# TECHNOLOGY-ENHANCED TEACHERS' PROFESSIONAL DEVELOPMENT: A LITERATURE REVIEW IN CHINA

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**Abstract**

In this paper, a review of the recent Chinese literature concerning background, policies, standards, evaluation, models as well as phases and processes of teacher professional development enhanced by technology is presented. The current situation in terms of status quo, issues and trends is described and considered in terms of technology- enhanced teachers' professional development. Finally, the paper highlights ten conclusions drawn from Chinese research and practices.

## Introduction

The quality and performance of teachers have for a long time been considered as determining factors for the success of educational changes (Aluko & Aluko, 2008). Teachers' professional development (TPD) is a crucial component in nearly every modern proposal for educational improvement. Lately, technology-enhanced teachers' professional development (TETPD) has been one of the trends and hot topics of teacher education development in the world. In China, TPD is "mainly carried on by the way of pre-service education that is normal education in early years. It has gradually developed into in-service teachers' education till 1980s" (Wang, 2007). From the 1980s on, teachers' education has been advocated and related policies have been issued. Literature on practices and researches on how technology enhanced teachers' professional development has since increased.

Based upon a review of the past 20 years of Chinese literature on this issue, this paper intends to do four things. First it provides a background description on Chinese policies concerning TPD. Secondly it provides different standards and evaluation systems for TETPD. Thirdly, it provides a review of research on TPD and TETPD in terms of phases, processes, models and strategies for TPD and TETPD. Last and fourthly, the paper ends with ten conclusions concerning teachers professional development related to the use of technology in China.

## A Tentative View of TETPD

In the past 20 years, Chinese research on TPD has progressed. The amount of literature on in-service teacher education outnumbered that on pre-service teacher

education. And the perspectives, scopes, and outcomes of related researches became richer and richer (Yu, 2007). But at present, there is no clear and generally accepted definition of TETPD. The understandings, backgrounds and perspectives of researchers and policy- makers differ. To guide this paper, a tentative definition of TETPD could be to frame it 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 different technologies, especially information and communication technologies. The aims and missions of TETPD would be to help teachers to adapt teaching and learning in information age, and finally promote the quality of teaching and learning.

## TETPD: Policies, Standards and Evaluation

With the recent development of teachers' education, and the transformation from in-service teacher education to a perspective of teachers' long-life education, TPD and TETPD have attracted many policy-makers of different departments of education in China.

### A Short Historical Background on TPD and TETPD Policies

Looking backward will be helpful for looking forward. The three national conferences on education in the past twenty years opened the curtain of the TPD and TETPD in China.

The 1st National Conference on Education held on May 15–20, 1985 in Beijing is one of the most important conferences after China's implementation of the open-door policy and reform. At this conference, reform of educational system and its steps and strategies were discussed. Existing problems in Chinese educational system such as unreasonable structure, poor basic education, lack of schools, unsatisfied quality of schooling, and lack of qualified teachers and devices and equipments were also hot topics. *The Decision on the Reform of the Educational System by the Central Committee of the Communist Party of China* (CCCPC) was published by Xinhua News Agency on May 27. From then on, rights of basic education have been shifted to local governments in order to develop basic education. The nine-year compulsory education system has been put in to practice.

The 2nd National Conference on Education was held from June 14–17, 1994 in Beijing. Its mission was to execute the priority strategy giving to the development of education into effect, call on the whole society to put *The Outline for Reform and Development of Education in China* published in February 1993 into practice. In this government document, the CCCPC and the State Council expected to achieve the goal that nine-year compulsory education would be basically universalized and illiteracy would be eliminated, and the quality of education in all

respects would be improved by the end of that century. In addition, the statement that revitalizing our nation depends upon education and invigorating education depends upon teachers firstly appeared in it. It became one of the common understandings in China to further boost teachers' training.

On December 24, 1998, The MOE released *The Action Plan for Invigorating Education toward 21st Century (MOE, 1998)*. This document was the blueprint of national educational reform and development in the trans-century period. In this document, a lot of effective measures, steps and strategies were made. For example, *Trans-century Project on Quality-oriented Education* to improve the overall quality of the whole nation, *Trans-century Teachers' Training Program* to enhance teachers' competence, *Project on High-level Creative Professional Manpower* to strengthen the scientific research work in Higher education, the *Project 211* (Chinese government's endeavor to strengthen about 100 institutions of higher education and key disciplinary areas as a national priority for the 21st century) to increase the creative competence of institutes, colleges and universities, and *Modern Distance Education Project* to shape open education networks and build up the long-life learning system.

The 3rd National Conference on Education was held from June 15–18, 1999 in Beijing. At this conference, *the Decision on Deepening Reform of Education and Conducting a Comprehensive Quality-oriented Education* was made by the CCCPC and the State Council. In September 1999, the MOE convened a national working conference on National K–12 Teachers' Continuing Education and Head Teachers' Training and the MOE Commissioned all parts of country to implement the *Project on K–12 Teachers' Continuing Education*.

The Chinese government tried to thoroughly train all K–12 teachers (more than ten million teachers) by *The Project on K–12 Teachers' Continuing Education*. Three types of teachers' training were mentioned in this project; new or novice teachers' training; in-service teachers' training; and backbone teachers' training. The MOE would organize the training of ten thousand Backbone Teachers at the national level; the local governments would organize training for ninety thousand backbone teachers at provincial level; and at the school level, a million backbone teachers would be trained. In addition, all K–12 teachers would accept computer skills training which would help them to use computer to aid their own teaching and learning. Diploma Education Project, aimed to improve teachers' diploma, and Trainers' Training Program was specially designed to promote different kinds of trainers' skill.

In order to carry out *The Decision on Deepening Reform of Education and Conducting a Comprehensive Quality-oriented Education*, the MOE decided to proceed with the reform of basic education, regulate the content and structure of

the curriculum system, and build up a new curriculum system to meet the needs of quality-oriented education. In June 2001, the MOE released *the Outline for Reform of Curriculum System in Basic Education* (Pilot Edition, MOE, 2001) and published *the National Curriculum Standards for Compulsory Education* (Trial Edition, MOE, 2001). In the autumn of 2001, the new curriculum system was put into trial use.

In 2003, The State Council convened a national meeting on rural education and decided to launch modern distance education in rural primary and secondary schools to accelerate the educational resource share between urban and rural area and raise the quality and efficiency of rural education. On March 3, 2004, *the Action Plan for Invigorating Education from 2003 to 2007* was put into effect. In the plan, the Project on Modern Distance Education in Rural Primary and Secondary Schools, and the National Associates for Networked Teachers' Education came into effect. The project used three kinds of models: CD-ROMs distributing centers, Satellite Receiving Stations, and multi-computer labs.

*The Standards of Educational Technology of China* (SETC) (CAET, 2004) released by China Association for Educational Technology in November 2004 marked the start to mature of evaluation and assessment of teachers' technical capability and competence (Gu, 2008). A month later, on Dec. 25, 2004, the MOE issued *the China Educational Technology Standards* (CETS) (MOE, 2004) which was the first national competence standard for K–12 teachers and one of important landmarks of K–12 TPD in China. And then, the MOE launched *the National Plan of Build-up of K–12 Teachers' Competence of Educational Technology* (MOE, 2005).

On May 18th 2007, the State Council authorized *the Framework of Development of Education in the Eleventh National Five-year Plan* submitted by the MOE, in which strengthening teachers' education and training, improving the quality of teachers and staff were emphasized.

The following four points can be highlighted from the backgrounds and policies of TPD and TETPD since 1980s:

- Teachers' education in China was tremendously changed in the past 20 years and issues related to teachers such as TPD and TETPD were gradually highlighted.

- There has been three great transformations on teachers' education in China in the past 20 years: the first concerns a shift from only stressing normal education (Pre-service teachers' education) to the combination of normal education and in-service teachers' training; the second

concerns a gradual shift from focusing on teachers' training and teachers' continuing education to TPD; the third concerns a shift from the over-emphasis on face to face teachers' training to a combination of face to face training and distance teachers education and other strategies and approaches.

- During the past 20 years, neither technologies nor technological factors were appreciated in TPD.

- And the amount of literature regarding TETPD has gradually increased.

## Standards and Evaluations of TPD and TETPD

At present, a few standards and evaluation systems related to TPD and TETPD have been formulated and executed in practice in China. In some laws and regulations such as *Teacher's Law of the Peoples Republic of China* issued on Oct. 31, 1993 and *Regulation of Teacher's Qualification* released on Dec.12,1995 by the State Council, teachers' qualification and teachers' competence were concerned.

The SETC and CETS mentioned above are two documents related closely to standards and evaluation systems on TPD. The SETC covers basic requirements and competence of educational technology for almost all participants including students, teachers, educational administrators, and professionals of educational technology, it also covers its performance indicators, successful cases, design templates, evaluation tools and training syllabus required in the process of implementation.

The standards of competences of educational technology for teachers and staff, administrators and technicians in CETS cover the following four dimensions:

- Awareness and attitudes: recognition and understanding of the importance, consciousness of application, evaluation and reflection as well as life-long learning.

- Knowledge and skills: elementary knowledge and basic skills.

- Adoption and innovation: Instructional design and implementation, teaching support and administration, scientific research and development, cooperation, collaboration and communication.

- Social Responsibility: fair use, effective use, healthy use and code of conduct.

If the CETS and SETC are compared with National Educational Technology Standards for Teachers (NETS.T) issued by the International Society for Technology in Education (ISTE) in the USA, it is apparent that the CETS and SETC learnt a lot from NETS.T, but they have their own features and characteristics. The following comparison shows some of those issues.

*Structural system of standards:* CETS and SETC, SETC.T (SETC for teachers) in particular, are quite similar to NETS.T in the structures of competence and indicators. But NETS.T is more commonly used, understandable and operable than CETS and SETC. It can be used as an index system and rating scales to measure teachers' competence of educational technology, and help teachers in self-inspection and self-assessment.

*Target audience:* CETS is for all in-service teachers, but SETC and NETS.T for all teachers including pre-service teachers, newly inducted teachers as well as in-service teachers. All teachers' growth phases are covered in SETC.T including student teachers, pre-service teachers, new teachers and in-service teachers. For different kinds of teachers or teachers in different growth phases, different and specific requirements are specified.

*Content of standards:* The NETS.T has been revised and edited three times. It has been absorbed and integrated new research findings of educational technology and innovative technologies. Also, the content of NETS.T is in line with its sister standard, NETS.S, standard for students. At this point, SETC.T is quite similar to NETS.T and teachers' standards of educational technology are aligned with students' standards.

A difference, comparatively speaking, is that NETS.T is much more flexible and compatible than SETC.T and CETS because of the difference of national systems between the two countries. In the U.S.A, different states can localize and redefine the national standards to meet its own needs according to its own cases. In China, SETC.T is divided into two different parts, A and B. The former is used in schools in the developed area or in schools that have high standards. The latter is used in schools in developing areas or in schools that have lower standards. But the regional classification available is too simple and rough for China, being such a large country with such diversity. What is worse is that it is not considered an option to localize or regionalize in CETS.

## Phases and Processes of TPD and TETPD

There is a lot of Chinese literature reporting on the processes and phases of TPD, but it seems that many build on foreign references and studies.

Baoxiang Shao and Jinbao Wang (1999) proposed 4 phases in the process of TPD of teachers: adaptation, growth, competent and mature. Caiguo Zheng (2007) claimed that the process of teacher professional development can be divided into 4: novice teachers, competent teachers, experienced teachers and expert teachers. Lan Ye and Yimin Bai (2001) believed that a teacher career cycle of TPD covers 5 phases: focus on nothing, focus virtually, focus on existence, focus on task, and focus on self-updating. Qin Luo and Shiyan Liao (2002) indicated 4 phases: adaptation, development, mature, and continuing development. Table 1 shows the different researchers and phases.

Table 1: Phases of Teachers' Careers of TPD

| Researchers | Phases of TPD |
|---|---|
| Baoxiang Shao and Jinbao Wang (1999) | adaptation, growth, competent and mature |
| Lan Ye & Yimin Bai (2001) | focus on nothing, focus virtually, focus on existence, focus on task, and focus on self-updating |
| Qin Luo and Shiyan Liao (2002) | adaptation, development, mature, and continuing development |
| Caiguo Zheng (2007) | novice teachers, competent teachers, experienced teachers and expert teachers respectively |

The researches above are researches on phases of TPD, not phases and processes of TETPD. There are only a few Chinese reports on phases and processes of TETPD, but there are some researches on phases of TPD in rich technology settings or informationalized environments. For example, Xiaoqing Gu (2004) referred the course of TPD as 4 phases: understanding, application, integration and innovation. Lu Wang divided TPD into 3 distinct phases: learning from experience, reflection from practice, and innovation from research (Wei, 2005). Shengquan Yu (2006) indicated that a teacher would experience 5 phases: learning from imitation, try and use, suspicion and puzzledom, evolvement and integration, as well as innovation and development. Wenxin Liang (2008) extended Shengquan Yu's 5-phases theory from ecological perspectives. He classified the course of TPD into 3 phases: ecological mutation phase, ecological evolution phase,

ecological equilibrium phase. In the ecological mutation phase, teachers begin to know ICT and try to understand it; in the ecological evolution phase, teachers integrate ICT into their own teaching and learning; in the ecological equilibrium phase, teachers fulfill the application of technologies and can effectively integrate ICT into their teaching and learning. Table 2 summarizes the research on phases of TPD in technology rich settings.

Table 2: Phases of Teachers' Careers of TETPD

| Researchers | Phases of TPD |
|---|---|
| Xiaoqing Gu (2004) | understanding, application, integration and innovation |
| Lu Wang (2005) | learning from experience, reflection from practice, and innovation from research |
| Shengquan Yu (2006) | learning from imitation, try and use, suspicion and puzzle dom, evolvement and integration, as well as innovation and development |
| Wenxin Liang (2008) | ecological mutation phase, ecological evolution phase, ecological equilibrium phase |

Actually, one might note that the phases proposed above are quite similar to the ideas about barriers for ICT use proposed by Patricia L. Rogers (2000). Either TPD enhanced by technologies or general TPD, teachers' growth seems to follow its trajectory. It may not exceed its own path of TPD. But, with the introduction of technologies into TPD, the phases and processes of TPD may be changed. A way of understanding this change from the research above is:

- Content of teachers' learning is changed, basic skills and applications of technologies such as ICT turn into what teachers should learn during the course of TPD, especially at the beginning of TPD.
- Features and characteristics of each phase may be changed such as learning focus, learning styles etc (Fu, 2003; Gu, 2004).
- The duration of each phase of TPD may be changed. It may be shortened if technology is properly used.

- Levels of competence and degree of development of TPD may be improved and promoted.

It is all these changes that TETPD and research on TETPD are focused and emphasized. It is not hard to see that the development of technologies and its introduction to school setting affected teachers' professional development, and phases or growth periods of TPD in a sense followed the development and evolution of ICT. Many researches on phases of TPD in China were based on foreign researches. These suggested phases are quite similar to those revealed by foreign researchers.

## TETPD: Different Models

Dennis Sparks and Susan Loucks-Horsley (1989) described five models of teachers' professional development: the individually guided model, the observation and feedback model, the curriculum development/improvement model, the training model, and the inquiry model.

Having analyzed the effects of networked environment on TPD from a perspectives of teachers professional qualities and roles of teachers, Xiufeng Ma and Xiaofei Li (2006) elaborated four models of TPD: autonomous development; cooperation development based on learning organization; practical reflection; and network associates. Meanwhile, in the same paper, they regarded the effective strategies of TPD supported by networked technologies as autonomous development, cooperation development based on learning organization, practical reflection, and network associates.

There are few reports on models of TETPD. What Dennis Sparks and Susan Loucks-Horsley (1989), Xiufeng Ma and Xiaofei Li (2006) described are more strategies, methods or approaches rather than models of TPD.

## TETPD: Conclusions from Research and Practices in China

This paper reviews the researches and practices on TPD and TETPD in China. Having reviewed the Chinese literature, it can be concluded:

- TPD was highlighted for special attention, and researches and practices on TETPD in China are at its preliminary stage. TPD and TETPD have increasingly attracted policy makers of departments of education in China.

- Training is one of significant approaches and strategies of TPD and TETPD in China. Some other approaches, strategies and methods of TETPD have appeared recently and are being adopted slowly.

- Practices on TPD and TETPD have gone ahead of research. There are few studies on TETPD reported in Chinese literature, but practices on TETPD are booming recently.

- Teachers' training practices in china have been dominated by top-down organization and face to face trainings are the overwhelming majority of teachers training activities in China. In recent years, other practices on TETPD begin to come to prominence in China.

- Much research and practice on TPD and TETPD in China seems to be anchored in approaches from abroad. Most of them focused on phases of TPD. There are few reports on phases, processes and models of TETPD. It seems that there is a long way for Chinese researchers to go before having developed an approach of their own.

- There is a lack of research on teachers' learning and learning through the use of technologies in China. The difference between knowledge learning and technology learning has been neglected by designer and practitioners in the practices of teachers' training.

- Training techniques and methods should be improved and new strategies and approaches should be introduced. Some training lack proper instructional design. Complex and advanced technologies used to be selected as content of teachers' training. But these technologies seem seldom to be brought into play in teaching and learning of teachers who accepted this kind of training. Therefore, new strategies and approaches such as participatory training, task-driven training, action research, cases study, problem based training, could be adopted in teachers' training.

- Traditional pedagogical skills have not been given proper importance and technologies and teachers professional skills in networked environments are highly thought of by training designers and teacher-trainers. For example, oral expression, classroom management, questioning, homework design and mark, peer coaching and mentoring, skills of lesson plan, were overlooked in training.

- The enthusiasm of teachers of TPD should be encouraged; especially the desire of teachers' autonomous development should be stirred up.

Training, based on a model of one size fits all, can not meet the individual teacher's needs. Teachers, being as busy as a bee with great pressure for raising the rate of their students enrolled into colleges and universities, has not enough time to update their own knowledge and pedagogy.

- The links between Normal universities or Teachers' training institutes and K–12 schools should be strengthened. Researchers who work in normal universities or teachers' training institutes should be encouraged to do their own research in classrooms or K–12 school settings.

TPD is not a business made at a stroke. Effective continuous TPD demands cooperation and collaboration through technologies among educational departments, K–12 teachers, educational researchers, and educational resources suppliers.

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