

Research on Primary School Science Teachers' Occupational Well-being and Professional Development: A Survey Based on Primary School Science Teachers in Z City

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Abstract: *The "Compulsory Education Science Curriculum Standards" emphasize the fundamental role of primary school science education, which sets higher requirements for the professional development of primary school science teachers. This study takes primary school science teachers in Z City as the research subjects to investigate their occupational well-being and professional development status. The results reveal that background variables such as age, job position, and school type significantly affect their occupational identity or professional development. Furthermore, the occupational identity of primary school science teachers positively promotes their professional development. Providing a supportive environment that fosters a culture of well-being and constructing systems that support professional development will help primary school science teachers better carry out science education.*

Keywords: *primary school science teachers; occupational well-being; professional development*

1. Introduction

The "Compulsory Education Science Curriculum Standards" issued by the Ministry of Education in 2022 state that cultivating students' scientific literacy is the goal of science education [1]. According to data from the "China Compulsory Education Quality Monitoring Report (2018)," the proportion of part-time science teachers in primary schools is high, and most science teachers' inquiry-based teaching is at a low level [2], highlighting the current challenges faced by primary school science teachers. Cultivating primary school science teachers with high scientific literacy is crucial for the effective implementation of foundational science education. This study focuses on primary school science teachers in Z City, Guangdong Province, to investigate their occupational well-being and professional development, aiming to provide references for enhancing the effectiveness of primary school science education.

2. Research Process

2.1 Research Design

This study draws on the surveys and analyses of occupational well-being or influencing factors by Jiang Yan (2006) [3], Xanthopoulou (2012) [4], Wu Hongmei (2015) [5], Huang Qiuping (2017) [6], and Zhang Jin (2019) [7] to develop the Primary School Science Teachers' Occupational Well-being Scale. The scale represents teachers' occupational well-being through five dimensions: job satisfaction, job involvement, interpersonal relationships, positive emotions, and physical and mental health. Simultaneously, based on the research on teachers' professional development by Ding Gang (2011) [8], Mao Ju (2012) [9], Zhou Ling (2016) [10], Miao Peizhou (2017) [11], and Li Qiong (2018) [12], the Professional Development Scale for primary school science teachers was created, reflecting teachers' professional development status through three dimensions: professional knowledge, professional attitude, and professional development expectations.

Both scales use a five-point Likert scale format. After developing the scales, three experienced primary school science teachers were invited to review the scale structure and item design, resulting in the finalized Occupational Well-being Scale with 18 items across five dimensions: job satisfaction, interpersonal relationships, job involvement, positive emotions, and physical and mental health, with 3, 4, 3, 4, and 4 items, respectively. The Professional Development Scale consists of 9 items covering three

dimensions: professional knowledge, professional attitude, and professional development expectations, with 3 items each. A purposive survey was conducted among primary school science teachers in Z City, with 200 questionnaires distributed and 190 valid responses collected, achieving an effective response rate of 95%. The reliability of the scales was assessed as shown in Table 1. The reliability evaluation results of the scale show that the reliability estimate of the Occupational Well-being Scale for Primary School Science Teachers is $\alpha=.930$. The α values for the dimensions of Job Satisfaction, Interpersonal Relationships, Job Engagement, Positive Emotions, and Physical and Mental Health are .708, .831, .837, .878, and .862, respectively. The reliability estimate of the Professional Development Scale is $\alpha=.894$, with the α values for the dimensions of Professional Knowledge and Skills, Professional Attitude, and Expectations for Professional Development being .737, .813, and .880, respectively. These results indicate that both scales have high validity and reliability.

Table 1: Demographic Variables of Primary School Science Teachers

Demographic Variable		Number	%	Demographic Variable		Number	%
Gender	Male	40	21.1	Major Category	Humanities	68	35.8
	Female	150	78.9		Science and Math	65	34.2
Age	29 years and below	47	24.7		Arts and Physical Education	8	4.2
	30-39 years	53	27.9		Other	49	25.8
	40-49 years	64	33.7	Job Position	Full-time Science Teacher	31	16.3
	50 years and above	26	13.7		Science and Other Subjects	30	15.8
Teaching Experience	2 years and below	77	40.5		Other Subjects and Science	117	61.6
	3-5 years	49	25.8	Teaching and Management	12	6.3	
	6-10 years	29	15.3	School District	Township	105	55.3
	11 years and above	35	18.4		County Level	47	24.7
			City Level		38	20	

2.2 Research Methods

This study utilized SPSS 21.0 statistical software to analyze the questionnaire data using statistical methods such as one-way ANOVA, independent sample t-tests, correlation analysis, and qualitative research.

2.3 Research Results

2.3.1 The Overall Occupational Well-being and Professional Development of Primary School Science Teachers Are Good

As shown in Table 2, the scores of all dimensions of primary school science teachers' occupational well-being and professional development were above 3, indicating that the overall status of professional development among primary school science teachers ($M=3.89$) is good. The statistical results also show a positive correlation between primary school science teachers' occupational well-being and professional development, with a Pearson correlation coefficient of $r=.725$, which is statistically significant ($p<.001$).

Table 2: Overall Status of Occupational Well-being and Professional Development of Primary School Science Teachers

Dimension/Variable	Mean	Standard Deviation
Job Satisfaction	3.44	0.759
Job Involvement	4.43	0.655
Interpersonal Relationships	4.44	0.64
Positive Emotions	4.29	0.71
Physical and Mental Health	4.12	0.719
Occupational Well-being	4.17	0.575
Professional Knowledge	3.59	0.913
Professional Attitude	3.84	0.854
Professional Development Expectations	4.24	0.783
Professional Development	3.89	0.739

2.3.2 Age as a Factor Influencing Primary School Science Teachers' Occupational Well-being

The results indicate that the differences in occupational well-being among primary school science teachers across different age groups were significant, with $F=2.704$, $p=.047$. Specifically, the dimension of interpersonal relationships also showed significant differences across age groups, with $F=3.391$, $p=.019$. The scores of occupational well-being for teachers aged 29 and below, 30-39, 40-49, and 50 and

above were 4.02, 4.10, 4.28, and 4.30, respectively, indicating that older teachers had significantly higher occupational well-being than younger teachers. For interpersonal relationships, the average scores across the four age groups were 4.25, 4.38, 4.61, and 4.51, respectively, showing that older teachers also scored significantly higher than younger teachers in interpersonal relationships.

2.3.3 Job Position as a Factor Influencing Primary School Science Teachers' Professional Development

The results show significant differences among primary school science teachers in different job positions in terms of professional knowledge ($F=7.272, p=.000$) and professional attitude ($F=3.829, p=.011$), as well as overall professional development ($F=4.362, p=.005$). The data suggest that full-time science teachers and those primarily teaching science along with other subjects scored significantly higher in professional knowledge and attitude compared to other types of part-time science teachers.

2.3.4 Administrative Districts as a Factor Influencing Primary School Science Teachers' Occupational Well-being

A one-way ANOVA conducted on primary school science teachers from township, county, and city-level schools showed no significant differences in their occupational well-being and professional development. Due to the relatively small sample size, whether city-level primary school science teachers have higher occupational well-being compared to their counterparts in county and township schools remains to be further explored.

2.4 Theoretical Analysis of Primary School Science Teachers' Occupational Well-being and Professional Development

First, the achievement of occupational well-being among primary school science teachers is influenced by tangible conditions. According to Tan Chuanbao (2002), teachers' occupational well-being is a state of educational subjectivity in which teachers realize their professional ideals[13]. Teachers are developing individuals[14], and their occupational well-being is influenced not only by personal factors but also by collectivist social orientation factors[15]. Most primary school science teachers, particularly younger ones, recognize the importance of science education. However, a significant proportion of part-time science teachers, who often juggle other subjects or management duties, are unable to devote sufficient time and energy to science courses, thus neglecting the goal of scientific literacy[16]. Moreover, their lack of theoretical knowledge in science and the burden of daily administrative tasks prevent them from engaging deeply in scientific exploration or innovative research. Teachers' professional development should not only focus on knowledge, attitudes, and practices but also consider the organizational culture and structure of the schools where they work[17].

Additionally, the occupational well-being and professional development of primary school science teachers are reflected not only in individual cognition and behavior but also in the interaction between individuals and their social contexts, encompassing a complex dynamic development process. The pursuit of occupational well-being among primary school science teachers is also evident in their professional knowledge and attitudes toward development. Occupational well-being serves as a motivational force for teachers' professional development, providing a solid emotional foundation for their professional growth[18].

3. Research Recommendations

3.1 Strengthening Ideological Guidance for Primary School Science Teachers

Primary school science teachers should approach basic science education with a more positive mindset and reasonably consider the duality of problems. Personal positive efforts are the driving force behind occupational well-being, rather than the outcome. Well-being comes from a dedicated attitude. Primary school science teachers should also recognize that the process of primary science education is not merely the simple transmission of scientific knowledge but also involves ideas and spirit. They need to have a deep understanding of natural science knowledge, possess high scientific literacy, and have a broad knowledge base. Science teachers should grasp the philosophy and goals of primary science education and have a comprehensive understanding of the nature of science education. They should keep abreast of the latest developments in basic science education at home and abroad. Only when they realize the sense of mission and urgency in providing quality science education can they continuously enhance their motivation for professional development.

3.2 Creating a Happy Cultural Environment and Building a "Collaborative, Interactive, and Diversified" Resource Platform

First, schools should encourage teachers to participate in school management affairs, fully integrating their practical needs with their actual work to ensure they have enough time and energy to carry out their teaching duties effectively. Secondly, improvements should be made to the promotion and evaluation systems for primary school science teachers to provide a safeguard for their professional development in the field of science education. Measures such as establishing awards for teaching practice or theoretical research achievements, providing policy support for professional training, and offering title promotion support can stimulate the subjective initiative and potential of primary school science teachers. Furthermore, a "collaborative, interactive, and diversified" resource-sharing platform should be built to support the professional development of primary school science teachers, especially those in township and county-level schools. By leveraging modern internet technology, these platforms can provide high-quality teaching environments, such as creating resource-sharing platforms and establishing science teacher learning groups, to offer targeted professional support and growth plans.

4. Conclusion

Enhancing the professional happiness of science teachers in primary schools will contribute to their professional development and further promote the improvement of science education in primary schools. This conclusion is basically consistent with the views of other domestic experts. This study explores the inner mechanism of influencing primary school science teachers' professional well-being through an empirical sample survey of primary school science teachers in Z city, which provides reference for educational administrators to face up to the professional development needs of primary school science teachers and create a good working environment for them. The conclusion of this study is only applicable to the discussion of science teachers' professional well-being in Z city or its adjacent areas, and it can not make a broader inference to science teachers in other areas. In order to further explore the factors affecting primary school science teachers' professional well-being, further research should be carried out in combination with other regional groups.

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