Analysis on Teaching Effectiveness of Primary Mathematics teachers based on SPSS

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Abstract
In recent years, the teaching style of primary school mathematics teachers has been paid more and more attention, the curriculum reform is in full swing, many primary school mathematics teachers are confused in their professional growth, they are not only facing the difficulties of practical work. There is also confusion in professional growth. At the same time, the teaching style formed by primary school teachers will play a role in their teaching efficacy. Therefore, studying the influence of the former on the latter is of great significance to improve the quality of teacher-child interaction and cultivate the fine personality of primary school students. By using the questionnaire method, this study collected the questionnaire data of 50 primary school mathematics teachers, then used the spss, to carry on the quantitative analysis, explored the teaching style, the teaching efficacy present situation and the relation research, analyzed the primary school mathematics teacher teaching efficiency potential factor.

Keywords
Teaching effectiveness; Teaching style; Primary education.

1. Introduction
Among the many factors restricting the professional growth of primary school teachers, teachers' teaching efficacy is a key psychological factor restricting their professional growth. New primary school mathematics teachers will be troubled by a lot of problems, such as the reality of shock. These problems make novice teachers think and do a gap, resulting in a low sense of efficacy. The higher sense of teaching efficacy urges primary school mathematics teachers to know themselves accurately, to enter the working state earlier, to sum up their own shortcomings in the work, and then to expand the scope of work, improve their working ability, enhance their self-confidence, and do a good job of colleague relations. Therefore, teachers' self-efficacy is the essential internal energy for teachers' professional development. High self-efficacy will promote them to establish perfect self-concept and professional recognition, and point out the correct course of their professional development.

2. Research Design
2.1. Purpose of Study
(1) The present situation of teaching style and teaching efficacy of elementary school mathematics teachers
(2) To study the relationship between teaching style and teaching efficacy of primary school mathematics teachers

2.2. Research Content
(1) To explore the present situation of teaching style of mathematics teachers in primary schools
(2) To explore the current situation of teaching efficacy of elementary school mathematics teachers
(3) To explore the relationship between teaching style and teaching efficacy of primary school mathematics teachers

2.3. Research Model
This study discusses the relationship between teachers' teaching style and teaching efficiency perception. According to the existing literature, the teaching style is divided into legislative, executive, judicial, local, radical and conservative, and teaching efficiency is divided into general teaching efficiency and individual teaching efficiency. The research model is as follows:

![Figure 1. Model of This Study](image)

2.4. Research Methodology

(1) Questionnaire
This study is a study of the relationship between the teaching style and teaching efficacy of primary school mathematics teachers. In order to investigate the present situation of teaching style, the present situation of teaching efficacy and the relationship between method of questionnaire survey. Therefore, around the "teaching style ", "teaching efficacy" these two keywords, determine the two directions of the questionnaire.

(2) Literature analysis
Through the network, books, periodicals and other ways to consult the primary school mathematics teachers teaching style, teaching efficacy and other aspects of literature, to determine the problems to be studied. This paper analyzes the contents of the previous scholars, summarizes the previous research conclusions and existing problems.

3. Questionnaire Sources
"Primary school mathematics teacher teaching style questionnaire" This study adopts Guo Ping (2009) in "Primary school mathematics teacher teaching style research" master's thesis "Primary school mathematics teacher teaching style questionnaire ", the teaching style total questionnaire reliability is 0.923, the original questionnaire and this research questionnaire reliability and validity all accord with the measurement science standard. From the original questionnaire, RobertJ. Sternberg, RobertJ. Sternberg divided the teaching style into five aspects: function, form, level, scope and tendency. According to the research content and the
results needed by the researchers, only three dimensions are selected to form the questionnaire, which are: horizontal dimension, tendency dimension and functional dimension, respectively, local teaching style in horizontal dimension; tendency dimension is divided into conservative and radical teaching style; and legislative, judicial and executive teaching style in functional dimension.

The questionnaire was assessed by 5 grades ("1" completely unsuitable ",2" slightly unsuitable ",3" more suitable ",4" fit ",5" very suitable "). It is divided into six teaching styles: legislative (16, 18, 20, 27, 43), executive (24, 28, 32, 35, 36, 42), judicial (23, 26, 34, 39), partial (14, 21, 23, 31, 39, 41), radical (16, 19, 25, 37, 38, 40), conservative (17, 29, 30).

4. Data Processing

This study takes SPSS21.0 as the analysis tool, takes the questionnaire data as the research sample, distributes the questionnaire to the mathematics teacher in a teaching reform WeChat group in the form of the network questionnaire (questionnaire star), carries on the correlation and the regression analysis to the primary school mathematics teacher teaching style, the teaching efficacy, carries on the single factor anova analysis to the primary school mathematics teacher teaching style, the teaching efficacy, the independent sample T test, the post-test, also carries on the primary school mathematics teacher teaching style and the teaching efficacy correlation, the regression analysis.

5. Correlation and Regression Analysis of Teaching Style and Teaching Efficacy of Mathematics Teachers in Primary Schools

5.1. Analysis Analysis of Teaching Style and Teaching efficacy of Mathematics Teachers in Primary Schools

<table>
<thead>
<tr>
<th>Teaching efficacy</th>
<th>Teaching style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>.243</td>
</tr>
<tr>
<td>Sig</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 1. Analysis on Teaching Style and Teaching Efficiency of Mathematics Teachers in Primary School

<table>
<thead>
<tr>
<th>Teaching style</th>
<th>Legislative</th>
<th>Executive</th>
<th>Judicial</th>
<th>Local</th>
<th>Radical</th>
<th>Conservative</th>
<th>Teaching efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation</td>
<td>.088</td>
<td>-.467</td>
<td>-.090</td>
<td>-.133</td>
<td>-.037</td>
<td>-.420</td>
<td>-.198</td>
</tr>
<tr>
<td>Sig</td>
<td>.049</td>
<td>.000</td>
<td>.045</td>
<td>.003</td>
<td>.413</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 2. Analysis on Teaching Style and Teaching Efficiency of Mathematics Teachers in Primary Schools

Table 1 shows that the teaching style and teaching efficacy of primary school mathematics teachers are extremely significant at 0.001 level Related.

Table 2 shows that the teaching style and teaching efficacy of primary school mathematics teachers are extremely significant at 0.001 level Related. The general teaching efficacy and
personal teaching efficacy of primary school mathematics teachers' teaching style were significantly correlated at 0.001 level; conservative and teaching efficacy were significantly correlated at 0.01 level; executive and teaching efficacy were significantly correlated at 0.05 level.

5.2. Regression Analysis of Teaching Style and Teaching efficacy of Mathematics Teachers in Primary Schools

In order to better understand and test the relationship between primary school mathematics teachers’ teaching style and teaching efficacy, the following studies have been carried out: predictive variables are six dimensions of primary school mathematics teachers' teaching style. The dependent variable is the teaching efficacy of primary school mathematics teachers.

Table 3. Regression Analysis of Teaching Style and Teaching efficacy of Mathematics Teachers in Primary Schools

<table>
<thead>
<tr>
<th></th>
<th>Non-standardized coefficient</th>
<th>Standardized coefficient</th>
<th>t</th>
<th>Sig</th>
<th>R2</th>
<th>Adjust R2</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Standard error</td>
<td>Beta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legislative</td>
<td>63.905</td>
<td>4.823</td>
<td>13.249</td>
<td>0.000</td>
<td>0.316</td>
<td>0.308</td>
<td>38.033</td>
</tr>
<tr>
<td>Executive</td>
<td>-9.718</td>
<td>1.485</td>
<td>-6.546</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Judicial</td>
<td>5.443</td>
<td>1.616</td>
<td>3.369</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Judicial</td>
<td>8.078</td>
<td>2.027</td>
<td>3.985</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservative</td>
<td>-1.992</td>
<td>1.115</td>
<td>-1.788</td>
<td>0.074</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table shows, R square of the model is 0.316, This indicates that the teaching style of primary school mathematics teachers can explain the change of teaching efficacy of 31.6% of primary school mathematics teachers. There are four dimensions in each dimension of teaching style that have significant predictive power to teaching efficiency, They are executive, judicial, local, radical. Among them, the executive type can significantly negatively predict the teaching efficacy, Radical type can significantly positively predict teaching efficacy, Judicial type and local type can significantly predict teaching efficacy. According to the regression equation =63.905 × legislative (-9.718) × executive 5.443 × judicial 4.909 × local 8.078 radical (-1.992) conservative.

6. Analysis on the Difference between Teaching Style and Teaching Efficiency of Mathematics Teachers in Primary School

6.1. Analysis of the Teaching Style of Mathematics Teachers in Primary Schools

From the above descriptive statistical results, we can see that the average score of each dimension of the teaching style scale is above the middle level, in which the average score of legislative, judicial and radical dimensions is higher than 4, the legislative dimension score is the highest, the average is 4.19, and the judicial dimension score is the lowest, the average is 3.59. It shows that primary school mathematics teachers prefer to use legislative, judicial and radical teaching styles. Primary school mathematics teachers with legislative teaching style do not tend to use fixed mode, prefer their own construction mode, in teaching dignified and solemn, teacher-centered, not good at students as friends. Primary school mathematics teachers with judicial teaching style have analytical and speculative minds and like to evaluate established facts and rules. Primary school mathematics teachers with radical teaching style innovate teaching law method, and it is not their style to carry out teaching activities step by step.
step and one by one. Not only teachers with certain teaching age like this teaching style, but teachers with solid theoretical knowledge also like to use radical teaching style.

6.2. Difference Analysis of Teaching Style of Mathematics Teachers in Primary School

(1) An analysis of the differences in teaching styles among primary school teachers of different genders shows that there are significant differences between male and female primary school mathematics teachers in executive and conservative teaching styles. The results are as follows: male teachers score higher than female teachers in these two dimensions, which is consistent with Li Zhijun (2011)2 and similar to Tian Caixia (2007)3. Li Zhijun points out that there are significant differences in gender between executive and conservative teaching styles, while Tian Caixia points out that male and female teachers who study physical education show obvious differences in conservative teaching styles, but not in other types of teaching styles. This topic research and the social actual situation is relatively consistent. According to the previous social experience, female teachers tend to choose conservative and local teaching style, while male teachers show obvious overall teaching style. However, from the results of the study, male and female teachers tend to be consistent in teaching style. The reason is probably that in today’s relatively open social environment, most teachers tend to improve themselves, and male and female teachers in primary education are generally extroverted. These factors may lead to different gender teachers in different teaching styles do not show significant differences.

(2) Analysis of the Differences in Teaching Style of Primary School Teachers with Different Qualifications There are significant differences in the dimensions of radical, local, legislative and judicial types among primary school mathematics teachers with different academic qualifications. In the judicial dimension, primary school mathematics teachers with technical secondary school, college degree and undergraduate degree have higher scores than those with graduate degree or above, which is different from the research results of Menlu (2014)2. Menlu points out that teachers with graduate degree or above tend to be more judicial than primary school mathematics teachers with other degrees.

(3) Analysis of the Differences in Teaching Style of Primary School Teachers with Different Titles This study found that in the legislative and judicial dimensions, primary school mathematics teachers without professional titles scored higher than those with professional titles. This is inconsistent with most studies. In general, the professional title increases with the increase of teaching age, for the new hand teachers without professional title, as the new staff of primary school, the professional technical ability is not sophisticated enough, groping for teaching style is their only way, so like to put forward new rules, judge facts, evaluation tasks. In the executive and conservative dimension, the score of primary school mathematics teachers without professional title is lower than that of those with professional title, which is consistent with Tian Caixia (2007)3. The reason is that familiar teachers like to carry out regular teaching tasks, like to follow the usual teaching methods, like to teach according to pre-designed activities; Another possibility is that they have not fully mastered the new teaching methods, so they dare not use them without knowing their actual effect, which leads to conservative teaching style.

(4) The results of a study on the differences in the teaching styles of primary school teachers with different marital status showed that unmarried students scored higher on radicalism than married students, and married students scored higher on conservative. First, this may be related to the personality of unmarried female primary school mathematics teachers. In this study, 85% of the samples are female, and in the actual work of primary school, female teachers are found to be far more than male teachers. Zuo Jiuyi's study shows that primary school mathematics teachers are more aggressive and sensitive than other female employees, indicating that the new educational concept is more convenient to integrate into the work and
life of primary school mathematics teachers. Second, unmarried women have no family constraints and ties, so creativity is higher than married women, like to transcend existing rules and procedures, so unmarried primary school math teachers are more aggressive than conservative.

(5) Analysis of differences in teaching styles of primary school teachers at different pay levels
In the local, conservative and executive dimensions, the primary school mathematics teachers with a monthly salary of more than 7001 yuan scored higher than those below 7000 yuan. The sample of this study is mainly concentrated in Liaoning Province, the monthly salary of more than 7000 yuan is mostly the principal, vice-principal level, they pay attention to the details of the work, prefer the details of the teaching, from a small entrance to study the teaching course, facing the teaching work and student management can always be far-sighted, emotional delicate. Like according to their own way to achieve teaching tasks, so in the local, conservative, executive dimension score is high. In the legislative and judicial dimensions, the monthly income of 1001-3000 yuan of primary school mathematics teachers scored the highest. Perhaps because of the largest number of samples at this salary stage, accounting for 49.2%, and 59% of the samples are under 5 years old, as a primary school mathematics teacher's fresh blood, professional technical level, professional skills are immature, in the teaching style is in a changing stage, so like to put forward new rules, according to their way of teaching, eager to establish prestige among primary school students, feel deeper to speak with authority, learn to judge facts, evaluation tasks.

(6) Analysis of the differences in teaching styles among pupils of different ages
According to the empirical analysis of this study, it is found that the scores of teachers under 21 years of teaching age in local teaching style are relatively stable, while those over 21 years of teaching age show a significant downward trend, and this is contrary to the previous Sternberg et al. (1995) study. According to their analysis, old teachers are more inclined to local teaching style than new teachers. Analysis of the reasons: first, female teachers are generally the majority of primary education majors, and women generally have a delicate mind and value details. Second, the induction training of primary education mainly emphasizes the application of teaching methods and strategies, including the organization and management of classroom teaching and the use of teacher wit to solve unexpected classroom events. Third, young primary school mathematics teachers prefer to analyze teaching tasks, and have dialectical thinking, showing the most obvious tendency of local type. With the increase of working years, teachers from caring for their own development (including getting along with colleagues, whether they are liked by leaders) to focus on children, teaching, based on the overall control of teaching, in the local type of score decline. Primary school mathematics teachers who worked 6-10 years had the highest scores in the legislative and radical dimensions, and those who worked for more than 10 years had a downward trend in the legislative and radical dimensions. This is consistent with Guo Ping (2009)1 and He Wen (2005)2.

7. Conclusion

Conclusion 53 questionnaires were distributed, 50 valid questionnaires were recovered, and the effective recovery rate was 94%. Through empirical analysis, the following conclusions are drawn:

(1) Primary school mathematics teacher teaching style and teaching efficiency sense are in the middle level.

(2) Primary school mathematics teachers are mainly judicial, legislative and radical teaching styles, local, conservative, executive teaching style is not dominant, the first three scores are generally higher than local, executive, conservative. In addition, according to the results of investigation and analysis, the first three categories are favorite teaching styles of primary
school students and parents. Teachers who show legislative teaching style tend to be creative tasks and emphasize teachers' majesty; teachers who show judicial teaching style face dilemmas and need speculative thinking; teachers who show radical teaching style like to evaluate and analyze facts, like challenging tasks and transcend the original order.

(3) Primary school mathematics teachers mainly focus on personal teaching efficacy, 31-40 years old primary school mathematics teachers' personal teaching efficacy score reached a peak, education has a very significant impact on teaching efficacy; Primary school mathematics teachers with a monthly salary of 1001-3000 yuan have the strongest sense of teaching efficacy and primary school mathematics teachers with the lowest sense of personal teaching efficacy.

(4) From the analysis of teaching style and demographic variables of primary school mathematics teachers, we can see that age, sex, education, professional title, marital status, salary level, teaching age, excellent title, school nature, region, school scale, school grade, teaching class have different influence on the teaching style of primary school mathematics teachers.

(5) From the analysis of teaching efficacy and demographic variables of primary school mathematics teachers, we can see that there are significant differences in age, educational background, salary level, teaching age, school nature and school scale in each dimension of primary school mathematics teachers' teaching efficacy; gender, professional title, school grade, teaching class have different degrees of influence on the single dimension of primary school mathematics teachers' teaching efficacy; marital status, excellent title, work area have no influence on primary school mathematics teachers' teaching efficacy.

(6) There is a significant positive correlation between the teaching style and the teaching efficacy of primary school mathematics teachers, the executive, judicial, local and radical can significantly predict the teaching efficacy, among which the executive can significantly predict the teaching efficacy, the radical can significantly predict the teaching efficacy, the judicial and local can significantly predict the teaching efficacy.

References


