Chapter 5
Towards Balancing Knowledge and Practice of In-Service Mathematics Teacher Education Program in Korea

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Abstract This chapter describes the general system and the changes of in-service mathematics teacher education in Korea. Korea is achieving excellent results in international comparative assessments such as PISA and TIMSS, and one of the reasons for this is the excellence of its teachers. Teachers' professional development is divided into two areas, preservice teacher education and in-service teacher education. This chapter focuses on in-service teacher training programs in Korea, analyzes the changes in the training contents and methods with regard to mathematics teacher training, and then discusses what goals should be set by Korean mathematics teacher training programs for enhancing professional development.

keywords In-service teacher training program · Teachers' professional development · Teacher education

5.1 Introduction

Teacher training for in-service teachers has been regarded as an important mechanism that enhances teachers' understanding of content knowledge and teaching method as well as the qualitative level of teaching practice in the classroom

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(Ball and Cohen 1999; Little 1993). Thus, teacher training is essential for improving the quality of education, and providing effective training is recognized as a starting point for enhancing the quality of education.

To improve the quality of education and introduce a new paradigm to schools, a change in the current paradigm of the teacher training system that affects teachers' professional development is needed. Many previous teacher professional enhancement development programs were based on the model of technological reasoning, which defines the roles and behavioral characteristics of teachers. In other words, it was expected that the quality of teaching would improve if teachers learned about the principles and procedures established through research (Doyle 1991). However, many studies show that simple transfer of knowledge is not effective in changing teachers' beliefs, attitudes, or teaching practices (Greenberg and Baron 2000).

Teaching, which is a teacher's duty, is practical like the work of doctors and lawyers. To carry out such practical work well and with professionalism, teachers need to acquire and improve practical knowledge combined with theory and practice (Cochran-Smith and Lytle 1999). Enhancing teachers' professional abilities does not start from only a deep understanding of content (Hill et al. 2005) and is not possible through instruction given directly by external experts. Rather, the methods used to enhance teachers' professionalism should be based on authentic contexts that reflect teachers' direct participation in the definition and formation of the difficulty of practice in an actual classroom situation or a context teachers' encounter (Cobb et al. 2003; Kazemi and Franke 2004). Today, teacher training programs are carried out in connection with the context of teaching practice and lead to the development of class assignment or activities, on the basis of research findings that teachers' professional development is achieved in close relationship with the context of their teaching practice (Cochran-Smith and Lytle 1999; Shulman and Shulman 2004).

Teacher training in Korea is also changing from theory-centered to practice-centered training. Korea is achieving excellent results in international comparative assessments such as Programme for International Student Assessment (PISA) and Trend in International Mathematics and Science Study (TIMSS), and one of the reasons for this is the excellence of its teachers. In fact, because excellent preservice teachers become teachers in Korea, their efforts in developing their own capabilities, such as spending considerable time for self-development, are large on average (Kwon and Ju 2012). An example of this is that the number of Korean teachers with a Master's degree and/or doctoral degree is on the rise, as teachers attend graduate school with a personal goal. Although 17.4 % of elementary school teachers had a Master's degree and/or doctoral degree in 2005, this number was 26.9 % in 2012, representing an increase of 9.5 % points in 8 years. This phenomenon is found in middle school teachers as well. In 2012, 36.8 % of all middle school teachers and 39.9 % of high school teachers had a Master's and/or doctoral degree. Generally, there is a phenomenon that the educational level of teachers increases as the school level increases (Korean Educational Development Institute 2013).

In Korea, in-service teachers must complete at least 90 h of professional development activities to upgrade their teaching certificate (usually after 3–4 years of teaching). Following which, they are required to participate in professional

development activities every year (Sami 2013). In 1995, the New Educational Reform Plan was announced and it states that in-service teachers must receive training at regular intervals. However, the plan did not provide any mandatory details about the number of hours and regularity of the intervals, such as every year or three years (Education Reform Commission 1996). In recent years, the government fully supports a minimum of 20 h of annual professional development for each teacher. However, most teachers attend 40–60 h of professional development activities to keep up with the new developments in their fields of expertise.

The 15th ICMI Study (Even and Ball 2010) divides teachers' professional development into two areas, preservice teacher education and in-service teacher education. As the research on preservice teacher education in Korea was described in Kwon and Ju (2012), this paper explores in-service teacher training programs in Korea, analyzes the changes in the training contents and methods with regard to mathematics teacher training, and then discusses what goals should be set by Korean mathematics teacher training programs for enhancing professional development.

5.2 Teacher Training Programs in Korea

Immediately after liberation, the teacher training programs in Korea had been carried out sporadically without a legal basis or separate training institutes. From the time the law on teacher training institutes was promulgated and amended in 1953, 1964, and 1972 to the present, such institutes have been the foundation of in-service teachers' training programs (Lee et al. 1993). As "Provisions for teacher training programs" was enacted by a presidential decree in the late 1980s, a system was organized for the type and establishment of training institutions, training targets, training types and courses, training period, and records of training performance (Shin and Jeon 2008). Authorized distance educational training institutes, which began operations in 2000, have continuously expanded; there were 39 distance educational training institutes in the second half of 2001. Today, there are over 70 distance educational training institutes in operation. Given the advantage that one can receive training in a variety of forms anytime and anywhere, teachers' demand for and interest in distance educational training programs are continuously increasing (Kim and Kim 2013).

Despite the continuous effort of the government to improve the teacher training system, many studies pointed out the problems of the teacher training system in the early 2000s (Shin and Jeon 2008). Representative problems were that the training programs did not reflect the demands of the fields, leaned toward the use of a one-sided lecture-style training method, relied excessively on institute-centered training, and were lacking in variety. In response, in 2001, the Ministry of Education started to systematically evaluate the curriculum and the operation status of training programs by introducing "Teacher training certification for the evaluation of training institutes." Also, by designating various excellent teachers' associations as training institutes for special fields, it jointly developed various training programs and materials and implemented practice-oriented training programs

directly related to teaching. Also, it attempted to foster and support voluntary training programs or research activities by allowing the designation of school-based training programs or autonomous training programs of nearby school associations as training programs for special fields.

Keeping pace with the current trends, since 2000, teacher training programs have been diversifying in terms of their contents and methodological aspects. Moving away from institute-centered training programs, school-based, or individual-centered training programs are growing, and institute-centered training programs are also diversifying due to the training programs run by the Ministry of Education or the Office of Education as well as various teacher groups or associations. Particularly, as the voice for applicability on-site increases, school site-centered training programs are being developed, moving away from one-sided, lecture-style training method (e.g., Kwon et al. 2014). Also, through "Plans to Enhance the Teaching Professionalism of Teachers," the Ministry of Education (2009) is focused on supporting teachers' professional development through open classes, teaching consulting, and teaching clinics. In addition, it required teachers to continuously seek to improve their teaching practices by enacting the law on "Evaluation for teacher's ability development" in 2011, which makes training programs mandatory when a teacher fails to receive a certain level of assessment from students.

As shown in Fig. 5.1, teacher training programs are currently divided into training institute-centered training programs, school-based training programs, and individual-centered training programs (Ministry of Education 2013).

Institute-centered training programs are divided into qualification training, job training, and special training as the training programs led by various training institutes. Training programs for obtaining higher qualifications (e.g., level 1 or 2
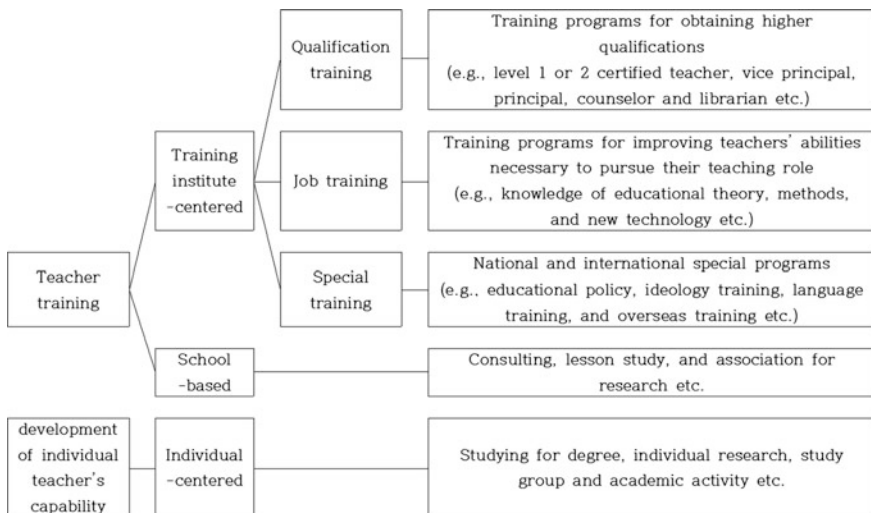

Fig. 5.1 Types of teacher training programs (Ministry of Education 2013, p. 2)

certified teacher, vice principal, and principal) and training programs for obtaining special qualifications (e.g., counselor or librarian) belong to qualification training programs, which are training programs for obtaining qualifications. Job training programs are implemented for teachers to improve their knowledge of educational theory, methods, and general education; learn new technology; and cultivate the skills and qualifications necessary to pursue their teaching role. Special training programs are training programs in which state or local government requires teachers to complete national and international special programs such as educational policy, ideology training, language training, and overseas training of inspection tour for cultivating professional knowledge and skills (Ministry of Education 2013).

In 2014, there were 167 institutes authorized or established to implement the institute-centered training programs. Seventeen city and provincial education training institutes, eight educational administration, and general education institutes, 80 education training institutes affiliated with universities, and 62 distance education training institutes are leading in ensuring the substantiality of the qualification training programs and the job training programs for teachers' professional development.

Mathematics teachers in Korea complete a mandatory new teacher training program when they are hired and mandatory qualification training program for level 1 certified teacher after about 5 years of employment. They complete about 60 h of job training every year. Concrete changes in the contents and methods of training programs for mathematics teachers are discussed in Sect. 5.3.

5.3 Mathematics Teacher Training Programs in Korea

The contents of training programs for mathematics teachers in Korea are changing in accordance with the changes in the curriculum and government policies. Similarly, training methods are changing with the current trends.

5.3.1 Changes in the Contents of Training Programs

Since 1993, qualification training programs have required trainees to complete 18–36 h (10–20 %) of liberal arts courses, 18–36 h (10–20 %) of teaching courses, and 126–144 h (60–80 %) of major courses in order to reduce the regional gap in training contents (Lee et al. 1993). To specifically explore how the contents of the training program for level 1 certified teachers are changing in accordance with the current trends, the training contents for level 1 certified teachers provided by the Seoul Education Training Institute are compared and shown in Table 5.1. Table 5.1 compares hours in accordance with the content area of the training program for level 1 certified teacher implemented in 1993 and 2014.

Table 5.1 Comparison of the 1993 and 2014 curricula of the training program for level 1 certified teacher

1993 training program for level 1 certified teachers				2014 training program for level 1 certified teachers			
Liberal art subject	Pedagogy course	Major course	Total	Basic literacy	Capability area	Major area	Total
20 h (11 %)	36 h (20 %)	124 h (69 %)	180 h	15 h (16 %)	22 h (24 %)	54 h (59 %)	91 h

When the numbers in Table 5.1 are compared, the hours required for completion are cut in half from 1993 to 2014, and the proportion of the major course is also slightly lowered. Since 2011, training hours were adjusted from over 180 h to over 90 h. In 1993, there were five liberal art subjects, including "Understanding the cultural tradition," "Information society and computers," and "Environment and education," and nine pedagogy courses, including "Problems with youth and guidance," "Trends of educational reform," and "Educational law." Among the nine major courses, 12 additional courses were related to the mathematics content knowledge. Examples of specific courses include "Sequence and limit," "Equation and inequality," and "Calculus." Courses related to pedagogical content knowledge include "History of mathematics," "Mathematics education and assessment," and "Mathematical problem solving." Regarding such contents of the training programs, Jung et al. (1994) pointed out the following problems: Most courses in the qualification training programs fail to have relevance with secondary school mathematics, training is not designed from an integrated perspective on mathematics or with emphasis on the application of mathematics, and most courses are carried out in the form of expository instruction.

There were many negative views of the qualification training program by teachers. The level 1 certified teacher training program is a representative institute-centered training program that most teachers have to take. Kim and Kim (2005) stated that teachers add the meanings "rite of passage" and "picking score" to the course of the level 1 certified teacher training program. This indicates that the programs are regarded as courses that all teachers should take and that, although trainees are qualified as level 1 certified teachers when they fulfill the basic required hours and grades, they are aware that they should earn high grades, as the grades affect their promotion.

In the qualification training program implemented in 2014, the titles of the courses offered in the program have changed from liberal art subject to basic literacy, pedagogy course to capability area, and major courses to major area. There were seven basic literacy courses, including "Global education policy trends," "Use of smart work beyond the classroom," and "Living together and understanding special education," and 10 courses belonging to the capability area, including "Understanding and practices of a happy class," "Use of materials for good classes," and "Understanding student counseling." There were 12 courses belonging to the major areas. Six courses related to the mathematical content knowledge included "Secondary geometry," "Secondary algebra," and "Secondary probability and statistics", other six courses related to pedagogical content knowledge included,

such as "Storytelling and mathematics education," "Mathematics, personality, and mathematics education," "Math class observation and analysis," and "Math classes with GeoGebra."

The 6th curriculum was applied in 1993, and the 2009 revised curriculum was applied in 2014. This indicates that there were many changes in the courses in accordance with the changes in the curriculum. Given that "problem-solving capability," which is the focus of the 6th curriculum, was established for major courses and "creativity and personality," which is the core of the 2009 revised curriculum, was established as "Mathematics, personality, and mathematics education," one of the goals of the teacher training programs is to widely spread the national education policy. Based on the subject names, it seems the courses of the teacher training programs implemented in 1993 are focused on content knowledge, whereas the teacher training programs implemented in 2014 are focused on pedagogical content knowledge. The previous paradigm of the teacher training programs was to train teachers to have necessary knowledge, but recent teacher training programs are more interested in class and students. Also the paradigm of the recent teacher training programs is focused on participation and practice. In particular, in the course "Class observation and analysis," trainees have an opportunity to reflect on teaching by directly filming their own teaching and analyzing it.

The results of Park and Moon's (2009) survey showed that 39.5 % (less than half) of mathematics teachers did not participate in a mathematics training program within 10 years or completed less than 5 h of training. The first reason is the lack of established mathematical training programs, and the second reason is the use of contents that are not applicable on-site. Teachers want training programs that provide practical knowledge and methods that they can actually use in the classroom. In fact, as shown in the analysis of the status of mathematics teacher training programs by Lee and Jang (2012), the training contents that were evaluated as "well done" by the Office of Education were those that can be used in an actual classroom site. Given that the goal of professional development was to "help teachers develop instructional practices in which they induct their students into the ways of reasoning of the discipline by building systematically on their current mathematical activity" (Cobb and McClain 2001, p. 207), it is desirable to modify the qualification training program to include practical knowledge that can be used for a class.

One of the reasons that the contents of the qualification training program changed in such a way is that the teachers themselves formed groups for self-development because the institute-centered training programs failed to reflect their demands. A representative voluntary meeting of mathematics teachers is the Korean Society of Teachers of Mathematics. The Korean Society of Teachers of Mathematics started with the publication of a magazine called *Math Love* in 1995. Currently, it is a research society of mathematics teachers with the goal of popularizing mathematics. It is run purely on membership fees, participation, and donations from members. By operating a seminar team, it studies teaching-learning methods, philosophy of mathematical education, curricula, the use of software in mathematics classes, and the history of mathematics. Also, it develops teaching materials that are directly incorporated in teaching. It regularly holds a conference

in which the seminar team shares its research findings. The Math Festival, which began in 1999, has been promoted as a part of the job training programs since 2004 and is one of the representative jobs training programs for which in-service mathematics teachers voluntarily apply. Table 5.2 summarizes the training contents of the Math Festival in 1999 and 2013 (http://www.tmath.or.kr/bbsd/list.asp?bbsId=data_30_16).

Lecture contents in the first Math Festival in 1999 included content promoting changes in mathematics teaching like "Mathematics class introducing the history of mathematics" as well as class organization methods and evaluations, like "Differentiated class," and mathematics teaching that uses technology. When compared to the level 1 certified teachers training program implemented in the same

Table 5.2 Training contents of the Math Festival in 1999 and 2013

	Content area	Lecture title
1999	"A" session	Math lessons with activities, Practice of differentiated class, Mathematics education introducing the history of mathematics, Let's make mathematics class, …
	"B" session	Secondary school performance assessment, Differentiated class, Potential use of Excel in statistics class, Use of GSP in secondary school geometry education, …
	"C" session	Tessellation, Probability in everyday life, How to use GSP in class, Fractal geometry that is realized in the classroom by using a graphing calculator, …
2013	Plenary lecture	One gets creative when one sees nature through the eyes of mathematics, King Sejong's gunpowder weapons and precision science and technology
	"Study of teaching materials" session	Probability of meeting n people at the same time and problem of shortest distance, Between the infinite and the limit, Mathematics class in which all can participate, …
	"Improving teaching" session	Bridging art and mathematics, Mathematics class that nurtures convergence talent based on creativity and personality, Educational innovation in a learning community, Hanwool Middle School, …
	Math education session	Needs of ecological mathematics and practice, Mathematical thinking and creative thinking, Storytelling-based strategy for mathematics class, …
	Experience/gifted mathematics session	Travel story with mathematics, Practice of running an experimental mathematics program at a secondary school, Plan for vitalizing a math club, …
	Observing classroom session	Restructuring class to empower students, Why watch classes, Observing the middle school class on the properties of quadrilateral, Observing a high school class on the application of derivative, …
	Workshop	Elementary GeoGebra, Advanced GeoGebra, Board games and mathematics, Dual of a regular polyhedron, Making a math book, …

year, this forms a training program by focusing on pedagogical content knowledge, which is the knowledge teachers need to run a class. Furthermore, only three out of a total of 30 lectures were taught by professors; the other 27 instructors were in-service teachers. The Math Festival in 2013 was organized more systematically. The content was divided into two lectures and five sections of study on teaching materials, teaching improvement, mathematics education, experience/gifted mathematics, and observing classrooms, and there were seven lectures per section and 12 additional workshops. Accordingly, the festival presented information that was useful to teachers for improving their teaching and observing classrooms and collaborative classes or activity classes, therefore moving in the direction of greater emphasis on practical knowledge.

5.3.2 Changes in the Training Methods

In the past, teacher training programs have been largely lecture-oriented, and this is still true today. As the main agents of realization of the teacher-learning process, teachers have to determine the specific class situation of their school site and thus, even if they have attended a good lecture, the effect of the training program is not large if they do not actually apply the ideas in class (Park et al. 2010). In this context, the Ministry of Education (2013) is actively suggesting the introduction of various training methods such as workshops, case presentations, group discussions, and site visits in order to move beyond the lecture-oriented training program and maximize the training program effects.

Recent changes in teacher training methods are in accordance with the perspective that sees teaching as practical knowledge (Shulman and Shulman 2004). As a unique professional knowledge of teachers, practical knowledge, which is a concept defined by Elbaz (1981, 1983), refers to knowledge that is generalized and reconstructed in accordance with an encountered situation on the basis of values and beliefs. Training methods such as workshops, case presentations, group discussions, and site visits were suggested as methods that lead teachers to develop practical knowledge. However, these training methods also focus on the growth of individual teachers, and thus, a teacher community in which teachers focus on students and jointly reflect and discuss educational practice was recently formed.

Teacher community is a training method that emphasizes continuity, cooperation, and solidarity as an alternative that can overcome the limitation of the traditional approaches in which teacher professional development is focused on an individual (Kwon et al. 2014). Teacher community, which shares a similar school context, learning environment, familiarity among members, and objective of jointly agreed teaching activities, induces teachers' mutual development. In addition, teachers are regarded not only as people who runs the curriculum but also as practical researchers belonging to the teacher community.

By organizing a teacher community based on teachers within the same school, Kwon et al. (2014) developed a mathematics teacher training program that

continuously fostered the development of other teachers, even after the training. What distinguished it from other teacher communities is that it targeted three teachers teaching the same grade at the same school as one team and allowed them to plan to teach together in the training process; also, continuity was maintained even after the training ended. Training content was about convergence teaching for secondary school mathematics teacher and storytelling mathematics for elementary school teacher which have become issues in today's curriculum. Teachers who participated in the training program gained confidence as they planned and applied a new teaching method along with basic theory and reflected on the needs of the community and continuous maintenance. The program offered them an opportunity to share and understand their knowledge of the teaching process. Thus, the teacher community can be a useful teacher training method that enhances individual professional development and growth through cooperation and reflection within the community.

Another training that expanded and changed teacher training in Korea is distance training, accompanying the revitalization of e-learning. Because distance training programs allows anyone to receive training anywhere and anytime using information and communications technology, they are effective for teachers who have difficulty securing time for training due to their teaching responsibilities and various administrative duties. In addition, as teachers directly experience education that uses information media, distance training has the advantage of playing a leading role in changing school education for the information age (Cho 2004; Jeong et al. 2009).

Distance training programs have continued to grow since their inception in December 2000, and as of 2013, 62 distance educational institutes were in operation. It was found that 67 % of those who participated in a distance training program favored it over collective education training programs (15 %) or blended training programs (16 %), and 95 % were willing to participate in distance training again. Although 1820 people received distance education training in 2000 when the distance training programs first began, 288,030 people completed distance training programs annually as of February 2010. Accordingly, distance training programs are growing rapidly, now accounting for about 40 % of all training programs (Korea Education and Research Information Service 2013). Moreover, although distance education training content was implemented only on web-based platforms, training content that enables one to learn on smart devices (smart phones and smart pads) has continuously developed due to the recent smart technology and widespread use of mobile devices. In this respect, it is expected that teachers' demand for and interest in distance education training programs that allow them to receive training in various forms anywhere and anytime will further increase. In 2009, the Korea Education and Research Information Service developed the Teacher Training Information Service (http://ttis.edunet.net) and are providing an information service that has the characteristics of a portal site for teacher training programs. Such cases are hard to find in other countries, and the program has significance as national comprehensive training service for teachers (Kim and Kim 2013).

However, criticism of distance training programs is also increasing. The training courses that were offered the most in distance education training institutes from January 2011 to September 2012 had the topics "self-development" (48.21 %),

"teaching and learning practice" (21.38 %), and "life guidance and counseling" (16.37 %) (Kim and Kim 2013). As these three subjects accounted for 85.96 % of the whole, it was found that the training curriculum operated with too much emphasis on certain subjects. Particularly, there was few course related to mathematics. It was shown that the establishment of major courses is very insufficient, a teacher could not find the training he/she wanted. Furthermore, trainees are recognized as having listened to a lecture even if they did not listen to it properly (e.g., by fast forwarding through the video), and they can complete the training program simply by clicking. Thus, even though good lectures are provided, it may not be helpful to teachers. Also, the problem of securing excellent instructors has been pointed out. As a way to increase the efficiency of training, the training method of blended learning, which combines online training and offline training, is suggested, and training methods are expected to change continuously in the future.

OECD (2009) chose informal conversation that improves teaching as the form of professional development that is most favored by teachers in TALIS participating countries and reported that 92.6 % of teachers have participated in it. Next, the participation rate for activities such as lectures, workshops, and reading technical books was high. Korean teachers responded that they also participated in informal conversation, lectures, and workshops the most in order to enhance their professional development. However, 77.7 % of teachers in TALIS participating countries responded that they read technical books, whereas only 52.5 % of Korean teachers reported the same. Korean teachers had a higher rate of participation in individual and group research, mentoring and observing coworkers, and visiting other schools for observation than the teachers in TALIS participating countries. Given this result, it seems in-service teachers in Korea have determined that practice-centered training programs are more effective than theory-centered training programs in bringing about changes in teaching.

5.4 Conclusion

Competency standards for teachers have changed in accordance with the times, and accordingly, the contents of teacher education have changed as well. In today's information age, the status and role of teachers are dramatically changing as the learning situation enlarges and the learners' initiative strengthens. In addition, as the movement of school education reform in accordance with social change in the twenty-first century demands changes in teachers, teacher training programs should also change accordingly. Matos et al. (2009) largely divided in-service teacher training programs into training models and participation models. Here, a training model is "a model focused primarily on expanding an individual repertoire of well-defined and skillful classroom practice" and is assimilated to the acquisition metaphor for learning by Sfard (1998). The participation model enhances teachers' professional development by requiring them to participate in professional development activities run by universities or educational institutions and activities in

which they can observe their own teaching and discuss learners' responses. It is assimilated to the participation metaphor for learning by Sfard (1998).

Teacher training programs in Korea are advancing toward a participation model as their focus evolves from content knowledge to pedagogical content knowledge; that is, they are changing from lecture-centered training programs with the goal of improving teaching to various forms such as workshops, teacher community, and cyber distance training programs. In 2013, the Ministry of Education presented the goals of teacher training programs, which are, first, a training curriculum for competence in teacher education policy; second, the substantiality of training programs for professional development; third, an increase in the efficiency and utilization of teacher training programs; and fourth, diversification of the training methods, thereby emphasizing pedagogical content knowledge for educational contents to ensure the substantiality of training programs. As the Ministry of Education mentioned workshops, case presentations, group discussions, and site visits for the diversification of the training methods, it presented goals equivalent to the direction of the recent changes in teacher training programs. Further, as explored in Sect. 5.3, there was the attempt to improve teaching through the activities of voluntary associations of Korean teachers, and the government has accepted this as policy, thereby accelerating the direction of teacher training programs.

OECD (2005) reported that teachers in Korea have a low rate of participation in training programs. In response to this announcement, in 2005, the government changed the policy, under which the training programs had been voluntary, to make them mandatory. As a result, the number of distance educational institutes has dramatically increased. According to OECD (2009), about 93 % of teachers in Korea participated in training programs, a number higher than TALIS's average of 87 %, and the average number of training participation days was about 33 days, higher than TALIS's average of about 18 days. Furthermore the Ministry of Education and Science Technology (2010) enacted the development of teaching competence into a law. A teacher evaluation system by students and parents was adopted. Teachers whose student evaluation is 2.5 points or less out of a total of five points must undertake 30 h of training. Clearly, the government's policy helped to increase teachers' participation in training programs. Moreover, in 2011, it was stipulated that teachers should complete over 60 h of on the job training a year, to be reflected in their performance-based pay. Accordingly, it is expected that more teachers will participate in training programs in the future.

However, the increase in distance training programs may not be very helpful in enhancing teachers' professional development. As analyzed in Sect. 5.3, the training courses selected by teachers are usually focused on self-improvement, and there are almost no courses on teaching methods for specific subjects. Because the programs offer one-time training, the formal increase in training will not bring about changes in the current teaching methods. For teachers' professional development to effectively increase the quality of education, the most important elements are active participation by teachers who directly provide instruction and independent willingness. Particularly, as relatively excellent students become teachers in Korea, they

earn degrees to develop their own capabilities or form groups specialized by subject. The government must accept this individual-centered training and provide support for teacher communities at the government level to achieve continuous collaborative professional development. If content knowledge and pedagogical content knowledge are balanced and the training method of blended learning is actively used, teacher training programs would be helpful to increase teachers' professionalism.

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