

A Japanese approach to in-service training and professional development of science and physics teachers in Japan

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Abstract: The purpose of this study is to explain in-service programs for science and physics teachers in Japan. This study specifically discusses the "course research" approach. "Lesson research" is an approach used in teacher training. Lesson Research was developed in Japan and has been successfully used in teacher training in many countries. Document review, one of the qualitative research methods, was used to collect data for this study conducted in a survey model. When document analysis was carried out in the study, efforts were made to access primary sources, documents were analyzed and data were analyzed and presented. One of the methods that can be used in document review is to consult expert knowledge. In this study, we consulted a Japanese expert and tried to collect relevant and authentic information. At the end of the study, proposals were made for improving the qualifications of science and physics teachers.

Keywords: In-service training, science and physics teachers, course research

Introduction

Teachers have an important responsibility as a key element of the education system. It is the teachers who implement the educational policy of the state and influence this policy through their implementation. Teachers are the main factor of quality development of the educational system. It is known that the role of teachers in the success or failure of curriculum reform is significant. Teachers play an important role not only in imparting culture, but also in preparing students for an ever-changing future. Changes in society and family, technological and cultural changes affect not only the curriculum, but also classroom and school dynamics. Student success depends on quality education, and educational effectiveness depends on the quality of teachers. Therefore, all countries are trying to improve the system of teacher training. In many industrialized western countries, educators are under pressure to improve student outcomes in order to improve the quality of education and create a more educated and skilled workforce.

The main goal in the training of pedagogues is to train qualified pedagogues. For this, teachers must have the necessary knowledge and skills in the areas of professional knowledge, field knowledge and general culture. Teacher training has always been important in all societies. Teacher training is seen as the main source of educational change in an organized, orderly society. Therefore, the professional development of teachers in different countries cannot be ignored, and efforts are made to ensure that teacher training programs take into account current conditions and future conditions. One of the main elements of reforms in the education system is teacher training. Societies no longer see teachers as the most meaningful element of reform, rather than as the only variable to be changed in the development of the education system. As the world becomes increasingly globalized, many see education as an important tool for national development. Economic development, progress and improvement in living standards are directly related to education. The training of intern-pedagogues and continuous improvement of existing pedagogical staff is the main factor of educational development.

The teaching profession is a profession that requires many skills in an increasingly complex and rapidly changing information society. Today, teachers must have high professional standards to be successful. To create an information society in the information age, continuous development of teachers and students is necessary. As expectations of students rise, so do expectations of teachers. In order to educate students well, teachers must constantly learn and improve themselves. Therefore, teacher training is as important as primary education. Professional development is generally defined as an individual's advancement in their profession. Teacher development is defined as improving a teacher's teaching through more experience and practice. Professional development includes formal experiences (eg, attending seminars, meetings or follow-up events, etc.) and informal experiences (eg, reading career-related publications, watching television programs about the academic discipline, etc.). Therefore, the concept of professional development is broader than the concepts of career development (development resulting from the growth of a teacher in the stages of a professional career) and staff development (training programs organized to ensure the development of a group of teachers).

One of the main goals of professional development is to accelerate positive changes in the educational system and in the theoretical and practical knowledge and behavior of the people who make up the system. In addition to providing the potential for change, professional development also provides opportunities for teachers and administrators to update and improve their knowledge and skills. Many countries, which consider teacher training as a meaningful element of improving the education system, are trying to implement various reforms to improve the professional skills of teachers. Although in many cases teachers are engaged in their own professional development and actively participate in various professional development programs, in many countries the professional development of teachers is shaped by standards, qualifications, responsibilities and ultimately certification. In the 21st century, knowledge is developing rapidly. Information doubles in a very short time. Because of this, there is an immeasurably more detailed knowledge and experience about how we and our students learn today than in the past. In today's information society, there is a need to educate individuals who have the knowledge and skills to effectively teach, who have learned to learn, who are open to self-improvement and lifelong learning. Teachers have an important responsibility in educating

the individual to meet the needs of a changing world. Therefore, teachers must be open to development, change and lifelong learning.

In a globalized world, a good education system and effective teachers are necessary to be a developed society and compete with other countries. It is important and necessary to know the different practices and trends in teacher education around the world. In order to improve our teacher training system, it is important to know the practices of other countries, to be aware of the problems faced and the solutions developed. Japan is one of the leading countries in the world, especially in the field of science. A notable approach to science and physics teacher training from practices in different countries is the "lesson research" approach that originated in Japan and is used in many countries. This approach should be better known in our country. For these reasons; How is science and physics teacher training being implemented in Japan and how is the emerging 'lesson research' approach being implemented in Japan? The questions constitute the problem of this study.

Science and Physics in Japan

After World War II, Japan's education system underwent major changes. Education is traditionally considered important to the Japanese, and teachers are respected. Japanese teachers are a key element of Japan's success. Japanese society places a lot of responsibility on teachers and expects a lot from them. In Japan, science and technology education is highly valued. The ministry said that if citizens can understand the meaning of science and technology and its relationship with daily life, the long-term use and development of science and technology can be achieved. Science and technology is the platform that supports the Japanese economy. The role of science and technology in solving global problems such as low birth rate and population aging, security and environmental problems has increased.

In Japan, as in other countries, the purpose of teacher training is to improve the professional competence of teachers. Teacher training in Japan is a multifaceted, continuous and systematic system. At the national level, professional development is carried out at five levels defined by the Ministry of Education: regional educational organization level (local government bodies), municipal educational organization level, school level, voluntary educational organizations, groups and individual training of teachers. . In the professional development of science and physics teachers, professional development paths for all teachers are usually used. In addition, since 1960, regional science education centers have been established throughout the republic to provide training activities. Also, in the regional educational centers established since 1965, among other fields, events and personnel training have been organized in the field of science. Since the 50s of the last century, the teachers themselves have formed voluntary working groups in their areas. To encourage this voluntary activity, the government has been subsidizing such activity since the 1960s. The Ministry organizes trainings and meetings to inform teachers about new developments in the field of science and technology. Newly appointed science and physics teachers are undergoing an internship like all new teachers. These trainings vary slightly by region. Training programs can be divided into two categories. The first category is programs administered by regional boards of education, in which all teachers must participate. The second category is programs in which teachers who want to participate.

There are three main programs in the first category: programs for new (first-year) teachers, programs for five-year teachers, and programs for ten-year teachers. Regional educational institutions in

cooperation with higher educational institutions and science centers offer training of science and physics teachers. These trainings include field observations, experiments, and problem-solving approaches. Compulsory and optional training courses are defined for all science and physics teachers working in secondary educational institutions, depending on their professional experience.

Course research

One approach used in teacher training in Japan is Jugyou kenkyu; It is an approach defined as collaborative research in learning and teaching. Translated as "collaborative research in classroom activities" by Nagoya University Research Group. However, researchers in the United States describe this approach as "lesson learning." In Japan, "Lesson Inquiry" emerged as the foundation of the educational movement to implement student-centered teaching. This is the most common approach to teacher training in Japan. "Lesson research" is an approach that has gained wide influence around the world and is also used by other countries. The phrase "lecture research" is a translation of the Japanese word Jugyokenkyu (jugyo means lesson, kenkyu means study or research). In fact, Jugyokenkyu involves more than just learning lessons. Therefore, when Jugyokenkyu is translated as "lecture study", it does not convey its full meaning.

"Lesson research" is the systematic questioning of teaching practice by examining lessons. These examined lessons are designated as kenkyujugyo in Japanese. Hence, it is the opposite of Jugyokenkyu, meaning a study or course of study. This approach is seen worldwide as an alternative model for schooling innovation and teacher development. Many researchers have used this method to enrich classroom practice and provide professional development for teachers. Educational researchers and educators in the United States and England see "lesson research" as an alternative approach for teachers who want to study classroom practice and shift the focus from teaching to learning. . Researchers in Thailand and Singapore say that "lesson research" can be a new model in teacher professional development and a useful way to improve teacher quality and student achievement. The Hong Kong Institute of Education uses "lesson research" in teacher training. It is used in professional development of teachers in China, Vietnam, Indonesia, Iran and Korea and has brought a new perspective to the field. There are many types of school-based professional development in Japanese schools. However, jugyou kenkyu is the most meaningful and basic program. Jugyou kenkyu is being developed as "collaborative research in teaching" in various forms.

Generally and systematically, it is a four-step cycle: plan-do-control-act. First, teachers should plan their collaborative research. They must then implement this plan and finally reflect and evaluate the success of the process in the form of a learning review and improvement. With jugyou kenkyu, the classroom is not only a workplace, but also a source of professional development, serving as a model for teachers to achieve meaningful change in their careers. In addition, teachers share responsibility for the teaching and learning process, which includes developing lesson plans, teaching materials, working with students, and assessing students.

The process of "lesson research" begins with the identification of the goals to be achieved at the end of the education. Then teachers start working on the lesson, identifying the necessary strategies to achieve the goal. Teachers plan a lesson in groups and make a detailed lesson plan. After this stage, one of the teachers in the group implements this lesson plan. Other members of the group observe this lesson and take notes on the lesson plan. After this lesson, group members

gather to share and discuss their observations. Based on the observations made, the lesson plan is reviewed and necessary changes are made. Another member of the group then implements the new lesson plan in the classroom he/she is teaching, while the other teachers observe the lesson. After the lesson, teachers share their observations, comments and suggestions. Typically, "lesson research" involves 10-15 hours of group meetings over 3-4 weeks, with two lectures held a few days apart. During lesson research, observing teachers observe situations that they do not have the opportunity to observe when teaching their lessons: what students think, how they interact, what they talk to each other, how much they are interested in learning the concepts presented in the lesson. ready A "course study" consists of a series of planned steps that may last several months or more. It usually includes the following activities:

- Collaborative lesson planning
- Doing the lesson in the classroom
- Get lesson tracking information
- Reflecting, discussing and repeating the lesson
- Redo the lesson

In addition, the "course research" team prepares a report on the work and results of the entire process. This method supports and encourages regular cooperation and solidarity among teachers. Teachers often participate in "lesson research" as part of their training as part of state-sponsored professional development. During their training, prospective teachers prepare for "course research" with a university counselor and a practicing school counselor. The Lesson Study approach, which originated in Japan, challenges experienced teachers to test and improve their teaching practices. The origins of Japanese "lecture research" (sometimes called "research course") date back to the early 1990s. Many "course research" centers have opened in America. "Lesson Research", Jugyou Kenkyu is described as the main teacher training program in the school. In this approach, teachers find opportunities to reflect and create their own responses to the many challenges they face in school and in the classroom. Japanese teachers see professional development and teacher improvement as a lifelong process. They know that experience, self-study, peer critique of their lessons, and self-reflection are important parts of the process. Japanese teachers are interested in long-term self-evaluation and improvement rather than one-off seminars on the latest educational topics. When Japanese teachers are asked what they have learned from the "lesson research" process, most of them say, "My perspective on students is improving."

Discussion and conclusion

Teacher training in Japan; It is implemented at various levels, including national, regional, city and school. Special attention is paid to in-service professional development practices held in schools. Voluntary working groups are also distinguished in the professional development of teachers in Japan. The state provides financial support for such activities to support volunteer activities. Examples include web pages and blogs created by teachers. In this way, teachers can share their work with colleagues and have various discussions in the forum section. However, teachers conduct these activities in their own time and at their own discretion. In our age of rapid development of information and technology, such regulation is effective in

improving the quality of teachers and, therefore, education. Participating in professional development programs at regular intervals is essential, especially for science and physics teachers, to learn about developments in their fields and teaching methods and techniques.

It can be seen that universities in Japan play an important role in teacher training. Universities support the professional development of teachers through programs called "Leaving school for post-secondary education" and three- or six-month programs organized in universities. By cooperating with universities, teachers can be improved both in their fields and in the methods and methods of teaching science. This can be achieved by using the knowledge and experience of universities in Japan. Lesson Research, which originated in Japan and is being implemented in many countries, is an effective approach to professional development. This approach has been used successfully in Japan for years. This approach, defined as collaborative research, can be tested in teaching and learning. However, for this it is important to first have a good understanding of the "course research" approach. The goal of this approach is to work collaboratively to prepare an effective lesson plan, to observe and develop this plan based on observations. The main goal is to enable students to learn more effectively.

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