

Lesson Study in Chile
The lesson of a collaboration Program

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Introduction

Chilean Government received assistance from Japan to improve teaching of school mathematics. Academics from eleven universities and officials of the Ministry of education of Chile participated in internships to internalize the operation of the Japanese education system. The significant learning reached by trainees during the course impules them to engage in several initiatives to improve training primary teachers in Pos-titles of mathematics Education. This article points out the core elements of the program and makes reference to its impact, beyond the innovation in the pos-title Programs.

1 Lifting the Collaborative Program

Within the framework of APEC meetings, towards the year 2004 the Minister of education of Chile expressed his Japanese counterpart his concern over the inadequacy of government Programs to improve levels of achievement in school mathematics in Chile. Thus began to be developed between the Government of Chile and the Agency of international cooperation of Japan (JICA) a mathematics education improvement project in Chile. The collaboration project started on December 2005, with duration of three years.

The goal of the project was to improve the quality of the school mathematics teaching, improving primary teacher's practices. This improvement would be possible through the Post-title Programs in mathematics education offered by Universities in convention with the CPEIP (Pedagogical Centre of Improving, Experimentation and Research, dependent on the MINEDUC), Post-title Programs which are served by teachers academic interns.

2. The action lines of the Program

The collaboration project includes two major lines of action. The main line consisted of **internships to Japan of Chilean universities teachers** engaged in the "Post-title of mathematics education" Programs offered to generalist teachers within the framework of its training courses. Scholars in internships to Japan learning's should affect the forms of labor in Post-title Programs. The second strategy of the project corresponded to visits to Chile of prominent Japanese teachers who teach math in primary schools, to monitor and promote the impact of the program, and in that context to conduct **demonstrative public classes with Chilean students** in the context of the Lesson Study strategy.

2.1 Internships in Japan for University teachers and officers of the MINEDUC

Three groups of trainees were financed for five weeks each, between 2006 and 2008. Each stay involved ten university teachers and two professionals from the Ministry of education of Chile. Interns focused his thoughts on how influence mathematical and pedagogical training of teachers that attend to the Post-title Programs.

The main academic activities of internships were to attend conferences, to visit schools, to observe classes at different levels, to participate in public classes, to participate in a lesson study cycle, to visit a teachers training centre, and to visit a publishing and producing teaching materials Company. Host entity was the CRICED (Center for Research on International Cooperation in Educational Development) of the University of Tsukuba, its main campus in Tsukuba and school annexed to the University of Tsukuba in Tokyo, campus, the latter, where Lesson Study practices were implemented. Much of the logistical support, as residences in Tsukuba, Tokyo and Osaka, was provided by JICA.

Internships provided a deeper vision of the Japanese education system, especially about curriculum, school systems monitoring, evaluation, and teaching training development. Moreover internships provided practical workshops in Lesson Study.

2.2 showcase Japanese teachers in Chile public classes

In parallel with internships to Japan, each year prominent Japanese teachers travelled to Chile to perform public mathematics classes with students from subsidized schools in different cities of the country. These open classes, took great call, especially of school teachers. The cycle of public classes began in 2006 with a class at the University of Santiago. Then Japanese teachers moved to Valparaíso for activity in the Catholic University of Valparaíso, and subsequently visited the Catholic University of Temuco.

In the next two years public classes were extended to the Metropolitan University of Education Sciences, Universidad de La Serena, Catholic University of Talca, and University of the Bio Bio and Catholic University of Temuco, covering much of the national territory.

In 2009, as part of the activities of project closure was a public class implemented by Chilean teachers subsidized in Valparaiso, being this time observers Japanese experts.

3. Lesson study, as focal point.

Internships of Chilean educators to Japan as visits of Japanese experts to Chile, both focused on Lesson study.

Chilean interns had the opportunity to know the system of education of Japan, focusing on the field of elementary mathematics teaching. They learnt about "Lesson Study", Jyugyo-Kenkyu in Japanese, as a form of work among teachers, enabling them to progressively improve their

educational and teaching methods. Some Chilean educators were challenged to implement a class during a lesson study cycle with Japanese children. They planned the lesson considering various aspects such as: status of the contents in the curriculum, objectives of learning, students' prior knowledge, used materials, didactic strategies for the development of the class and possible reactions of the students. The intern who conducts the lesson was observed by the entire group of interns and experts Japanese teachers. The meeting for analyzing the classes considered discussion about the class management and about the achievement of the objectives of the class. Interns realized that the analysis of the class refers to the fulfillment of the objectives, the lesson effectiveness, and the facilitation of the learning of students. The focus of the meeting was to reflect about the lesson and to improve the lesson plan.

Each year, Japanese teachers have dozens of opportunities to observe classes-investigation-classes in their school or outside, and one or two opportunities to teach a class observed by other teachers, as part of the lesson study process. In this internship all scholars had the opportunity to observe several classes at different levels and engage in a lesson study process.

4. the Japanese Lesson style, a finding, a constant.

Undoubtedly was impressive for trainees to note that there is a standard way of conducting classes in Japan, which is appreciated throughout the country. It's a solving problems focused lesson where students participate actively. Teacher poses a problem regarding a familiar context to the students. The problem involves a knowledge not previously acquired by students; however it is closed to content recently learned by students in previous lessons.

Japanese teachers equate this way of organize the lesson and forward the curriculum demands on the metaphor of "lesson plans pasted with solution", not contiguous plans which are posed one after another. Teacher intention is to superpose lessons, so give to the children the opportunity of using knowledge just learned, allowing them to find an answer by themselves. Conforming to this lesson model, teacher poses a problem to the class and provides enough time and individual support to personal student work. After several minutes, teacher or chests a sharing time, where students explain their strategies and solutions. During this stage, teacher looks for more complex and synthetic strategies, so that students can engage on deeper understanding, so getting more robust significant learning.

Chilean interns noted that Japanese students were able to solve problems without a previous teacher demonstration. Interns understood how to conduct an interesting lesson for students. Few countries in the world can say that their children enjoy mathematics classes: Japan is one of them. Without a doubt, that enjoyment favors the performances of schoolchildren in standardized tests, whether national or international.

The relationship between these effective lessons focused on a problem to solve, attractive for children and in accordance to curricular requirements is not far from the Lesson Study impact in curriculum and teacher professional development in Japan. Most of the countries of the world

teach mathematics following routines, a mechanical approach. Interns noted that Japan has chosen to fix first simple problems that children can solve by themselves. But then come other problems, which requires a base formed which becomes a key knowledge, and thus the student faces new challenges and learn the expected curriculum.

These good lessons are the result of a community of Japanese teachers which improves the curriculum collaboratively. Every time Japanese teachers analyze whether they are achieving the goals and if necessary to correct planning errors. During lesson analysis teachers talk about the difficulties that lie and what students need to learn better.

5. The impact of the program in Chile

At first, Program impacted trainees teaching understanding. Then, the initiatives taken by them led to an extension of that impact. Japanese expert teachers in major cities of the country showcase classes were of great help to this phenomenon extension.

5.1. The impact of the Program in trainees

Interns managed a deep understanding of teaching methods to teach mathematics presents in Japanese schools, and about the intricate relationship between continuous teacher training, curriculum development and policy of textbooks in Japan. Interns realized that the phenomenon of continuous improvement of mathematics teaching in Japan is the product of a collaborative work in which teachers play an active role.

The CPEIP professionals who participated in internships provided suggestions to the MINEDUC to optimize the Terms of Reference in the annual calls for Post-title Programs. It was established that those universities which were benefited with fellows for internships should join these academics to the Program team teachers. In addition, it was established that Certification Seminar of Post-title Programs should consider Lesson Study process, including observation of classes between pairs and discussion of classes with university professors.

By their side University Trainees implemented additional initiatives, such as the inclusion of Japanese teaching approach for improving their own math teaching strategies.

5.2. The impact of the Collaboration Program in Chile, beyond trainees

Interns learning raised their math teaching in several programs, not only in Post-title Programs. Interns innovate teaching in the training of secondary math preserves' teachers, and even in the training of engineers.

5.2.1 Impact of Lesson Study in the Post-title Programs

Lesson Study's impact on Post-title Programs is reflected in the way that trained teachers in Post-titles plan and conduct their lessons. The Pontifical Catholic University of Valparaíso, for example,

requires a final report, in accordance to the terms of reference requirements established by the CPEIP, that includes planning, experimentation and analysis of classes as in Lesson Study strategy. In addition, the Post-title Programs in Chile focused problem solving as priory strategy. That means conceptual and not only procedural content is considered during teaching. Primary teachers extended their discursive teaching techniques, the repetition of rules-based teaching methods.

5.2.2 Inclusion of Lesson Study in various forms of teacher development

The CPEIP incorporated Lesson Study in other ongoing training Programs, particularly in the communal workshops conducted between 2007 and 2009 in various communes of the country. These communal workshops involve primary teachers focusing mathematics and language and communication.

In addition, the CPEIP implemented the Lifelong Learning Program at schools, which considers the formation of technical leaders in service, deepening Lesson Study in small groups following different exes of learning. Leaders, in turn, perform workshops with first cycle elementary teachers and nursery educators in their establishments. Activities incorporate the process of designing, perform, observe and analyze a class. Currently about 300 schools declared as emerging are working these methodologies and, in some cases, the experience has matured to the point that already shows changes in the way that teachers address their work.

5.2.3 National conference of Lesson Study, a product of the Collaborative Program

The successful experience of trainees in Japan and the successful implementation of lesson study in some Chilean schools and universities motivated them to involve in new experiences: projects of teaching, research, development of a WEB site, and even on books publishing projects. In this context, as a way to share and combine these efforts the Collaborative Program alumni have agreed the realization of National conferences of Lesson Study.

"First National Conference of Lesson Study" was the result of a joint effort of several universities and the CPEIP. The first workshops were performed in the Catholic University of Maule on 25 and 26 September 2007, sponsored by the MINEDUC. The Conference was attended by all the Alumni through the year 2006, dictating conferences, workshops and reporting of ongoing investigations. Today, there are projects funded by Chilean government and ongoing master in education thesis degree that evidences the enthusiasm of Chilean trainees are involved in activities derivate from the Collaborative Program.

The "Second National Conference of Lesson Study" was again in the Maule Catholic University, which has assumed as challenge the continuation of such conference annually. On the second conference trainees from University of Antofagasta, University of La Serena, Pontifical Catholic University of Valparaíso, University of Santiago, University of Chile, Metropolitan University Education Sciences, Catholic University of Maule, Bío Bío University, and the Catholic University of Temuco offered their academic contribution.

5.2.4 Books Edition referred to both, Lesson Study and Japanese open ended lesson style

Internships generated and forged academic ties between Chilean universities and the University of Tsukuba. Since the beginning of the Collaborative Program, in 2006, University of Tsukuba has invited two researchers from Pontifical Catholic University of Valparaíso within the scholarships program for visiting foreign researchers of CRICED.

This interaction produces the addition of three books, the firsts in Spanish related to Lesson Study and to the Japanese lesson style. These books are: "the study of Japanese classes in mathematics" (Isoda, Arcavi & Mena, 2007), "The teaching of the multiplication and curricular demands" (Isoda & Olfos, 2009), and "The problem solving focus in the teaching of mathematics since Lesson Study development" (Isoda & Olfos, 2009). These books have been disseminated in various mother talk Spanish countries and have been used in courses for initiating teachers in Lesson Study methodology.

5.2.5 Dissemination of Lesson Study in Spanish WEB site

Currently there are scarce works in Spanish referred to Lesson Study in the WEB. Pioneer in this task was Professor Eliseo Martinez from University of Antofagasta. Martinez has incorporated into <http://www.uantof.cl/facultades/csbasicas/Matematicas/academicos/emartinez/extension/indice.html> various problems and documents about Lesson Study and about lesson centered in problem solving.

A group of scholars of the PUCV is currently implementing site <http://www.estudiodeclases.cl> which aims to include lesson plans, class's discussions, and videos of class episodes discussion. This web site aims to promote Lesson Study as a useful way of professional development in Chilean primary school math, and in other Spanish tongue countries.

6. Evaluating the Collaborative Program: for improving math teaching in primary school.

6.1. The vision of the actors of the Collaborative Program

The external evaluation of the Collaborative Program "**Improvement of mathematics education in Chile, with Japan support**" was commented during the closure meeting on September 2009. The closing ceremony was attended by the presence of Fumio Kawano, resident of JICA (Japan International cooperation agency) in Chile; Jaime Veas, head of the Division of general education of the MINEDUC; Carlos Eugenio Beca, director of the CPEIP, and Professor Masami ISODA of CRICED, University of Tsukuba. Mr. Veas announced the installation of the Mathematical Open World Program projected to all subsidized primary and secondary schools of the country, for improving learning in a sustained manner, where the experience of this Collaborative Program is considered. Mr. Beca noted that the MINEDUC continues driving the development of Lesson Study in other lines of educational improvement, as it is the case in the communal workshops and the work with technical heads at schools. Mr. Beca also pointing that a new stage starts where Lesson Study is been including as an strategy useful to plan, perform and analyze critically classes.. Both

the CPEIP and universities valued the contribution of the Collaborative Program to primary math education in Chile.

6.2. An external evaluation of the Collaborative Program

The evaluation of the project, carried out by an external organization, was highly positive. Its recommendations aimed to give continuity to Lesson Study initiatives in Chile and to maintain academic exchanges with the University of Tsukuba.

Recommendations brought the convenience that the CPEIP assume more leadership and leverage instances as the communal workshops, the network of teachers of teachers, and its e-learning platform to extend Lesson Study in the country.

Recommendations to universities were to include Lesson Study and Solving Problem Approach systematically in pre-service teacher training, to develop agreements with municipal corporations and to integrate Lesson Study in their research and extension programs.

References

- Mondaca, A. & Cvitanic, C. (2006). "Acerca de los métodos pedagógicos en matemáticas de Japón y sus posibles aplicaciones en Chile" Universidad de La Serena. National conference of mathematics education. SOCHIEM. In www.sochiem.cl/jornadas2006/ponencias/30.pdf
- Isoda, M., Arcavi, A. y Mena, A. (2007) El Estudio de Clases japonés en matemáticas. Valparaíso. Ediciones Universitarias de Valparaíso.
- Isoda, M. & Olfos, R. (2009). El enfoque de resolución de problemas en la enseñanza de la matemática a partir del estudio de clases. Valparaíso. Ediciones Universitarias de Valparaíso.
- Navarro S. (2009). Coordinación de grupos para el aprendizaje en el contexto de implementación de la estrategia de Estudio de Clases en la Escuela. CPEIP conference. Not published. MINEDUC.