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## Teaching and Teacher Education in the US: What does the Literature tell us?

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*“The concept that teaching is a profession is important because it  
connotes a behavioral level of expectation.”  
~ Stone & Schneider (1971, p. 337)*

Looking at American educational history, teaching was not regarded as a profession until the late 20<sup>th</sup> century. In colonial America, there was no training for teachers. Teaching was something young women often did or young men did when they just finished college and waited for better career opportunities (Fraser, 2007). There were not many requirements for teaching in the first half of the nineteenth century, even though some districts had general knowledge tests for teachers. In 1834, Pennsylvania became the first state to require potential teachers to pass a test of reading, writing, and arithmetic. By the second half of nineteenth century, more states began to certify teachers locally, testing basic skills, spelling, grammar, U.S. history, and geography (Ravitch, 2003).

In the early twentieth century, schools of education emerged in many universities. In addition, specializations, such as educational psychology, educational sociology, educational administration, and curriculum were developed at the undergraduate or graduate level, and each school of education had its own teacher preparation programs. Although people realized that teaching was a profession demanding an extended period of training, a shortage of teachers made it impossible to require rigorous credentials, which resulted in teachers being hired with minimum standards or less. The consequence was that teaching as a profession was questioned and the social status of the profession was sacrificed. Werf (1961) pointed out: “so firmly rooted is the idea that teaching is really not a profession that when a shortage occurs, as in the case of the last decade or so, there is a natural and easy truncation of standards, both in time and quality”; however, he noted that “four years is an inadequate preparation period for a profession like teaching. Six years could be used and eight would approximate more nearly a desirable and effective basic condition. (p. 568-569)

Three decades later, many Americans still believe “teachers are not professionals” (Stigler & Hiebert, 1999, p. 170). At a White House Conference, Ravitch (2003) reasoned that teaching failed to be considered a profession comparable to law and medicine, because there were no clearly defined knowledge and skills for effective teaching and there were no commonly agreed standards and procedures based on research to follow for teacher preparation.

Ornstein and Levine (2008) classified teaching as a “semiprofession” or “emerging profession”. They pointed out that teaching lacks some of the characteristics of a profession such as “a defined body of knowledge and skills beyond that grasped by laypersons”. Similar to Ravitch (2003), Ornstein and Levine argued that teaching cannot be compared with law and medicine, because there is no consensus on teaching knowledge that makes teachers experts, distinct from laypersons. This lack of a well-defined body of knowledge and skills results in variations of teacher preparation programs from state to state or even within a state. In addition, there is no uniform requirement for teaching certification. According to Ornstein and Levine (2008), although The National Council for Accreditation of Teacher Education (NCATE) has standardized required teacher-education courses and the qualifications of faculty to teach them, many teacher-education institutions have not yet met the NCATE’s standards. Less than 10 years ago, 45% of these colleges were still not accredited by NCATE. As recently as 2006, Ornstein and Levine noted that many NCATE members have put forth their best effort to meet NCATE standards, and 52% of these teacher-training colleges had met the goal. In 2008, NCATE had accredited or was close to accredit 60% of these colleges, and most of the remaining 40% of these institutions incorporate NCATE standards for state-level evaluations. NCATE standards are becoming the norm for teacher preparation programs, as evidenced by the fact that by 2006, thirty-nine states had applied NCATE standards, and the country as a whole had either adopted or followed NCATE recommendations in subject matter areas.

NCATE is still actively working on “making teaching a profession” through a reform called a “redesign and transformation” (Ornstein and Levine, 2008, p. 36). Jennifer Epstein (2010) reported in *INSIDE HIGHER ED*, that teacher educators and education policy leaders had the first panel meeting to address clinical preparation, partnerships and improved student learning, and to recommend practical ways that help improve in-the-classroom training and strengthen relationships between school districts and the colleges and universities that prepare their teachers. NCATE has set its goal to make teaching a respected profession with high preparation standards.

### **Knowledge Base for Teaching**

*“A knowledge base for teaching is not fixed and final. Although teaching is among the world’s oldest professions, educational research especially the systematic study of teaching, is a relatively new enterprise.”*

*~ Lee S. Shulman (1987, p. 12)*

Shulman's (1986, 1987) framework of a knowledge base for teaching has greatly influenced the field of teacher education. His contributions include:

- Identifying a “blueprint” for categories of the knowledge base of teaching;
- Locating the major sources for the knowledge base;
- Building a model of pedagogical reasoning and action that is a cycle through the activities of comprehension, transformation, instruction, evaluation, and reflection.

Before the mid-1980s, the study of the relationship between content knowledge and pedagogy was essentially missing from the research on teaching. However, in his article “Knowledge and Teaching: Foundations of the New Reforms”, Shulman (1987) bridged this gap and described categories of the knowledge base such as content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of education contexts. In this list, he (1987) declared that “pedagogical content knowledge is of special interest because it identifies the distinctive bodies of knowledge for teaching” (p. 8). He was aware that his list, much like that of “the chemist’s periodic table of a century ago”, was not “fixed and final” (p. 12).

Identifying the categories of a knowledge base of teaching and the connected sources provided an important foundation for a better understanding of the conception of teaching. However, equally important is to know what is involved in the process of teaching. Drawing upon Fenstermach’s work (1978, 1986), Shulman (1987) believed that the aim of teacher education was not to provide teachers a prescription for how to teach, but rather to educate teachers to use their knowledge base for making good choices while teaching. Good teaching involves the process of linking teachers’ understanding of their knowledge base with their pedagogical judgment and decision making (Petrie, 1996; Shulman, 1987). According to Shulman, the knowledge base for teaching encompasses the integration of content knowledge and pedagogy. As a result, teacher education should enable teachers to gain the ability to transform the content knowledge they possess into flexible and powerful pedagogical strategies that are adaptive to specific classroom situations.

However, there is still much work to be done. After twenty years, the theoretical framework described by Shulman is still not fully developed (Ball, Thames, & Phelps, 2008). Attempting to implement to change and build a useful knowledge base for teaching, Hiebert, Gallimore, and Stigler (2002) proposed the establishment of a system that offers teachers opportunities to share teaching ideas, which can be examined publicly. They identified the roles of practitioner knowledge and professional knowledge in the construction of a knowledge base for teaching. They defined practitioner knowledge as “the kinds of knowledge practitioners generate through active participation and

reflection on their own practice” (p. 4). They argued that a professional knowledge base was formed through the transformation from practitioner knowledge to professional knowledge. Practitioner knowledge’s three useful features are:

- Practitioner knowledge is linked with practice.
- Practitioner knowledge is detailed, concrete, and specific.
- Practitioner knowledge is integrated.

On the other hand, professional knowledge has the following characteristics:

- Professional knowledge must be public and communicated among colleagues through collaboration.
- Professional knowledge must be storable and shareable.
- Professional knowledge requires a mechanism for verification and improvement. (Hiebert et al., 2002)

In order to complete the transformation from practitioner knowledge to professional knowledge, Hiebert et al. (2002) suggested that a system should be established to support transforming practitioner knowledge into professional knowledge following the Japanese model of lesson study. In Japan, teachers, especially at the elementary level, continuously participate in an in-service program, conducting a lesson study with a small group of teachers through their entire career life (Lewis & Tsuchida, 1997, 1998; Shimahara, 1998; Shimahara & Sakai, 1995). The group meets regularly to conduct lesson study once a week for several hours. The lesson study is actually a learning process for the teachers in the group. Stigler and Hiebert (1999) described the steps of the lesson study process: defining the problem; planning the lesson;

Teaching the lesson; evaluating the lesson and reflecting carefully on its effects; revising the lesson; teaching the revised lesson; evaluating and reflecting again; sharing the results.

Hiebert et al. (2002) believed that it is possible to create a system in the U.S. to build professional knowledge from practitioner knowledge, because there are similar examples of the Japanese lesson study process practiced locally in the U.S., and there was a new trend in the U.S. to empower teachers as researchers and have them study their own classroom practice, test the effectiveness of their teaching strategies, and make their results public in journal publications (Berthoff, 1987; Burnaford, Fischer, & Hobson, 1996; Cochran-Smith & Lytle, 1993, 1999). Moreover, modern technology provides an efficient tool for teachers to share their practitioner knowledge. Web-based video libraries or online archives can be maintained to present teachers with sample lessons. The replication trails can be published online. Gradually the consensus of classroom practices for different student groups at different levels in different contexts can be accumulated and developed. Over time, the observations and replications of teachers’ teaching can become a common

practice through which new ideas could be examined and refined before they became a national norm in the classrooms (Hiebert et al., 2002).

The model of lesson study proposed by Hiebert and Stigler (2002), offers a concrete tool to build a knowledge base for teaching. Building a system that helps generate a professional knowledge base is a relatively new, but promising idea.

### **Teacher Education in the U.S.**

*“A weak K-12 mathematics curriculum in the U.S., taught by teachers with an inadequate mathematics background, produces high school graduates who are at a disadvantage. When some of these students become future teachers and are not given a strong background in mathematics during teacher preparation, the cycle continues.”*

*~ MSU Study (2010): US needs better-trained math teachers to compete globally, n.p.*

There are about 1,200 universities or colleges in the United States offering teacher preparation programs. About 90 percent of these programs prepare teachers in the form of a four-year college-based training that awards a bachelor degree with a major in an academic subject (Stone, 1968; Ducharme & Ducharme, 2004). In general, teacher preparation programs have four components: general arts and science courses, advanced study in an academic discipline, education courses, and teaching internships (Ducharme & Ducharme, 2004; Stengal & Alan, 1996). Some alternative routes for teacher preparation were developed during the last decades of the twentieth century, due to the shortage of mathematics and science teachers. There are 130 alternative route programs in the United States, including Teach for America (TFA) or Teaching Fellows, who recruit and train teachers who have no education degrees or are not certified (Office of News and Public Information, 2010).

There are no uniform credentials for teacher preparation programs. Generally, universities and colleges design their own curriculum. In a study involving 81 public and private college and universities, Schmidt et al. (2010) considered the issue of the courses and experience necessary for the preparation of teachers. They found that there was no evidence that one teacher preparation curriculum was better than another, and the quality and type of programs are different from state to state and from institution to institution. Today there are concerns that teacher preparation programs do not prepare teachers well. International comparison studies revealed that some of our teacher preparation programs did not prepare teachers adequately. For example, Ma (1999) conducted a study comparing 23 elementary school teachers from the United States and 72 of their counterparts from China. These Chinese teachers only received 2-3 years of schooling in normal schools after

the ninth grade. However, Ma's study revealed that the U.S. elementary school mathematics teachers lacked a "profound understanding of fundamental mathematics" compared to their Chinese counterparts (p.125).

Schmidt et al. (2010) studied more than 3,300 future teachers in the United States and 23,244 future teachers across 16 countries and discovered that the U.S. elementary and middle school teachers lagged behind Switzerland, Taiwan, and Singapore teachers with respect to mathematics learned prior to teaching. In countries and regions where students consistently have performed well in international comparison studies, more than 90 percent of prospective middle school teachers learned both linear algebra and calculus, while in the U.S. only 66 percent of future middle school teachers learned linear algebra and 55 percent of them learned calculus. If we want our future math teachers to be globally competitive, higher level of mathematics courses should be included in our teacher preparation curriculums. According to Schmidt et al. (2010), "Teacher preparation curricula are critical, not only for our future teachers, but also for the children they will be teaching" and "The problem isn't simply the amount of formal math education our future teachers receive. It also involves studying the theoretical and practical aspects both of teaching mathematics and teaching in general." (as cited in MSU: US needs better-trained math teachers to compete globally, 2010, n.p.)

Teaching, as a complicated profession, involves considerably many variables (Stone & Schneider, 1971). Four or five years of college studies or shorter alternative route programs are far from sufficient for training teachers to teach effectively, especially when teaching an abstract and complex subject like mathematics. Continuous on-the-job training, also termed in-service training, is a necessary and critical component of teacher education. According to Hass (1957), "Broadly conceived, inservice education includes all activities engaged in by the professional personnel during their service and designed to contribute to improvement on the job" (p. 13). Many American educators have realized the significant role of in-service training in teacher education. Yarger, Howey, and Joyce (1979), however, pointed out the lack of planned programs designed to help and support new teachers. Ryan (1979) referred to this lack of support for beginning teachers as a problem whose solution requires a fundamental historical change of mindset. Referring to the first year of teaching as "the survival stage", Howey and Gardner (1983) believed that the following support should be provided to new teachers: time to study and reflect on teaching, a mentor, systematic and continuing feedback on their development in teaching, assistance in understanding both the system and the community, and a clear, well-developed picture of teaching responsibilities.

Most in-service training in the United States is associated with workshops or summer college courses. Yarger and Galluzzo (1983), trying to identify "the bona fide field of research on inservice teacher education", concluded that "at this point in our educational history, the field does not, in reality, exist" (p. 189). Consequently, the majority of American beginning teachers have to survive on their own. The U.S. Department of Education cited the National Commission report which stated that beginner teachers are "isolated behind

classroom doors with little feedback or help, as many as 30 percent leave in the first few years, while others learn merely to cope rather than to teach well” (as cited in U.S. Department of Education, 1997 n.p.).

In the last two decades, research on in-service education has reached a consensus that is long-term professional development activities produce effective teaching (Darling-Hammond, 1995; Garet, Porter, Desimone, Birman, & Yoon, 2001; Hiebert et al., 2002; Hord, 2004; Joyce, Wolf, & Calhoun, 1993; McLaughlin & Talbert, 1993; Rosenholtz, 1989; Senge, 1990; Stigler & Hiebert, 1999), and teacher collaboration plays a major role in professional development. However, traditionally, the American norms of teaching have been individual and private. Teachers are separated and individualized behind classroom walls and work in an atmosphere with little professional sharing among colleagues (Goodlad, 1984; Leonard & Leonard, 2003; Lortie, 1975; Rosenholtz, 1989). Since “teaching is a cultural activity” (Stigler & Hiebert, 1999, p. 85), teachers’ behavior is defined by the social culture in which teaching takes place. Banks (2003) noted that “individualism as an ideal is extreme in the U.S. core culture” (p. 9). Collaboration characterized by sharing does not match the expectation of individualism embedded in the school culture. Leonard (2002) studied 238 Louisiana teachers and documented the following findings: Teachers do not think their schools’ administrations expect collaboration, nor do they fully support teachers who engage in collaboration; competition, individualism, and lack of a trusting and caring environment are still the hallmarks of the teaching culture; time and schedules do not mesh well to coordinate collaborative practices; teachers need to improve their collaborative skills to further their professional development.

Historically, teaching in the United States has been shaped into a school culture discouraging teacher collaboration. Teachers develop their own knowledge individually, not sharing or accumulating. As early as one century ago, John Dewey had realized one of the saddest things about American education:

...the successes of [excellent teachers] tend to be born and die with them: beneficial consequence extend only to those pupils who have personal contact with the gifted teachers. No one can measure the waste and loss that have come from the fact that contributions of such men and women in the past have been thus confined. (Cited as in Hiebert et al., 2002, pp. 11-12)

These barriers are continually encountered all over the country. The sadness perceived by John Dewey about one century ago remains the same today. The wise insights and experiences of good teachers are still seldom preserved and passed on to the new generations. Change of this teaching culture requires time of commitment and effort from all parties involved – policy makers, district and school administrators, and teachers.

## **Conclusion**

In summary, two big issues exist in the field of teacher education in the United States today. The first issue is the conceptualization of a knowledge base for teaching. What knowledge is needed for effective teaching? What courses should be included in college-based teacher preparation? There is currently no established consensus for pre-service teacher preparation. For mathematics, research has documented that mathematics teachers in the U.S. are not prepared with a strong mathematics background. Lack of mathematics content knowledge puts our mathematics teaching and learning at a disadvantage. Mathematics teacher preparation curricula need reform.

The second big issue in teacher education, raised in the last two decades, is the issue of in-service training for teachers. Most new teachers start teaching with little support from their schools or colleagues. Teachers, in general, work alone and are isolated from each other. Sink-or-swim is the norm for new teachers in the U.S., although some schools have started encouraging teachers' collaboration practices, this hasn't yet become a general practice for teaching cross the nation. Teacher collaboration as a part of in-service training draws a growing attention among educators. Models, such as a professional learning community (PLC) and Japanese lesson study, are promoted for implementation in schools. Teacher collaboration plays a major role in PLC and Japanese lesson study, and research provides evidence that teacher collaboration benefits both teaching and learning. Establishing a collaborative environment in traditionally structured schools will be a long, slow process due to the dominance of individualism in the teaching culture of US, but a necessary step for building up an effective system of in-service training.

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*Organizing and Improving School Environment*

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