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Exploring Chinese Rural Primary School Teachers' Application Competencies of Educational Technologies

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Abstract: This study analyzes the Chinese rural primary school teachers' application competencies for educational technologies in Jilin Province, from perspectives of the application of digital teaching resources and digital teaching tools. According to the research results, this study provides practical suggestions from three perspectives: resource application, tool application and school-based training.

Keywords: Chinese rural areas; primary school teachers; application competencies; educational technologies

1. Introduction

Due to the relatively remote and backward economy in rural areas, Chinese rural primary school teachers, the main force of rural education, are faced with difficulties in their professional development (Zhu & Yan, 2015). The single teaching mode, disconnection between training content and real needs, insufficient training, or training being unsystematic and discontinuous have been noted by Chinese scholars (Yan, Li, & Ren, 2018). In order to promote the basic education curriculum reform, the China central government vigorously facilitates ICT applications in education by implementing a series of supporting policies and measures (Zhang, et al., 2010). In particular, rural primary school teachers' rational use of digital resources and tools has been the key criteria for the application of educational technologies (Mazalah, etc., 2016；Yusuf, 2005). Therefore, this study focuses on the application of digital teaching resources and tools to analyze the application competencies for educational technologies of Chinese rural primary school teachers.

2. Data Collection

2.1 Sampling

In this study, teachers from various disciplines in rural primary schools in Jilin province were sampled. Stratified sampling was conducted according to gender, age, discipline and other characteristics to make the samples representative. A total of 1840 valid questionnaires were collected in this study, with the valid rate of 91.2%. In terms of gender, male teachers accounted for 28.75% while female teachers 71.25%; In terms of subjects, teachers of Chinese accounted for 19.24%, mathematics 18.05%, English 11.12%, science 10.69%, arts 11.21%, music 11.73%, physical education (PE) 11.10%, information technology 5.44%, and moral education 0.85%.

2.2 Questionnaire

The questionnaire adopted in this study consists of two parts. The first part is the personal information of teachers, including teaching subjects, gender, age and educational background. The second part consists of teachers' application of teaching resources, teaching tools and their participation in ICTs trainings.

3. Data Analysis

3.1 Application of Teaching Resources

The application of digital resources in rural primary school is shown in Table 1. It revealed that rural teachers have gradually diversified in their access to digital resources. The professional resource supply platform, dominated by national and regional education has become the main source for rural teachers to develop their professional digital resources. It indicates that the digital education resources obtained by rural teachers are becoming more and more professional.

As shown in Table 2, the resource application frequency in rural areas is sufficient so that classroom teaching assisted by digital resources is basically realized. However, we cannot ignore that there is a great discrepancy between different subjects in the application of multimedia teaching resources. A careful comparison shows that the rural teachers who often use multimedia teaching resources for classroom teaching are teachers of English, music, information technology, and their using of school-based resource database is also relatively high.

In term of educational resources application, Table 3 reveals that the rural teachers have various multimedia teaching resources; however, PPT is still their favorite choice, accounting for more than 69%. To be specific, teachers of Chinese, English, mathematics use all kinds of teaching resources in a balanced way, especially for questions/test papers.

Table 1
Percentage of Digital Resources Application /%

	Overall	Chinese	Math	English	Science	Arts	Music	PE	ICT	Moral
National education resource platform	66.61	65.36	65.76	66.82	71.68	69.62	69.16	62.50	79.13	72.22
Regional education resource platform	48.06	45.95	46.40	50.93	49.56	49.37	47.14	42.19	49.57	33.33
Individual production	40.35	41.52	39.95	47.66	38.50	37.13	40.97	34.77	46.09	33.33
Sharing by teachers or research groups	40.02	38.08	37.72	41.59	37.17	37.55	40.97	39.06	41.74	33.33
Commercial search engine	37.70	36.36	34.24	37.38	36.28	38.82	34.80	36.72	41.74	27.78
School resource bank	30.26	26.54	25.31	34.58	36.28	28.27	31.72	28.91	31.30	16.67
Personal purchase	12.62	15.97	16.38	10.75	12.83	13.08	13.22	10.94	13.04	16.67

Table 2
Percentage of Resource Application Frequency /%

	Overall	Chinese	Math	English	Science	Arts	Music	PE	ICT	Moral
Always	22.38	28.67	28.88	25.81	20.69	21.67	22.08	13.95	29.57	11.11
Often	44.17	43.61	44.17	46.54	43.53	43.75	48.48	31.78	51.30	27.78
Sometimes	18.50	18.80	17.48	16.59	21.12	20.00	18.61	23.26	13.04	44.44
Rare	12.35	8.67	8.98	11.06	13.36	12.08	7.79	21.71	5.22	16.67
Never	2.60	0.24	0.49	0.00	1.29	2.50	3.03	9.30	0.87	0.00

Table 3
Percentage of Educational Resources Application /%

	Overall	Chinese	Math	English	Science	Arts	Music	PE	ICT	Moral
PPT	84.74	91.65	91.07	88.79	85.40	84.39	86.78	69.92	87.83	77.78
Micro lecture	36.08	36.61	37.22	40.19	38.94	38.82	40.09	32.42	40.87	44.44
Case	29.02	29.98	31.02	29.91	32.30	29.11	25.11	24.22	32.17	16.67
Online courses	22.60	24.57	24.32	22.43	26.11	22.36	21.15	21.48	31.30	38.89
Questions/test papers	19.53	26.78	27.30	21.50	21.68	16.46	14.54	12.89	13.04	11.11
Online video	17.96	18.92	18.11	17.29	19.91	21.52	17.62	17.58	19.13	11.11

3.2 Application of Digital Teaching Tools

Digital teaching tools, according to their function, can be divided into classroom teaching tools, resource making tools, test tools, teaching and research tools, etc. The application of digital teaching tools in rural primary school is shown in table 4. Compared with other disciplines, the teaching tools of English and music are more prominent in terms of teachers' self-exploration and students' individualized learning.

Meanwhile, the teaching materials of these two subjects are equipped with more special teaching tools. Special subject teaching software and network teaching platform are critical in solving the shortage of teaching resources in rural primary and secondary schools.

When coming to the application of resource making tools, rural primary school teachers have a good command of them, but rural primary schools have not established the mechanism of high-quality resources co-construction and sharing.

In the application of test tools, the application of marking tools and score analysis tools is poor. At present, rural primary school teachers are more accustomed to using electronic test question bank, but the traditional papers and manual marking still cannot go without.

The use of network teaching and research platform in rural area is not widely seen. The main reasons come from two aspects: on the one hand, rural teachers are weak in online teaching and research; on the other hand, rural primary schools have not yet formed online teaching and research support system.

Table 4
Application of Digital Teaching Tools in Rural Primary School %

	Classroom teaching tools		Resource making tools		Test tools		Teaching and research tools
	Teaching software	Online teaching platform	Multimedia courseware making tools	Digital resource sharing platform	Marking tools	Performance analysis tools	Online teaching and research platform
Overall	40.13	25.08	68.23	36.03	5.88	5.18	22.22
Chinese	38.82	25.55	73.22	41.28	6.39	4.67	22.36

Math	39.70	25.81	72.70	41.44	5.96	4.71	23.08
English	45.33	28.50	75.23	37.85	7.94	3.27	27.10
Science	38.94	28.76	71.24	37.17	7.52	5.31	28.32
Arts	39.66	29.11	71.31	33.76	4.64	4.64	23.21
Music	42.29	30.40	69.60	33.04	4.85	4.41	25.11
PE	33.20	23.05	58.98	30.47	3.91	4.69	20.70
ICT	49.57	34.78	67.83	37.39	6.96	4.35	24.35
Moral	27.78	38.89	77.78	22.22	5.56	5.56	27.78

3.3 School-based Training

School-based training plays an important role in improving teachers' application competencies of educational technologies (Yang, Wu, & Zheng, 2018). The specific situation of school-based training in rural primary school is shown in table 5. In terms of training content, the demand for teachers from various disciplines is diversified and consistent. Rural teachers have paid too more attention to the basic operation of ICTs and the improvement of personal resource production skills, instead of cognitive strategies and metacognitive knowledge. In ICT-supported teaching, rural teachers' demand for the training of ICT-based teaching design is higher than 62%. However, their demand for educational technology theory and TPACK is lower than 45%. Meanwhile, rural teachers tend to ignore the teaching and learning methods, so they not only need to constantly learn new teaching theories, pedagogies and information security knowledge, but they also need to improve their competencies of integration of ICT with teaching.

Table 5
The Rural Teachers' Requirements about School-based Training Contents/%

	Educational technology theory	ICT-based teaching design	Courseware making technology	Information technology application	Online resources application	Subject teaching tools	TPACK	Network security application
Overall	44.70	69.35	90.91	57.61	58.22	56.82	36.42	12.41
Chinese	39.85	69.31	90.84	56.93	57.92	53.96	33.66	8.17
Math	39.35	69.17	89.22	55.14	57.64	54.64	32.83	8.27
English	46.01	70.42	86.85	52.58	52.58	53.52	38.50	12.21
Science	42.48	66.81	85.84	54.42	48.67	52.65	29.20	11.95
Arts	44.68	63.83	86.81	50.64	54.47	59.15	34.89	8.94
Music	44.49	66.08	83.70	55.51	54.63	53.74	34.36	10.57
PE	41.57	62.75	76.08	52.94	46.27	45.88	30.59	12.94
ICT	43.48	70.43	87.83	58.26	57.39	69.57	46.09	23.48
Moral	38.89	72.22	88.89	27.78	61.11	61.11	33.33	5.56

4. Discussion and Conclusion

In terms of the educational resource application, it is necessary to develop school-based resources with local characteristics, and realize the co-construction and sharing of resources (Lin, 2008). Considering the fact that rural primary and secondary school teachers are poor at processing and reprocessing resources, it is urgent to encourage them to develop high quality curriculum-based resources that are suitable for rural area. Meanwhile, they should accumulate localized teaching resources in their teaching practice so as to meet the personalized and school-based needs.

In terms of teaching tools application, it is advisable to encourage rural teachers to apply teaching tools in classroom teaching with a wide range of practical applications. Because rural primary school teachers are not used to adopting teaching tools, they need to be guided to increase the frequency of application of teaching tools in classroom teaching, and experience the convenience and efficiency brought by teaching tools in classroom teaching, so as to improve the enthusiasm of rural teachers to apply teaching tools in classroom teaching.

In the aspect of school-based training, school-based training should be carried out with discipline as the unit, and rational incentive and evaluation mechanism should be formulated. There is a need to carry out "precision" training and carry out training based on the local conditions of rural areas. It is also important to promote typical ICT application cases in rural schools, and promote the in-depth integration of ICT with teaching under the weak condition of ICT equipment in rural areas.

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