# TECHNOLOGY-ENHANCED TEACHERS' PROFESSIONAL DEVELOPMENT: STUDY OF FOUR CASES IN CHINA

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**Abstract**

Technology-Enhanced Teachers' Professional Development (TETPD) is arousing increasing interest among practitioners and researchers both in China and other countries. Good practices of teachers' education, supported by information and communication technologies, are in line with the needs of society. This paper proposes a framework for designing a multiple-case study to analyze technology enhanced teacher professional development in four typical Chinese cases. It describes the differences and similarities among the cases and argues that an understanding of TETPD could be built from them. The paper concludes that TETPD needs not only the joint planning of the central government, but also full support from local governments and schools, and especially teachers' active participation.

## Introduction

Success in using ICT in education depends largely on teachers and their level of skill in integrating ICT into their professional development and utilizing ICT to provide learner-centered, interactive education. All institutions of teacher education are faced with the challenge of preparing a new generation of teachers to effectively use the new learning resources in their life long learning and in their teaching practices. This is one of the reasons why technology enhanced teachers' professional development (TETPD) has aroused an increased interest from both practitioners and researchers, in China as well as in other countries (Carlson & Gadio, 2002; Schlager & Fusco, 2004; Zhang, 2007).

Today, there are more than 10 million teachers and 200 million students in China. In the past 20 years, teachers' education institutes in China have made great progress in TETPD (Gu, 2005). Many explorations and practices in China provided typical cases, lessons, experiences for the academic community in teacher education to draw upon when conducting research on TETPD (Jin & Xiong, 2006). Having proposed a theoretical framework on TPD which allows for the design of a multiple-case study (Yin, 1993), four typical cases are selected and presented. The paper then discusses how to analyze and successfully compare those cases in order to highlight similarities and differences among them and to contextualize the cases for comparative use in the multiple-case study design.

## Theoretical Framework

In providing an understanding of TETPD, one need not only reflect the researchers' own recognition, but also anchor the work in the recent development and progress of research and practice. Therefore, a broader theoretical framework for the design, selection and analysis of a range of cases to study is needed. In order to do so, a tentative definition of TETPD is first proposed.

### TETPD: A Tentative Definition

In recent years, teachers' professional development enhanced by information communication and technologies has been one of the trends and hot topics of teacher education development around the world (Villegas-Reimers, 2003; Zhao, 2007). The use of technology to support TPD draws a good deal of attention. But there is not any clear and generally accepted definition of TETPD, since the backgrounds and perspectives from researchers and policy- makers differ (Jiao, Wang, & Qin, 2009).

TETPD is a relatively new topic in China, but there is still some literature discussing the features and development of TETPD. Generally speaking, scholars, educators, practitioners and researchers use different terminologies and terms to refer to TETPD: such as TDP in the Environment of Information Technology (Gu, 2005), TDP towards Informationalization (Liang, Yu, & Wu, 2008), and Distance Teachers Education (Liang, 2004).

TDP in the Environment of Information Technology focus how technologies can be used and regarded as an environment in which TPD occur. Distance Teachers' Education put particular emphasis on how teachers' education can be deployed as distance education. Both can be regarded as a kind of strategies or approaches of TETPD. In the case of TDP towards Informationalization, prominence was given to the aims and missions of TPD.

All these concepts used by researchers in China are connected to TETPD. But since TETPD is a new issue, emerging from the interaction of TPD and the development of information communication and technologies, these concepts being conceptualized in a different area may be something different from TETPD. In a sense, they might intuitively be related to TETPD and act as guiding concepts. In TETPD, technology may be regarded not only as environment of TPD, but also as resources, tools, strategies, and approaches of TPD. Therefore, a tentative definition is needed.

In this paper, TETPD is regarded as a systematic, dynamic and complex process which helps teacher to improve his or her professional knowledge, teaching strategies and skills, and attitude in technology enriched environment via

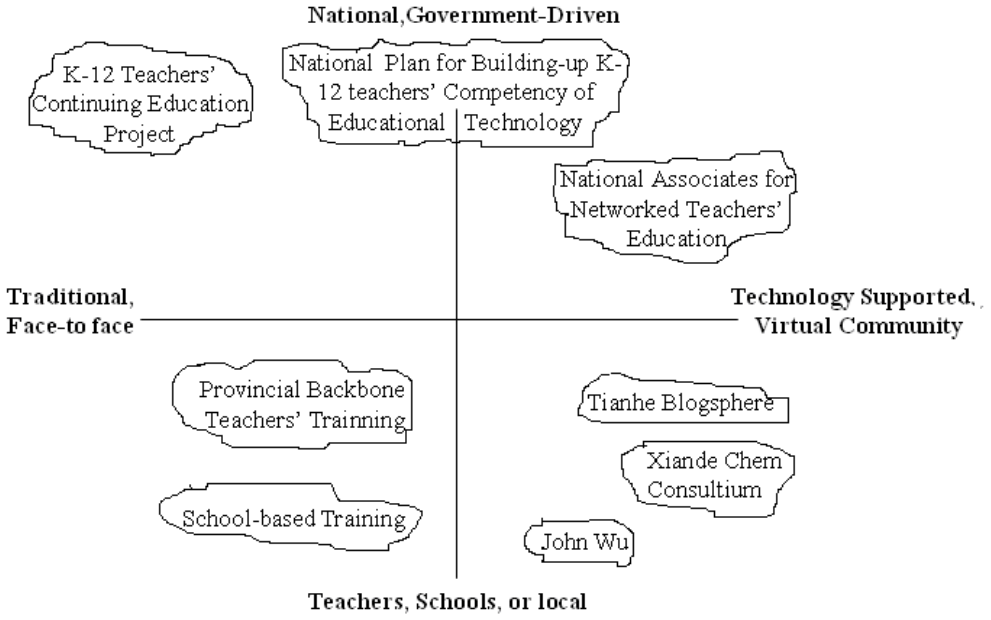
technologies, especially information and communication technologies. Its aims and missions are to help teachers to adapt teaching and learning, and finally promote the quality of teaching and learning.

## Theoretical Framework for the Design and Selection of Cases for a Multiple Case Study

There are a lot of research and practices, as well as successful cases on TPD and TETPD in China (Jiao, Wang, & Qin, 2009). An important question to address is how to select cases that would represent TETPD in China?

This paper presents a framework designed to select cases for a multiple case-study, and to analyze and compare the similarities and differences among some cases selected in China. The framework combines two dimensions: one is the stakeholders of TETPD such as government driven TETPD, individual teachers, schools, local departments; the other is the approaches, strategies and methodologies of TETPD used, such as traditional face to face dominated, technology supported, virtual communities etc. In accordance with to these two dimensions, four quadrants are formed. Within this framework, almost all TPD and TETPD may be designated to one of the four quadrants. The framework is shown in Figure 1.

Figure 1: The Framework for Cases Study




On the left side of the vertical axis, technologies such as computer technology, multimedia, Internet, etc., are considered as content and subject matter of TPD.

They are what teachers should learn. On the right side, technologies are used as approaches, methods, environments, and strategies to improve TPD. On this side, technology represents how teachers learn in an absolutely different way.

On the upper part of horizontal axis, TPD is initiated and driven by national or governmental initiatives, and on the lower part, TPD is spontaneous or controlled by individual teachers, specific schools, or local educational departments. This gives a framework to select cases representing as much variation and diversity within these dimensions as possible.

## Case Selection and Methodological Consideration

In accordance with the tentative definition of TETPD given, and in relation to the framework discussed above, four cases of TETPD in China are selected. These are briefly presented and described in the following.

### Brief Description of the Four Selected Cases

Case 1: National Plan for Building-up K–12 Teachers' Competence of Educational Technology (NPBKTCET)
In April of 2005, The Ministry of Education (MOE) issued *the Notice of Launch of National Plan for Building-up K–12 Teachers' Competence of Educational Technology*, with the purpose of applying ICT to teaching and learning in K–12 schools. Its aim is to markedly improve K–12 teachers' competences of educational technology, promote the effectively use of ICT in teaching, help teachers to change their pedagogy and teaching method, improve the quality of teaching and learning, and thereby develop basic education in China (MOE, 2005).

Case 2: National Associates for Networked Teachers' Education
In order to push forward the innovation of teachers' education and improve the quality of teachers and staff, the MOE launched the Plan of National Associates for Networked Teachers' Education (NANTE) in September of 2004. The NANTE is a joint enterprise of institutes of distance education, a confederation of 13 organizations and institutes which are involved in networked education for teacher education (MOE, 2003).

Case 3: Tianhe Blogosphere
Tianhe Blogosphere (www.thjy.edu.cn, in Chinese) is one of the top four regional platforms for teachers to communicate and share experiences concerning teaching in China. It has been known as one of the four teachers' blogospheres (the others being Zibo Blog for Teaching Research, Suzhou Educational Blogosphere, and Haiyan Teachers' Blogosphere), named as the Tianhe Blogosphere Phenomenon.

The blog was originally used by teachers in the Tianhe District of Guangzhou city. At present, it has attracted more than ten thousands of teachers from other areas in China.

Case 4: John (Bingjian Wu)
John is a former English teacher at Zhixin Primary School in Shaoguan city of Guangdong Province with a special website for teachers. (www.teacherweb.com/CH/Zhixin/JohnWu) He taught English to students from grades 4–6 for more than 10 years. In those years, John linked his class to classes from 26 different countries via different technologies, from Air Mail to E-mail, Website, etc. His students benefited from his exploration, while he progressed in his own professional development. Later, he was transferred to the teaching and research division under Shaoguan Department of Education. He is in charge of guiding English teachers at primary schools in Shaoguan city.

These four cases are not intended to be representatives of all case of TETPD or to present a comprehensive overview of all possible cases to select in China in this fast changing field. But within each case, both special and typical characteristics are included and they take full advantage of two dimensions mentioned above. The next section will provide additional information in each case in order to more thoroughly see the variation and diversity of each individual case.

## Methodological Consideration on the Analysis of the Multiple-Case Study

The above theoretical framework helps us select four cases in China. The next question to address is how to analyze these four cases, and to make as much use of their similarities and differences in the multiple-case design. For each case to be better understood, each case is discussed from a more elaborated account of the framework in Figure 1.

In this paper, the following four facets and subsequent questions are discussed:

- Stakeholders: Who or what kind of organizations aid, finance, and organize the practices of TETPD?

- Features and Characteristics: What are the behavioral features and characteristics of teachers, educators and organizers involved in the TETPD?

- Primary Technologies: What kinds of technologies are used, and what roles and functions do technologies play in the TETPD?

- Effect and evaluation: What are the assessment and evaluation of the TETPD, in terms of comments from teachers who are involved, input-output analysis, etc.?

## Discussion

The four facets above are used to differentiate and further describe the four cases. In this section, an analysis of each case from the four facets is provided, and then a comparison is made to illustrate similarities and differences among the cases and pointing towards the possible understanding of TETPD they could provide respectively.

### Case 1: NPBKTCET

In July of 2005, the MOE launched a pilot project of new curriculum reform in nine provinces including Liaoning, Jiangsu, Henan, Guangxi, Hainan, Chongqing, Sichuan, Yunnan, and Ningxia. From July of 2006 on, new curriculum reform has been carried out in all-round in the whole nation.

NPBKTCET can be divided into two parts: training and examination. The examination of competence of educational technology (CETS) was organized and implemented by the National Test Center under the MOE. In August of 2006, The NPBKTCET's official website (www.teta.com.cn) was launched, and its office was established by MOE in September (MOE, 2005). Training activities were organized and the first national test was held in November. From then on, this kind of test is held twice a year.

The NPBKTCET is a top-down project. The stakeholders of NPBKTCET are the central government and local educational authorities. All K–12 teachers are required to participate in its training activities including face-to-face sessions and online sessions, and pass its national test. Its supporting websites both at the national level and the provincial level have been designed and developed. It is a one-size-fits-all model for teachers' professional development.

### Case 2: NANTE

NANTE is a joint enterprise of institutes of distance education for teacher education, a confederation of 13 organizations and institutes. Included are 8 normal universities: Beijing Normal University, East China Normal University, North Eastern Normal University, Central China Normal University, Southwestern University, Shaanxi Normal University, Fujian Normal University and South China Normal University; A mega-university focused on distance education, Central Radio and TV University, An National Educational TV Station, China

Educational TV, and two publishing houses: Higher Education Press and Peoples' Education Press.

On the official website of NANTE (www.jswl.cn), there are different modules such as Teachers Training, Head teachers Training, Resources Centre, TPD, Rural Education, Educational News, Trends of K–12 Curriculum Reform, International Educational Review, Policies and Regulations, ICT Skills Training, etc. It has been a professional portal and hub for teachers' professional development.

NANTE is a loose organization associated with the Department of Teachers Education under the MOE (MOE, 2003). Its approach is a top-down way to help teachers' with professional development. Its effects and impacts on TPD are under observation in the future.

### Case 3: Tianhe Blogosphere

The Tianhe Blogosphere is an important channel and approach for teachers' professional development. By April 7, 2009, there has been 14,026 K–12 teachers exchanged their professional experiences, affective interaction, ideas and thoughts, shown their own talents and competence on the Tianhe Blogosphere all over the country. A lot of bloggers tell their own stories and their life in schools, post their own lesson plans and syllabus to collect suggestions and advice from others online, accumulate successful cases and improve their own tacit knowledge and wisdom. The total posts' numbers in the blogosphere added up to 229,019 since it was built on February 2005. Today, more and more students in K–12 schools, undergraduates from teachers' colleges and normal universities, and in-service teachers from all over the country, are attracted to it.

As such, blogs are important part of the rapidly developing Web 2.0 phenomenon that revolutionizes the current World Wide Web. As a founder of Tianhe Blogosphere, Mr. Zhang Weichun said that Tianhe Blogosphere is not only a technological system, but also a communicative mechanism and management system, as well as a culture of TPD (Ruan, 2007). Not only teachers are active on the Tianhe Blogosphere, more and more students join in it, too.

Tianhe Blogosphere changed the model of TPD from a top-down, centralized model of TETPD to a bottom-up, autonomous and spontaneous model. It combined teaching and research, teacher resources development, teachers' practical reflection, school- based training as well as quality monitoring of teaching and learning in one system. It strengthens communications among teachers, students and parents. The blogosphere is unique in that it is a place where everyone can share his or her thoughts and spread his or her views. This personalized aspect seems very important for teachers.

## Case 4: John (Bingjian Wu)

In the summer of 1994, Bingjian Wu (John), a 22-year-old English teacher at the Zhixin Primary School of Shaoguan, participated in an English Seminar sponsored by Shaoguan University. At the seminar, he met Rhonda Rolf, an elementary school teacher from Temple City. Both were enthusiastic about their work, and they had many experiences to share. Later, Wu and Rolf worked out a feasible pen pal program. John Wu put much extra effort into the program, because his students had difficulty in writing in English. In 1997, Rolf introduced John to her former teaching colleague, Mrs. Jackson. Jackson introduced a colleague of hers who worked at another school, Mrs. Fikac…… this process went on and more and more teachers from different countries and their classes were involved.

Mostly, the children's letters have been about their school life, birthday parties, pets, family members, hobbies, festivals, favorite pop stars, religion, and current events they had seen on news broadcasts. Sometimes with their letters, the children enclose small gifts such as photographs of themselves and their families, postcards, maps, paintings created by them, handicrafts, and reading materials that depict life in their countries (Xiang, 1999).

Through pen pal communication, John created a natural and real environment of English language learning for his classes, fulfilled language interactions and made his students experience a fancy English learning.

At that time, computers were really expensive for people there and the Internet access was not available. John and his students wrote air mails to their pen pals. Later, John bought a computer and developed websites to improve cross-cultural communication.

John is a self-regulated teacher with high achievement motivation. He continuously strives to develop professionally and to change his teaching and learning.

## Comparison among Four Cases

These more elaborated descriptions can be used to highlight the four cases on each one of the four facets. Table 1 summarizes the similarities and differences among these four cases.

Table 1: Comparison among the Cases on Four Facets

| | Case1: NPBKCET | Case2 NANTE | Case3 Tianhe Blogosphere | Case4 John Wu |
|---|---|---|---|---|
| Stakeholders | Central Gov. | Commonwealth of institutes and Central Gov. | Local education departments and teachers | A teacher |
| Features and Characteristics | Top-down compulsory | Semi-government | Teachers and schools are encouraged and attracted | Personal subjective |
| Primary Technologies | Face-to face training and websites | Online community, website with resources | Online community based blog workshops, | Air mail and e-mail, IM tools and website, etc. |
| Effect and evaluation | National, one size fits all | to be investigated | Neighbors help neighbors | Personal effective |

In these four cases, case one, NPBKTCET can be regarded as a top-down, one-fits-all model of TPD. All K–12 teachers are required to accept training and pass the test. Face-to-face training is the dominant approach. Case 2, NANTE, is a mixture with real institutes and community of practice. It is funded and supported by government. A website with abundant resources, as a virtual community of teachers, has been created. Case 3, the Tianhe Blogosphere, is a model which satisfies the needs of teachers, schools and local educational authorities. More and more teachers have been involved in it. Case 4, John Wu, is a special case of a teacher who tried to find more room for his own development and sharing this experience through the internet.

Among these four cases, different technologies were used to improve TPD. But "Introducing new technology alone is never enough. The big spurts in productivity come when a new technology is combined with new ways of doing business" (Freidman, 2005, p. 119). That means, only when ICT and new ways of teaching, learning and professional developing are dynamically integrated, TETPD will truly promote the growth of teachers to enhance teaching quality and efficiency.

The cases provide the ground for claiming that there could not be one given model for TETPD. As it was expressed by Darling-Hammond: "In the recent past, many teacher education programs have been criticized for being overly theoretical, having little connection to practice, offering fragmented and incoherent courses, and lacking in a clear, shared conception of teaching among faculty" (2005, p. 391). The specific aspects of each case might provide a sound basis for adhering to Darling-Hammond's point. Learning about practice could be done in practice, in technologies enriched settings, in professional communities of teachers, and learning by doing designed and effectively integrated in models of TETPD drawing on the four cases. Deng Xiaoping said that it doesn't matter whether the cat is black or white, as long as it catches mice. For educators, the most important thing is to explore, compare and introduce approaches, strategies and models to improve teachers' professional development, especially TPD that is enhanced by information communication and technologies.

## Conclusion

Introducing technologies provides TPD new approaches, methods, strategies as well as environment. It has been an obvious trend to study new instructional technologies from teachers' communities of practice and promote TPD in the technological settings. Teachers' vision, motivation, enthusiasm and technological sensitivity are the foundation of technology enhanced teacher professional development. Therefore, TETPD needs not only the joint planning of the central government, but also the full support from local governments and schools, and especially teachers' active participation.

These four cases illustrate the potential diversity of TETPD. Each case has its different features and characteristics; they reflect the four facets in different ways and form different approaches or models of TETPD. It is believed that TPD will reach educational ideals through combining multi-approaches and different methods, and in developing such models of TETPD multiple-case studies such as the one outlined here are needed.

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