

Exploring the Strategies for ICT Integration with School-based Professional Development: A Case of a Mainland Chinese Primary School

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Abstract: Based on a collective case study of three groups of teachers from Chinese, English and Mathematics specializations from a primary school in South-western China, this paper aims to evidence the strategies for ICT integrated with school-based professional development for primary school teachers. According to the research results, this study provides practical suggestions from three perspectives: resource application, ICT tool application and school-based professional training.

Keywords: New basic education; ICT integration; primary school teachers; professional development

1. Introduction

According to the overall deployment of the "Education Informatization 2.0 Action Plans" and "Teacher Education Revitalization Action Plan (2018-2022)", the Ministry of Education of China has decided to promote the integration and innovation of information technology in education. Educating teachers on how to use ICT to enhance their teaching practices is an important objective of teacher education (Chang et al., 2012; Tondeur et al., 2017). The project of "New Basic Education" was an experimental project for basic education reform, aiming at creating modern Chinese schools to "cultivate life consciousness, develop people and make achievement" (Ye, 2015). In recent decades, this project has been deduced, summarized and refined into a series of educational theories based on the reality of Chinese Local Education - "Life-Practice School of Educology". In March 2017, Zhuoran Primary School officially joined the project "New Basic Education". As a sampled school, Zhuoran Primary School has made great efforts on building their teachers' ICT-related competencies and encouraged teachers to rethink, redesign and reflect their subject teaching and learning with the support of ICT. Therefore, this study investigates the strategies for ICT integration with the school-based professional development of primary school teachers.

2. Literature Review

Teacher professional development is a life-long and continuous process, in which teachers are expected to upgrade their knowledge, master new skills and change their practices (Santos & Miguel, 2019). The improvement of their teaching career is finally for their students and education reform (Dwivedi & Alam, 2011). Teachers' professional development is related to the success or failure of school development, and it also leads the reform and development of teacher education. In recent decades, the large-scale introduction of ICT into classroom has become an important way to affect the professional development and growth of teachers (Liu & Li, 2019). As shown in Figure 1, in the practice of "New Basic Education", teachers' professional development is realized through "Research-oriented reforming practice". Based on the "New Basic Education" theory, the practice of school research-based change is formed by the change of daily education and educational practice. In the practice of "New Basic Education", every teacher who

participates in the practice of research-based change is required to become an independent reform practitioner with theoretical guidance (Zhang & Ye, 2014). The research-oriented reform practice emphasizes the value and significance of teachers' daily educational practice for their own development (Zhong, 2017). With the guidance of educational experts, teachers constantly reflected and reconstructed, and constantly summarized the accumulation of daily experience to promote the professional development of teachers. The reform of educational theory and teachers' educational practice is a complex relationship of mutual construction and transformation, which not only puts forward new requirements for teacher development, but also provides opportunities and space for teachers' professional development (Feeney, 2016).

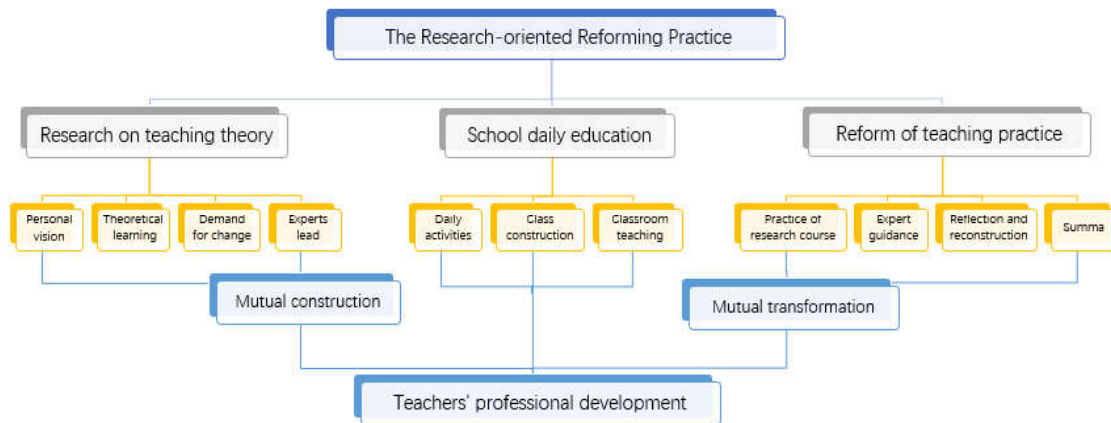


Figure 1. The realization of teachers' professional development through the research-oriented reforming practice

3. Methodology

To fulfill the aims of the present study, a purposive sampling method was adopted. Both qualitative and quantitative research methods were employed. A total of 80 teachers from specializations of Chinese 35, Mathematics 25, and English 20 were chosen for this study. This study lasted for four semesters. Data were collected from interviews, students' questionnaires, teachers' feedback and reflections, teachers' records, and etc. The qualitative data analyses were mainly through Coding, while quantitative data were analyzed by SPSS 20.0.

4. Profiles of three cases

4.1 Profile of case one: ICT integration with Chinese teachers' professional development

In 2012, the Zhuoran Chinese team set up a national school-based Chinese curriculum system, developed national school-based teaching materials and continuously revised them in teaching and learning. Meanwhile, the Chinese team made use of the advantages of ICT to optimize Chinese teaching in the school.

4.1.1 Recording micro-lessons

In 2020, thirty-one Chinese teachers recorded micro-lessons during the postponement of the start of the new pneumonia epidemic. Through online lesson preparation, there were three sections in micro-class teaching: Recitation and Rehearsal Hall, aid-learning Magic Bag and Challenge, guiding students to "read,

think, understand and practice", and learning Chinese with interest. During the 12-week network teaching period, the Chinese teachers studied the teaching materials, overcame the difficulty of being not familiar with the technologies, and recorded 63 micro-lessons of Chinese learning.

4.1.2 Constructing the online-learning platform

In the spring of 2020, with the "learning together" APP, an online-learning platform was built to provide rich materials for learning Chinese classics. Chinese teachers organized students to punch in their cards, read aloud and recite ancient poems on the online-learning platform, and carry out activities, such as online exchange, discussion, and digital Chinese classics stories. Till the end of spring semester, Chinese teachers had organized 474 exchange activities in 45 classes. As shown in Table 1, totally 1787 students, about 95.77% of students in Zhuoran, had participated in Chinese online learning.

Table 1. *Students' Chinese online-learning outcomes*

Total number of students	Online self-learning				Online self-learning with parents' help			
	Yes		No		Yes		No	
	number of students	%	number of students	%	number of students	%	number of students	%
1866	1787	95.77	79	4.23	1755	94.05	111	5.95

4.1.3 Chinese teachers' awards

Zhuoran Chinese teachers' professional learning has been developed rapidly with the ICT-supported instructional environment, especially in terms of curriculum development and teaching implementation. Chinese teachers have won various awards in City-level teaching and research achievements in Guilin Basic Education (See Table 2). Especially, Chinese teacher, Miss Tang Xili won the national "Model Teacher" title, and Miss Mo Nini won the "Excellent Teacher" title in Guangxi Province respectively.

Table 2. *Awards for Zhuoran Chinese teachers (Jan.2019 -Jul.2020)*

Team Research Project	City level research projects 2019	City level research projects 2020	City level achievements in education
No.	One for Level A	One for Level B	One for First Prize
Individual Research Project	Honorary	Classroom Teaching Competition Award	Paper Publication Award
No.	22	17	45

4.2 Profile of case two: ICT integration with Mathematics teachers' professional development

In order to improve Mathematics teachers' ability to use ICT in their teaching and learning, they employed Linglong Drawing Board, Hao Jun dynamic Mathematics and mathematics Class Stack to improve mathematics teaching quality. Furthermore, a comparative survey was conducted in 2019 and 2020 respectively to make contrast for the implementation of ICT integrated into mathematics teaching. we conducted a survey on the allocation of teachers' lesson preparation time among 20 mathematics teachers respectively (See Figure 2 & 3). After mastering the visual technology, the distribution of mathematics teachers' lesson preparation time changed significantly. Teachers' lesson preparation form was simplified, which saved a lot of time in preparing teaching AIDS, and teachers had more time to focus on students themselves. The value of visual teaching design lies in that every teacher becomes a designer, fully displays the vitality of classroom teaching.

Mathematics teachers regarded the ICT integration as the foothold for professional development,

and made the following main achievements : Firstly, Mathematics teachers successfully applied for the municipal project "Research on visualization Design and Application of Key and Difficult Knowledge in Primary School Mathematics" in 2018, and successfully closed the project in 2020. Secondly, Mathematics teachers collected more than 50 mathematics research samples and wrote more than 100 teachers' self-reflections on teaching and learning and working summaries. Last, Mathematics teachers had 11 papers published in provincial journals, and 2 papers won the first prize in the municipal paper competitions.

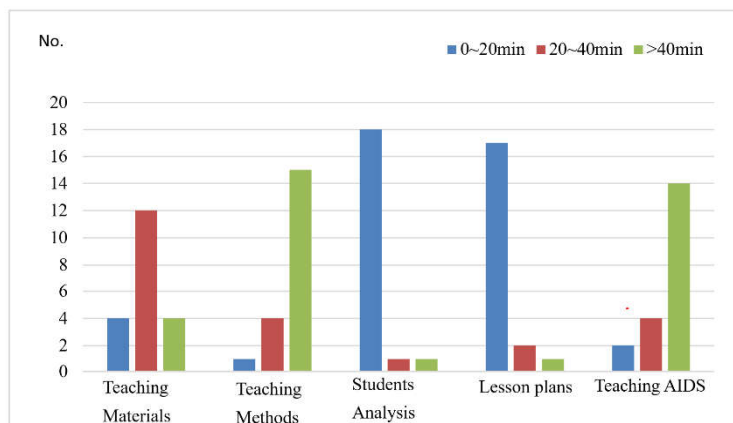


Figure 2. The distribution of Mathematics teachers' preparation time in 2019

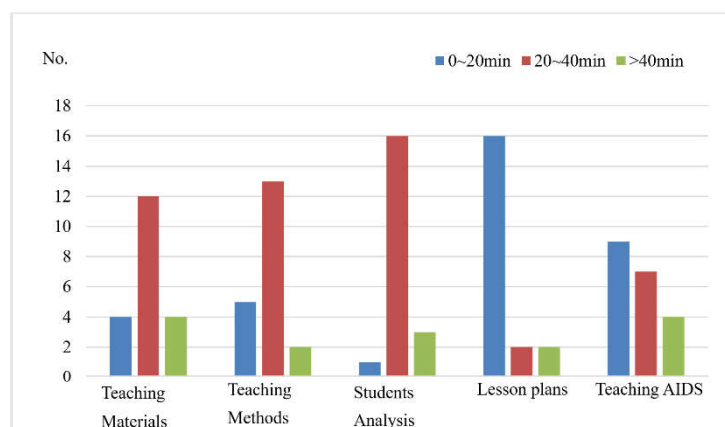


Figure 3. The distribution of Mathematics teachers' preparation time in 2020

4.3 Profile of case three: ICT integration with English teachers' professional development

The network technology has brought new development opportunities and challenges for Zhuoran English teachers to continuously explore new teaching methods. In the past three years, Zhuoran English teachers have combined new basic theories with multimedia software, such as Homework Network, Fun Dubbing, WeChat, Youdao, Himalaya and other Apps, to carry out "Cloud teaching and research" and "Cloud coaching" to promote professional development.

4.3.1 Build up a learning community to promote professional learning

As shown in Figure 4, in terms of paper publication, lecture sharing, teaching experience and classroom teaching, English teachers' theoretical materialized achievements and teaching practice cases have changed qualitatively, teachers' self-professional identity has also become higher and higher. English teachers' team has developed a strong sense of independent development, a good communication and cooperative learning

community. Meanwhile, with the support of "Smart Cloud Platform", English teachers jointly created learning and teaching resources. They can think and innovate on a certain knowledge hotspot. New ideas and new thoughts can be recorded to create richer and more diversified teaching resources. Teachers can download the necessary resources from the resource library, or watch videos for learning, and then reflect on and reconstruct on their own teaching practice. English teachers learning community is still in innovation and change, teachers also need more interactions to obtain teaching knowledge and to greatly improve the teaching ability and research level.

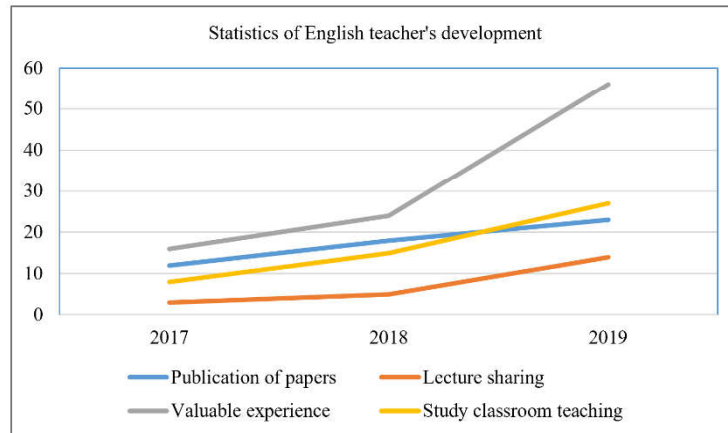


Figure 4. The professional growth of English teachers

4.3.2 Multi-dimensional investigation of classroom teaching

In the end of 2019, a survey was conducted among all English teachers with the status of teachers and students as the core. A total of 38 questionnaires were distributed and collected. Figure 5 shows that in practice, teachers actively "give up" and give time to students instead of the whole class. In the class teaching, teachers increased students' individual learning, group learning, group learning, large group discussion, teaching or scene performance and other activities or organization methods, and gave back the learning space to students. Meanwhile, teachers should pay attention to the combination of content and methods. Teachers no longer regarded questioning as their own privilege, but encouraged students to preview and think independently. Teacher also put forward questions of various types, including questioning, putting forward different views from teachers, classmates or teaching materials. Teachers actively returned the right of evaluation to students, allowing students to self evaluate or evaluate others; express their feedback, put forward opinions, praise and suggestions. Teachers presented a variety of resources in "Multi-dimensional interaction" and promote "interactive feedback" as well.

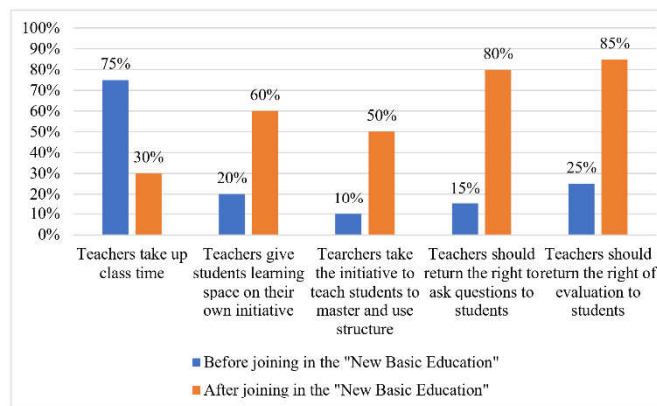


Figure 5. Self-evaluation for the interactions between teachers and students

5. Discussion and conclusion

Zhuoran Primary School explores the in-depth ICT integration of teaching Chinese, mathematics, English and other disciplines, to improve teachers' ICT competencies, innovation ability, self-awareness of professional development, and self-learning and reflection ability. Therefore, Zhuoran Primary School had summarized the following three strategies for teachers' professional development supported by ICT.

5.1 *The network information resources*

The application of the network information resources can encourage teachers to broaden their horizons, to learn advanced educational concepts, to understand the educational development trends. Furthermore, with the help of ICT-supported teaching resources, teachers have paid more attention to realize the deficiencies of their theoretical knowledge and teaching methods, to stimulate their professional learning, and even to strengthen their awareness of professional development.

5.2 *The application of ICT tools*

The application of ICT tools can make our classroom more vivid, so as to improve the efficiency of classroom teaching. Making good use of ICT tools can not only promote the communication and exchange between teachers and students, but it also can accumulate rich practical experience for instructional work, and finally can realize the growth and development of teachers' professional development.

5.3 *The school-based research and training activities*

A series of school-based research and training activities can promote the competencies of teaching and research team, broaden the scope and space for teachers' mutual communication, create a platform to enrich teachers' knowledge and ideas, make reflection on teaching practice, and eventually to improve teachers' professional development.

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