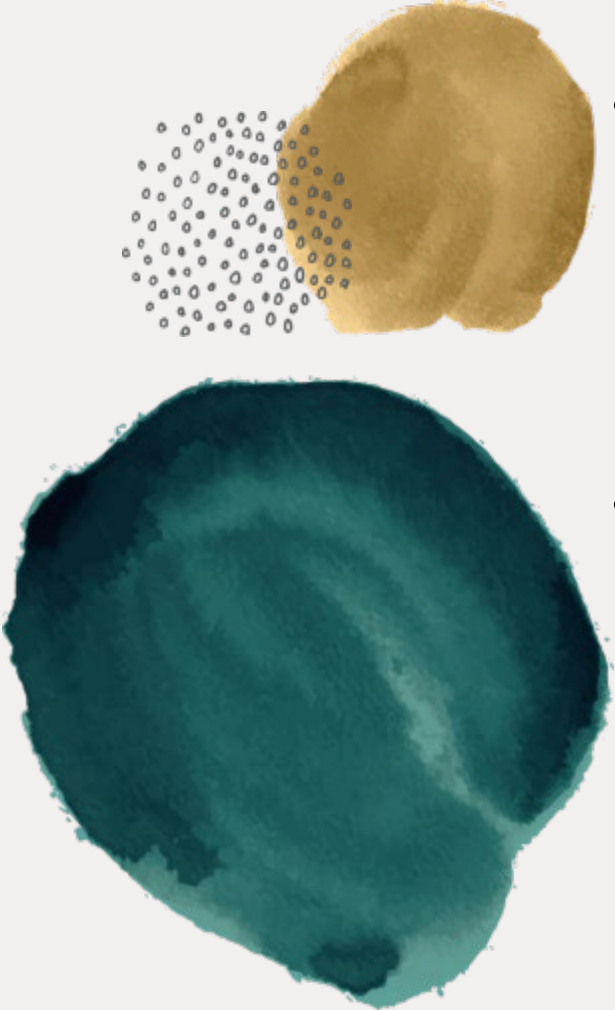
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# Introduction

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- “Developing rural education to create **a team of high quality rural teachers** with willingness to contribute and commit to living in the countryside.”

— *The Rural Teacher Support Plan (2015-2020)*

- “Establish and improve the support service system for the growth and development of rural teachers, carry out **high-quality training** for all rural teachers, and continuously improve **the pertinence and effectiveness of the training.**”

— *Action Plan for the Revitalization of Teacher Education (2018-2022)*”

## Key concepts

- **Teachers' professional development**

Teachers' professional development is a process of continuous renewal, evolution and enrichment of teachers' professional growth or internal professional structure (Ye, 2001) .

- **Teachers' independent development intention**

Teachers' independent development intention is the intention of studying, adjusting and improving their own ideas and practice in pedagogy in order to achieve their own professional development based on the corresponding understanding of their own professions (Yuan, 2006).

- **Professional identity**

Professional identity is an individual's evaluation of the occupation (s)he is engaged in, which is the driving force and foundation of teachers' professional development (Li, 2010).

## Literature review

- Two studies performed in Hunan and Hebei Province showed that rural teachers held negative perceptions in their professional identity as rural teachers, and had weak independent development intention(Huang, 2018; Yang, 2015) .
- Studies done in Guangdong Province revealed that rural schools didn't provide incentives, enough information resources and funds to support teachers' professional development (Yang, 2015; Zhang, 2013) .

## Research aim

- This study aims to investigate math teachers' professional development (i.e., **professional identity, independent development intention**), and the impact of external factors (i.e., **rural students and parents, school atmosphere**) on their professional development from their points of view in rural middle schools in Liaoning Province in China.

## Research questions

- Firstly, which kind of beliefs do the rural teachers held in their **professional identity, independent development intention, and the impact of rural students and parents, school atmosphere** on their professional development?
- Secondly, is there a **significant positive relationship** between every two of the four dimensions, i.e., teachers' points of view in their professional identities, independent development intention, rural students and parents, school atmosphere ?
- Finally, is there **any influence of some factors** (e.g., gender, age, salary, years of teaching, lessons hours) on teachers' perceptions in their professional development?

## Participants

- Participants were 100 math teachers from rural middle schools in Liaoning Province in China (61 rural middle school math teachers in the pilot study)

Table 1. Participants' personal information

Dimension	Percentage			
Gender	Male (37%)	Female (63%)		
Age	<31 (23%)	31-40 (34%)	41-50 (41%)	>50 (2%)
Years of teaching	<5 (24%)	5-10 (12%)	11-15 (17%)	>15 (47%)
Highest degree achieved	Associated or lower (1%)	Bachelor(96%)		Master or higher (3%)
Professional position	Level 3 or no(8%)	Level 2(19%)	Level 1 (45%)	Senior and specialist(28%)

# Instruments

Table 2. Dimensions and items

Dimensions	Examples
Personal information	How many years have you been a teacher?
Professional identity	Rural school teacher is a boring job. I feel my salary is lower than what I have done for my job. I think I am competent in teaching.
Independent development intention	I often consciously think over problems arising from my teaching. I don't think it is necessary to improve myself.
Rural students and parents	Rural students' learning attitude made me lose the enthusiasm of teaching. Rural parents pay much attention to their children's learning urges me to work hard.
School atmosphere	The school's performance appraisal policy can stimulate my enthusiasm for work. I usually need teach many lessons per week, so I can't find time to do research on teaching. Facilities and equipment in my school are poor and teaching resources are scarce. School-based teaching and research activities in my school are superficial and lack of expert guidance.
Difficulties in professional development and their expectations for training programs	



## **Task Administration and Data Coding**

- Task administration

Questionnaires were sent to the rural teachers by Questionnaire Star, a professional online questionnaire survey platform, and 100 questionnaires were sent back to the researcher.

- Data coding

For the five point Likert-style items, each response was awarded 1 to 5 points with a higher score reflecting a more positive belief. Teachers' answers for the open questions were summarized and typical responses were identified.

## Results

Table 3. Mean value and standard deviation for the four dimensions

Dimensions	Mean	SD	Max. Score	Min. Score	Median
Professional identity	20.77	3.36	30	6	18
Independent development intention	27.52	3.47	35	7	21
Rural students and parents	9.98	2.91	20	4	12
School atmosphere	30.41	4.90	45	9	27
Total	88.68	11.90	130	26	78

## Results

Table 4. Mean value and standard deviation of items with higher and lower scores

Items	Mean value	Standard deviation
<b>The social status of rural teachers is high.</b>	<b>2.18</b>	0.88
If there were a chance, I would like to be a teacher at schools in cities.	2.54	0.93
I feel that my salary is less than what I have done for my job.	2.43	1.10
Many rural school students lack good family education.	2.52	1.24
The attention that rural parents pay to their children's learning urges me to work hard.	2.96	1.26
<b>I think I am competent in teaching.</b>	<b>4.27</b>	0.57
I often consciously think over problems arising from my teaching.	4.18	0.41
I often solve problems by collecting data or consulting other teachers when I meet some unsolvable problems in teaching.	4.14	0.47
I don't think it is necessary to improve myself.	4.09	1.04

## Results

Aligning with the second research question, there were significantly positive correlations between different dimensions.

Table 5. Correlation coefficient between different dimensions

	Professional identity	Independent development intention	Rural students and parents	School atmosphere	Total
Professional identity	1	.464**	.398**	.592**	.759**
Independent development intention		1	.525**	.569**	.785**
Rural students and parents			1	.627**	.768**
School atmosphere				1	.898**
Total					1

Note. N = 100; \*\* significant level is at 0.01 (two tailed) .

## Difference analysis

- In terms of teachers' points of view on **professional identity**, there was a significant difference between teachers with different salary ( $F(3, 96) = 2.916, P = 0.038 < 0.05$ ).

Table 6. Mean value and standard deviation of teachers' professional identity between different salary level

Number	Salary level	Mean	SD
22	<b>2000-2999 Yuan</b>	<b>20.55</b>	2.84
36	3000-3999 Yuan	21.25	3.19
32	4000-4999 Yuan	21.25	3.50
10	<b>≥5000 Yuan</b>	<b>20.88</b>	3.69

## Difference analysis

- In terms of teachers' point of views on **professional identity**, there was significant difference between teachers who teach different numbers of lessons per week ( $F(2, 97) = 3.19, P = 0.046 < 0.05$ ).

Table 7. Mean value and standard deviation of teachers' professional identity between different lessons per week

Number	Number of lessons	Mean	SD
90	8 or less lessons	20.00	3.37
80	9-15 lessons	21.15	3.24
10	<b>16-23 lessons</b>	<b>18.50</b>	3.66

## Difference analysis

- In terms of teachers' points of view on the impact of **school atmosphere** on their professional development, there were significant differences between teachers who teach different number of lessons per week ( $F(2, 97) = 3.82, P = 0.025 < 0.05$ ).

Table 8. Mean value and standard deviation of teachers' professional identity between different lessons per week

Number	Number of lessons	Mean	SD
10	8 or less lessons	28.20	5.49
80	9-15 lessons	31.06	4.77
10	<b>16-23 lessons</b>	<b>27.40</b>	3.80

## **Results of the open questions**

Question 1: Please briefly describe some difficulties you are facing in your daily working?

- Participant 32: “Rural students' motivation to learn is not strong, they are tired of learning.”
- Participant 44: “Parents in rural areas do not pay attention to their children' learning or urge their children to work hard. ”
- Participant 34: “Lots of resources on the internet are not free, so I lack teaching and learning resources. ”
- Participant 76: “The performance appraisal policies in my school aren't fair. ”
- Participant 80: “There are too much trivial work unrelated to teaching and less time to study and teach for rural teachers ! ”
- Participant 12: “My salary is too low. It's almost hard to support myself! ”
- Participant 91: “The pressure of teachers is too high, they can't release the pressure well. ”



## Results of the open questions

Question 2: If you could choose to take part in a training program now, which kind of abilities do you want to improve? What kind of training experts and forms do you like? And why? Please describe it in details.

- Participant 12: “I like trainings to solve the practical problems arising from the classroom, and the experts needn’t talk too much about theories.”
- Participant 6: “I want to improve my ability of integrating information technology into mathematics teaching, and I like the experts who can tell us how to teach according to the real situation in rural classrooms.”
- Participant 56: “I like the training in mental health and class management. I prefer training with examples from classrooms because it does not go far from the students. After the training, we can really gain development, instead of getting nothing and wasting time.”

## **Discussion**

### **Implications**

- First, rural schools should effectively carry out teacher training through school-based training, expert guidance, on-line training and other forms to meet the needs of teachers' professional development.
- Second, rural schools should reasonably arrange the number of teaching hours per week, and not to arrange many things that have nothing to do with teaching, so as to provide teachers with sufficient time to prepare lessons, guide students and reflect on their teaching.

### **Suggestions**

- First, in the future research, increasing sample size and the coverage of the survey area and subject scope will further enrich the research conclusions.
- Second, the deep reasons for the rural teachers' reported experiences and ideas need to be obtained through interviews and observation in future research.

TKS

**Thank you!**

