How Chinese In-service Elementary Mathematics Teachers Gain Knowledge from Professional Development: A Focus Group Study

Song A. An
Gerald O. Kulm
Texas A&M University, U.S.A.

This research explored the experiences of teachers' teacher professional development [TPD] participation. Four Chinese math teachers were interviewed in a focus group, and the grounded theory method was used in the data analysis. This study from four Chinese mathematics teachers' view, presented the construction of different types of TPD programs and how teachers interacted with other teachers in these programs. Also, how teachers gain different types of knowledge in different programs through interactions were noted.

Key Words: teacher professional development, grounded theory, teachers' knowledge.

Introduction

Teachers are learners on their own professional journey (McCarthy & Riley, 2000) and teacher professional development [TPD] is an ongoing and continuous process throughout a teacher's career (Loucks-Horsley, Stiles, & Hewson, 2000). Shulman (1987) contended ''teaching is, essentially, a learned profession'' (p. 9) and Harrington (1994), as well as McCarthy and Riley (2000) further stated that learning to teach is a lifelong developmental process that involves the continual deepening of knowledge and skills.

Nowadays, most TPD programs "collectively do not form a cohesive and cumulative program" and "much of the time and money invested in such programs, however, is not used effectively" (National Research Council, 2001, p. 431).Workshops, train-the-trainer, and speaker series are the major forms of traditional TPD, which are based primarily on transmitting new ideas of teaching and learning through top-down, hierarchical structures (Ruopp &

Haavind, 1993). One of the criticisms for traditional TPD programs prepared for teachers is that they are too short and failed to offer follow-up activities to teachers after they started their teaching career. (Penuel, Fishman, & Yamaguchi, 2007). In traditional TPD models, teachers were supposed to gain their knowledge from ''formal, highly structured activities outside the context of teachers' actual work'' (Schlager, Fusco, & Schank, 1998, p. 2). The traditional forms of TPD did not provide teachers enough direction over the content, focus and interactivity among sessions (Sykes, 1996), and are habitually scheduled at inappropriate times (Guskey, 1995). Researchers suggested that the traditional TPD forms are not sustained, generative or collaborative; difficult to change teachers' teaching practices and improve students' achievement; and are isolated from enacted teaching practices (Loucks-Horsely, Love, Stiles, Mundry, & Hewson, 2003). This tradition, based on an outside expert's opinion of what teachers' need, not what teachers' want, provides neither the content nor the opportunities teachers view as essential for teachers' professional growth (Lieberman, 1995; Loucks-Horsely et al., 2003).

Based on the weaknesses of the traditional TPD, researchers have summarized essentials for effective reform-oriented TPD programs. Researchers recommended that an effective TPD program should: (a) build teacher's capacity of understanding subject knowledge and the knowledge of students' development; (b) engage teachers in mathematical experiences similar to those they wish for their students; (c) provide teachers with leadership experiences; (d) include evaluation, critical reflection, and mechanisms for improvement; (e) allow for collaboration with colleagues; and (f) assist teachers to transfer the new knowledge and skills they learned into practice (An, 2004; Darling-Hammond & McLaughlin, 1995; Kubitskey & Fishman, 2006).

Different from the U.S., China has a unique way of organizing teacher TPD programs The TPD programs of China, teachers led by master teachers and teacher researchers, study the curriculum and plan lessons together, observe and critique each other's teaching, and analyze student learning collaboratively and these activities shaped Chinese teachers' teaching knowledge and practice (An, 2004). Ma (1999) demonstrated that Chinese elementary mathematics teachers had a better understanding of the fundamental mathematics they teach than their U.S. colleagues. One of the possible explanations for the knowledge gap between the Chinese teacher and U.S. the teacher is that Chinese teachers continue to gain their knowledge and

skills for teaching when they graduate from college and work as teachers in elementary school. As Ma indicated, classroom teaching, combined with TPD programs is the key way for Chinese teachers to improve their knowledge. These phenomena may imply that Chinese TPD programs are more effective than U.S. programs.

The principal purpose of the present research was to give voice to Chinese elementary teachers with respect to the types of support they most valued among several types of teacher TPD program they had attended. The two specific research questions are: (a) What kind of TPD program did teachers attend and how what were the interactions between programs? (b) How did teachers improve their knowledge through TPD programs?

Methods

Participants and School Background

In this study, four elementary school mathematics teachers in a southeast higher economic metropolis in China were interviewed. All teachers who participated in the current study are the author's former colleagues in the same elementary school and all of them are female teachers, and had different education backgrounds and teaching experiences (see Table 1), pseudonyms were used to protect participating teachers' privacy.

Table 1
Four Teachers' Demographic Information

Teacher	Degree	Major	Grade	Subject Area	Teaching Exp.
Li	BA	Chinese Literature	5	Math	11 years
Sun	BA	Elementary Education	6	Math	5 years
Qian	BA	Elementary Education	4	Math & Health	4 years
Zhao	Teachers' School diploma	N/A	2/6	Math & Science	24 years

In the elementary school where they are teaching, most students came from low-income families and students in this school are from the countryside of 18 different provinces. Most of their parents are working in this city as

physical laborers and had not completed high school. Although the students do not receive strong family support, the average mathematics academic test scores in this school always ranks in the top three out of 15 schools in the district, including some schools that have fewer students in each class.

Data Collection and Instrument

A 60-minute semi-structured focus group interview was conducted with the four teachers, and the interview was recorded by using a digital recorder and field notes were taken during the interview (Shuy, 2002). The participant teachers agreed to provide feedback on the recorded information and the interviews, which were transcribed verbatim with pseudonyms used to identify the participants. The transcripts were cross-checked by comparing field notes with the transcripts. A copy of the transcripts was sent to the interviewees to ensure the validity of the information provided.

Coding Process and Data Analysis

Grounded Theory was used for data analysis in this study. Conceptual model was inductively derived from the data (Strauss & Corbin, 2008). The interview transcripts for comments related to views of learning from TPD were reviewed. The data was then coded into thematic clusters or categories using an inductive approach (Patton, 2002). In this process, several discussions with advisors, classmates and TPD facilitators were conducted about possible categories or themes, thereby refining the definitions of the categories. Once the coding of subsets was saturated, the remaining data was coded by using categories developed.

Results

This section provided evidence for the two research questions from the focus group interview. First, the four types of TPD programs mentioned by teachers are described, and the interaction between teachers in each program was indentified. Finally the key strategies teachers used to improve their knowledge were summarized.

Types and Description of TPD Programs

Based on the participants' response, four levels of TPD programs were categorized. From the participants' range, in general, four kinds of TPD programs were listed in table 2. Except for the city based programs that only two teachers had attended before, all the four teachers indicated they were currently involved in all the three types of programs.

Table 2
Four Types of TPD Programs

Type of TDP	No. of Participants	Program Facilitators	Frequency	Activity
Grade Based programs	4-5 teachers	The math teach-research-committee chief in each grade	5-6 times per semester	Prepare lesson plan together and share teaching experience
School based programs	15-20 teachers	The math teach-research-committee chief in the school	3-4 times per semester	Observe and critique lessons of teachers from the same school
School district Based programs	30-50 teachers	The math teacher-researchers and teacher-researchers of other subjects from the school district	6-7 times per semester	Observe and critique lessons of teachers from other school, attend workshops
City based programs	100+ teachers	Master teachers and the math teacher-researchers from different school districts	1 time per semester	Observe lessons of master teachers and attend workshops

Grade based programs

As teachers described, it is a grade based teach-research-committee program, and mathematics teachers in each grade set up a teach-research committee to develop their knowledge by having small group meetings regularly. In this program, (usually four or five teachers in a committee), one teacher was selected as a chief for the committee. Every two or three weeks, they hold a meeting to prepare lessons together and share their teaching experience about the effects of the lesson plan they used in their teaching with each other. Teachers believed this program facilitated them in developing more effective lesson plans. Since all the teachers in a committee have the same lessons to teach, they separated the units of a textbook into several "chunks," and each teacher is assigned a special chunk to focus on.　An example of this lesson preparation method was described by Li:

> In this textbook, we have 10 units, and each teacher will focus on two units. For example, I was assigned units one and two, so [I have to] write all the lesson plans for the two units and print the out for all teachers, then I have to do some research on the two units. And talk about the key points in the two units and the difficult points and which points we need to pay attention to.

School based programs

As participants described, this kind of program was held by the school principal three or four times each semester and all the mathematics teachers were required to attend.　They pointed out that this program provided them opportunities to observe and critique each other's lessons. In each program meeting, one teacher (usually a novice teacher) was invited to have an open lesson, and all the mathematics teachers in the school were encouraged to observe this lesson.　Every two or three weeks, they hold a meeting to prepare lessons together and share their teaching experience with each other. As Sun mentioned: "… in the [school based] TPD program, we often go to observe other teachers' lessons, and have some "salon type" group discussion and everyone will share their opinions on that lesson."

School district based programs

The school district based TPD program, according all the participants' response, was the key program among all the other type of programs. As described by the participants, three sub-programs were in this program.

Program 1, which offered "mathematics content knowledge" workshops; Program 2 provided mathematics pedagogical content knowledge "focus topic" workshops; and Program 3 provided "menu type" pedagogical knowledge lectures for teachers to select to attend. The participants not only highly regarded the contribution of these programs but also gave their praise to the program facilitators. For example, Zhao commented "[they] not only have profound knowledge but also have an attractive personality; [they] can help us jump out of the circle of thinking, and reflect on our lessons from a higher perspective."

As participants mentioned above, each sub-program had a different focus. Specifically, in program 1, the TPD facilitator holds a meeting to introduce how to use the textbook in the beginning of each semester. Zhao described how this presentation helped them to prepare lessons for the new semester:

> [They] provided us the difficult points and core points to note in the textbook……they are not going to repeat the teacher' books … [but] going to explain each page and each question, and tell you how to deal with each example in the textbook in order to present a more effective lesson.

Zhao further added that these program facilitators have "rich teaching experience, and lesson observation experience" and they also shared "examples of failure" to help teachers to compare and figure out what common mistakes were made in their everyday teaching.

In program 1, as mentioned by participants, also provided several workshops for teachers to expand their mathematics knowledge, as Qian said:

> …they provide some problem solving [workshops to us] by asking us to solve Mathematics Olympic Questions, and these lectures can develop our math knowledge which we did not learn in the university or teachers' college. They are going to strengthen our math knowledge, and this kind of knowledge, when we had teaching experience, is desirable to learn. But, sometimes, due to personal reasons, such as laziness, or I cannot made up my mind to research these questions, but they are able to give us such knowledge.

As described by participants, program 2 provided several "focus topic" series of activities on how to use advanced teaching strategies to teach mathematics. Sun introduced one example "focus topic" on problem posing:

> …first, they give you a lecture, an introduction of this focus topic; second, you observe one of two lessons on teaching this topic, such as how to pose questions. They may spend a whole afternoon telling you how to pose a question… Then, they asked some teachers to teach some lessons and during the lesson, [they] asked us to focus on the questions that the teacher asked during the lesson, which questions… fit the principles we learned from the lecture, which questions were considered as non-effective questions.

Participants mentioned that program 3 provided "menu type" lectures on the general pedagogical knowledge on a variety of options for all the teachers in the school district to choose to attend. Sun described this program as follows:

> It is like a supermarket, you can choose what you like to attend. There are more than 10 workshops held by different teacher-researchers, and you can choose three to attend each semester. You can register earlier online, and you also can drop and change another one if you want.

City based programs

Only two teachers in this focus group stated they had attended the city based TPD program. Every year, each school recommended one or two teachers to attend this one-or-two-day long program and this program invited top teachers to demonstrate effective lessons to a randomly selected class of students from the host elementary school. These teachers also provided some lectures based on the lesson they just taught. Zhao mentioned her experience in attending this kind of TPD programs:

> It is a two-day program. Six master teachers showed their lessons on two topics… the first day, three master teachers demonstrated how to teach the multiplication of hundreds numbers. The second day, three other master teachers demonstrated how to teach the math concept on

the topic of understanding the 100,000,000. After the demonstrations on both days, two teachers provided two lectures on how to teach the math concept and how to teach computation lessons.

Although not all the teachers had chance to attend city level programs, as participants' stated, all the demonstrative lessons and lectures videos can be found on the TPD website. Also, the journal for teaching elementary math had some transcriptions of lessons' highlights, as well as the key points of the lectures. All four teachers indicated that they had watched the video online.
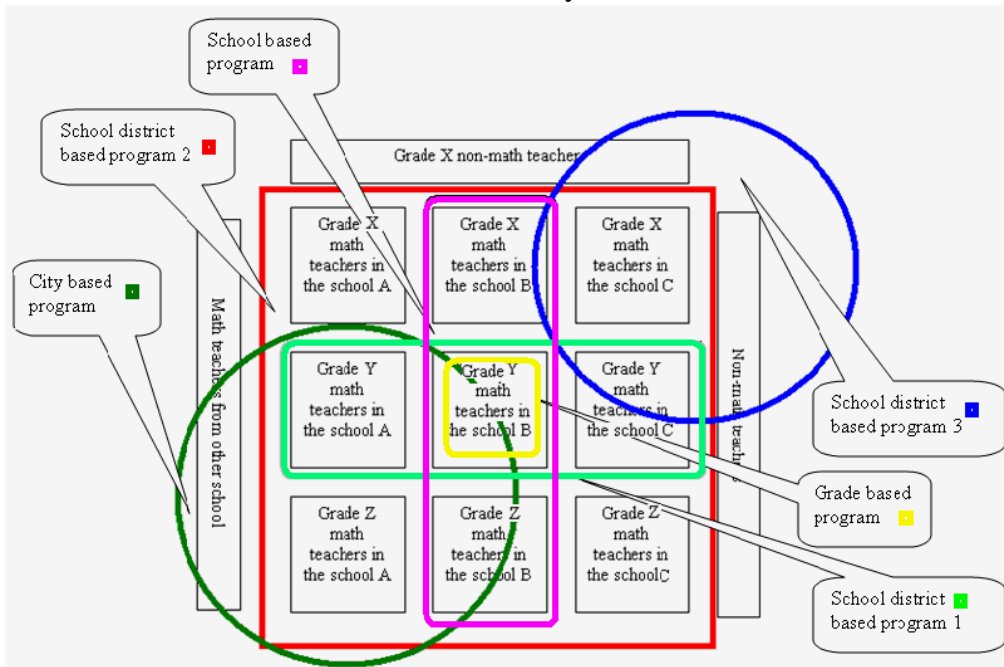

Figure 1. **Venn diagram of interaction between teachers in different types of TPD programs**

Based on the participants' response, six types of interactions were indentified from the six programs mentioned by participants (see figure 1 and table 3). In general, based on teachers' grade of teaching and teachers' affiliated schools, we classified all six programs of different levels into three categories: (a) horizontal interaction (math teachers meet with other math teachers from the same grade); (b) vertical interaction (math teachers meet with other math teachers from the different grades); (c) diagonal interaction (math teachers meet with non-math teachers or math teachers meet with other math teachers from other school districts).

Table 3
The Type of Interaction between Teachers in Different Types of TPD Programs

	Type of TDP	Participates Interaction (Math teachers interaction with)
Horizontal Interaction	Grade based Programs	Math teachers from the same grade and from the same school
	School district based program 1	Math teachers from the same grade and from different schools
Vertical Interaction	School based Programs	Math teachers from different grades and from the same school
	School district based program 2	Math teachers from different grades and from different schools
Diagonal Interaction	City based Programs	Math teachers from different grades and from different schools(cross the city)
	School district based program 3	Non-math teachers from different grades and from different schools

Multiple interactions between teachers were one of the key features that we acknowledged from the interview responses. In attending different TPD programs teachers have chances to communicate with teachers with different backgrounds. Specifically, teachers can communicate with math teachers who teach in the same grade with the same content from the same school in the grade based program and can communicate with math teachers who teach in the same grade in different schools within the school district in the school district based program 1; Teachers can communicate with math teachers who teach different grades and worked in the same school in the school based program and can communicate with math teachers from other schools in the school district based program 2; Teachers can communicate with teachers who teach other subjects from different schools in the school district based programs 3; and teachers can communicate with mathematics from other schools out of the school district in the city based program. What is worthwhile pointing out is that, from the interview teachers implied that they prefer to attend and can benefit most from the programs which have horizontal interaction with other teachers such as Grade based program and the city based program 2 than other types of programs.

The Improvement of Knowledge from Communication

The interview responses indicated that teachers had lots of communication opportunities from different teachers and gained a variety of types of knowledge through the activities of the different TPD programs. In addition, the interviews showed that the programs of different levels have interactions with each other, providing a comprehensive set of activities from a local to more global perspective. Generally teachers improve their knowledge by fixing the "knowledge blind points" in teaching from communication (see Figure 2): Teachers found their "knowledge blind points" through self-reflection, group-discussion and lesson critiques in their grade based programs and school based programs, and then, with a clear purpose to select suitable workshops to attend in the school district based programs and city based programs.
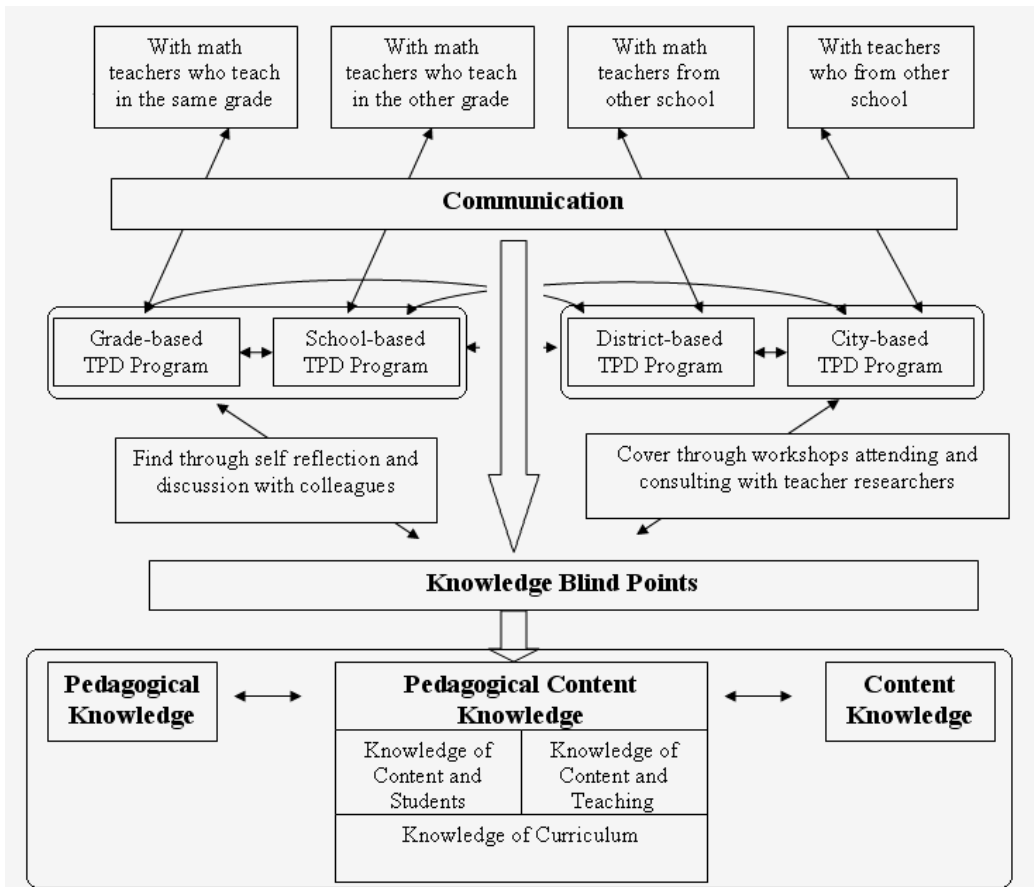

Figure 2. **The interaction between TPD programs and the development of teachers' knowledge.**

The grade based programs provided teachers who taught the same content for the students from the same grade a good opportunity to exchange their experiences with each other, enabling teachers to discover their "knowledge blind points". As Teacher A stated:

> ……by preparing lessons together, I think we have more opportunity to communicate with each other. Before that, we also have communication, I often discuss with Ms. M. It is a spontaneous one……But now, we have a fixed schedule, and we can communicate with each other, and I think the effects and the efficiency are better in our group discussions than in the individual discussions. Because there will always be some blind points that you don't know but others see other teachers can help you find out your weaknesses.

Also, the grade based programs improved teachers' knowledge of curriculum and the knowledge of students and content by preparing lesson plans together and sharing the teaching effects of the current lesson plan they used from the feedback of students.

The school based programs, which were complemented with grade based programs, provided teachers a chance to communicate with teachers across the school and to learn from the strengths of each other. As the teacher C indicated:

> I think I benefited a lot from the interaction with my colleagues: you have some thoughts about others' lessons, and we even have arguments, such as someone said this part is not good while others' thought it is pretty good. Actually, all of these are good; you can be inspired from the conflict to get new thoughts, you …can benefit your teaching.

The participants indicated in the school based program, through the lesson observation and critique, their weaknesses in teaching was pointed out by other teachers. Teachers and the teacher research committee leaders in the school thus can know each teacher's weaknesses and strengths in their everyday teaching, and strategies with a clear purpose to cover the weaknesses can be provided. The teachers then could select the suitable workshops to attend in the school district based programs, and they can go with some questions to attend the lectures provided by the school district teacher-researchers.

All the participants agreed that the school district based programs are the key sources that helped teachers to develop their knowledge for teaching; all the three sub-programs provided opportunities for teachers to communicate with mathematics teachers from other school in the school district to improve their pedagogical content knowledge, the content knowledge and the pedagogical knowledge. Specifically, in program 1, Mathematics Olympic questions were provided for teachers to solve and discuss. The questions teacher-researchers proposed to teachers, though, had no direct relationship with the content the teachers taught, expended teachers' view of how high-level thinking problems were designed and enhanced teachers' ability at math problem solving. As Qian mentioned:

> I think my ability in solving problems was improved. Before that kind of training, occasionally, I may have difficulty in answering students' questions they asked me in class or in the office. You know, students may ask you unexpected questions, sometimes these questions embarrassed me; I just have no clue how to answer them immediately … … after one semester's systematic training of solving Math Olympic problems, I found I not only have more strategies to solve problems but also have a quicker response to solve problems.

In program 2, in accordance with teachers' current needs, some advanced mathematics teaching methods were presented by the teacher-researchers. During program two (the "focus topic" program), the lectures on textbook analysis and explanations were provided and various well-developed, practical, teaching methods and skills were introduced to teachers. Also several lesson-observation-critique activities were organized in each semester. From program 2, teachers' knowledge of curriculum, knowledge of content and students as well as teaching was enhanced. Teachers in the interview believed they had improved themselves from criticizing each other's lessons. For example, in the school district program 2, they focused on problem posing, as Zhao indicated, "If you can judge which questions other teachers proposed are bad and which are good, then, at least, you may know which questions you proposed to children are good and this benefits your lessons, and you know which questions actually make no sense."

During program 3, different lectures on general pedagogical knowledge such as educational psychology, early child pedagogy were provided. The teachers' pedagogical knowledge was enhanced not only from learning some

advanced pedagogical theories but also from chatting with other teachers about their experiences.

The city based programs provided some advanced theoretical knowledge of instruction and pedagogy to teachers. Teachers' pedagogical knowledge as well as pedagogical content knowledge was improved in this kind of program. The city based programs, although not all the teachers had chance to participate directly, teachers who did not participate in this program also indicated they benefited indirectly from watching the video of the model lessons and the lectures provided in the city based programs. As Li said,

> …… from watching the video of lecture, I learned how and why textbook writers' arrange the books like this. You know, most of us do not like this new version of   textbooks…… however; this lecture removed my misunderstanding of the   construction of   the textbook, the explained with examples that the arrangement of the examples and   exercises were based on the constructivism theory, and I started   to pay attention to the sequence of present examples.

Discussion

Kelchtermans (2004) defines the TPD as "a learning process resulting from meaningful interaction with the context (both in time and space) and eventually leading to changes in teachers' professional practice (actions) and in their thinking about that practice'' (220). Kelchtermans' definition pointed out the importance of interactions between the context and the teacher's self mediated interpretations in the TPD process. Our findings demonstrated how TPD series in China effectively helped teachers to improve their knowledge and teaching skills through various interactions. The TPD in China at different levels could dynamically compliment each other for teachers to identify and cover their knowledge blind points from various interactions with teachers and researchers. The TPD in China does not have some weaknesses proposed by U.S. researchers in describing current TPD programs in the U.S., for example, traditional TPD in U.S. often (a) invite university professors to give formal presentations that have no relation with teachers' everyday teaching (Schlager, Fusco, & Schank, 1998), (b) have little communications among teachers as well as TPD facilitators (Sykes, 1996), (c) conflict with teachers' agendas (Guskey, 1995), and (d) are too short and failed to provide follow-up activities

(Penuel, Fishman, &Yamaguchi, 2007) . In China, in all levels of TPD programs, no "outsiders" were invited to lead the program. The facilitators of each program were current elementary teachers and the focus was closely related to teachers' daily teaching. Also, all the content and topics proposed and discussed in each programs was based on teachers' experiences, which meet the teachers' needs and in which teachers are enthusiastic to be involved. Also, in all TPD programs in China, teachers have ample opportunities to communicate with each other, not only communicating with those who teach in the same grade (e.g. in the grade based program), but also with teachers from other schools, from other grades, and teachers of other subjects (e.g. in the school district based programs). Moreover, although there are different types of TPD programs, as teachers mentioned, usually there were no conflicts between programs and the teachers' lesson schedules. In China, very flexible time schedules were designed in teachers meetings, and both grade based and school based programs were scheduled based on teachers' free time (e.g. one hour in the morning when all the teachers in a grade based program do not have a lesson and after school time for the school based program meetings). The school district based programs meetings were always scheduled on Wednesday or Friday afternoon (all Chinese elementary schools let out early on these days), especially for teachers to be able to attend meetings. Unlike most TPD programs in the U.S. that offer one-shot workshops every semester, the TPD programs in China provides all-year-long programs, and almost every week teachers have chances to attend a least one kind of TPD program. As Brown (2004) indicated longer duration and time span for TPD is more likely to contain more learning opportunities for teachers and to integrate new knowledge into practice.

Limitations were also noted in this study. First, few teachers were interviewed and all of them were from the same school. Second, their perspectives and experiences may not represent teachers from the other school districts in China. However, even with all these limitations, this study provided an opportunity to get a look into how Chinese teachers participated in and benefited from TPD programs. We do not advocate that the same TPD organizations described in this study are a prototype for all mathematics educators; based on our findings, however, some strengths of the TPD programs of China could provide inspiration for U.S. mathematics educators. For example, provide more peer communication opportunities for teachers to assist them in identifying their problems in teaching and knowledge gaps. Also, provide more types of TPD workshops with various focuses and for a longer

time span should be provided to teachers and schedule these programs flexibly for facilitate teachers to attend.

References

An, S. (2004). *The middle path in math instruction: Solutions for improving math education*. Lanham, MD: Scarecrow Education.

Brown, J. L. (2004). *Making the most of understanding by design*. Washington, DC:Association for Supervision and Curriculum Development.

Darling-Hammond, L., & McLaughlin, M. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan, 76*, 597–604.

Guskey, T. R. (1995). Professional development in education: In search of the optimal mix. In T. R. Guskey, & M. Huberman (Eds.), *Professional development in   education: New paradigms & practices (*pp. 114–131). New York: Teachers College Press.

Harrington, H. L. (1994). Perspectives on cases. *Qualitative Studies in Education, 7*, 117–133.

Kelchtermans, G. (2004) CPD for professional renewal: Moving beyond knowledge for Practice. In C. Day & J. Sachs (Eds.), *International handbook on the continuing professional development of teachers* (pp. 217–238). Maidenhead, ST: Open University Press),

Lieberman, A. (1995). Practices that support teacher development. *Phi Delta Kappan, 76,* 591–596.

Loucks-Horsely, S., Love, N., Stiles, K. E., Mundry, S., & Hewson, P. W. (2003).   *Designing professional development for teachers of science and mathematics* (2nd ed.). Thousands Oaks, CA: Sage.

Ma, L. (1999). *Knowing and teaching mathematics: Teachers' understanding of fundamental mathematics in China and the United States*. Mahwah, NJ: Erlbaum.

McCarthy, J., & Riley, S. (2000). A new vision for teacher professional development. *Leadership, 30*(2), 34-36.

National Research Council (NRC). (2001). *Adding it up: Helping children learn mathematics.* J. Kilpatrick, J. Swafford, & B. Findell (Eds.). Washington, DC: National Academy Press.

Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed). Thousand Oaks, CA: Sage.

Penuel, W. R., Fishman, B. J., Yamaguchi, R., & Gallagher, L. P. (2007). What makes professional development effective? Strategies that foster curriculum implementation. *American Educational Research Journal, 44*, 921–958.

Ruopp, R., & Haavind, S. (1993). From current practice to projects. In R. Ruopp, S. Gall, B. Drayton, & M. Pfister (Eds.), *LabNet: Toward a community of practice* (pp. 21–57). Hillsdale, NJ: Erlbaum.

Strauss, A., & Corbin, J. (2008). Basics of qualitative research (4th ed.). Newbury Park, CA: Sage.

Schlager, M. S., Fusco, J., & Schank, P. (1998). Cornerstones for an on-line community of education professionals. *Technology and Society, 17*(4), 15–21.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–22.

Shuy, R. W. (2002). In-person versus telephone interviewing. In J. F. Gurbrium & J. A. Holstein (Eds.), *Handbook of interview research: Context & method* (pp. 537–555). Thousand Oaks, CA: Sage.

Sykes, G. (1996). Reform of and as professional development. *Phi Delta Kappan, 77*, 465–467.

Authors:

Song A. An
Texas A&M University
Email: ansong131@neo.tamu.edu

Gerald O. Kulm
Texas A&M University
Email: gkulm@coe.tamu.edu