

Country Name	Project for the Improvement of the Quality of Lower Secondary Mathematics Education
Republic of Guatemala	

I. Project Outline

Background	The results of the National Program for the Evaluation of Learning Achievement (PRONERE) conducted in 2001 revealed that students' proficiency levels were generally low. JICA implemented a series of technical cooperation such as the dispatch of volunteer teams (2002-2005), technical cooperation projects ¹ (2006-2012), and the dispatch of an expert (2013-2015). The study by the Latin American Laboratory for the Assessment of Quality in Education and UNESCO in 2013 showed an improvement in performance in elementary education compared to the previous study (2006). In secondary education, however, national textbooks and teacher's manuals for mathematics were not yet available. The old teacher-led approach to mathematics education, based on teacher training programs, was still in place, and this was becoming an issue.				
Objectives of the Project	By developing the student's textbooks and the teacher's guides of mathematics for all three grades of the lower secondary education program consistent with elementary education, strengthening the induction training system for teachers, and introducing the guide for the specialist mathematics courses in the teacher training course, the project aims at introducing educational activities in accordance with the updated mathematics curriculum in lower secondary education, thereby contributing to the implementation of educational activities in accordance with the curriculum.				
	<ol style="list-style-type: none"> Overall Goal: Education activities in accordance with the updated mathematics curriculum are implemented in lower secondary education. Project Purpose: Education activities in accordance with the updated mathematics curriculum are introduced in lower secondary education. 				
Activities of the Project	<ol style="list-style-type: none"> Project site: Whole country. Main activities: Preparation of the annual study plan and the learning unit plan, development of the student's textbooks and the teacher's guides, design of the induction training contents, development of the guide for the specialist mathematics courses in the teacher training course, etc. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Japanese Side 1) Experts: 6 persons 2) Trainees received in Japan: 6 persons 3) Trainees received in the third country (El Salvador): 13 persons 4) Equipment: PC, copy machines, projector, etc. 5) Local cost for hiring local consultants, etc. </td> <td style="width: 50%; vertical-align: top;"> Guatemalan Side 1) Staff allocated: 21 persons 2) Office space, meeting space, etc. 3) Local cost for printing students' textbooks and teacher training expenses, etc. </td> </tr> </table> 			Japanese Side 1) Experts: 6 persons 2) Trainees received in Japan: 6 persons 3) Trainees received in the third country (El Salvador): 13 persons 4) Equipment: PC, copy machines, projector, etc. 5) Local cost for hiring local consultants, etc.	Guatemalan Side 1) Staff allocated: 21 persons 2) Office space, meeting space, etc. 3) Local cost for printing students' textbooks and teacher training expenses, etc.
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Project Period	(ex-ante) January 2017 to July 2019 (30 months) (actual) December 2016 to August 2019 (33 months)	Project Cost (Japanese side only)	(ex-ante) 210 million yen (actual) 227 million yen		
Implementing Agency	Ministry of Education (MINEDUC), Training School for Secondary Education Teachers of San Carlos University (EFPEM/USAC)				
Cooperation Agency in Japan	Koei Research & Consulting, Inc.				

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

[Confirmation of the achievement of Indicator 1 of the Overall Goal]

- Indicator 1 of the Overall Goal was "utilization of the methodology developed by the project for mathematics of lower secondary education." To verify the utilization of the methodology, it was confirmed whether the mathematics classes were conducted with the use of the teacher's guide and student's textbook developed by the project.

[Confirmation of the achievement of the Super Goals]

- In the project, the following Super Goals were set. In the ex-post evaluation, these were verified as long-term impacts.
 - The academic performance in mathematics in lower secondary education is improved. (Indicator: Improvement of students' results in mathematics in lower secondary education.)
 - Cooperation as to didactics in mathematics is promoted at the regional level. (Indicator: Participation in the Regional Seminars of the Regional Project in Mathematics (at least twice).

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Guatemala at the Time of Ex-Ante Evaluation >

In the "General Government Policy" (2016-2020), the education sector was positioned as a priority area, as increasing schooling years would lead to national development, improved health indicators, and increased productivity. In addition, the Ministry of Education's "Strategic Plan for Education" (2016-2020) listed action policies for rebuilding secondary education. The project was consistent with the development policy of Guatemala at the time of ex-ante evaluation.

<Consistency with the Development Needs of Guatemala at the Time of Ex-Ante Evaluation >

MINEDUC's 2013 survey of math achievement showed that only 18.4% of ninth-grade students met the standard. The old teacher-led approach to mathematics education was pointed out as an issue. The project was consistent with the development needs of Guatemala at the

¹ Project for Improvement of Mathematics Education Phase 1 (2006-2009), Phase 2 (2009-2012).

time of ex-ante evaluation.

<Appropriateness of Project Design/Approach>

No problem attributed to the project design/approach was confirmed. The project design/approach was appropriate.

<Evaluation Result>

In light of the above, the relevance of the project is ③².

[Coherence]

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

One of the priority areas in the assistance for Guatemala was social and economic development in poor areas³. In this connection, assistance for social development (health, sanitation, education, etc.) and economic development were listed in areas where many poor and indigenous people lived. The project was consistent with Japan's ODA policy to Guatemala at the time of ex-ante evaluation.

<Collaboration/Coordination with JICA's other interventions>

The collaboration/coordination between the project and the "Central American Regional Cooperation in Mathematics Education" (ESMATE) of JICA was planned at the time of ex-ante evaluation and implemented, the positive effects were confirmed at the time of ex-post evaluation. USAC participated in several workshops in El Salvador in person and online for information sharing. Besides, during the project period, JICA volunteers used the textbooks developed by the project to motivate the use of the textbooks in the class.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with other donors was not clearly planned at the time of ex-ante evaluation or during the project period.

<Evaluation Result>

In light of the above, the coherence of the project is ③.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>

At the time of project completion, the Project Purpose was achieved as planned. The student's textbooks and teacher's guides of lower secondary education were developed. The materials were distributed during the introduction training to not only the National Institutes of Basic Education (INEB) in the focused areas but also all INEBs in the country (Indicator 1). In addition, the guide for the specialist mathematics courses in the teacher training course for lower secondary education was prepared and introduced in the semesters in 2019 in the Training School for Secondary Education Teachers (EFPEM) of San Carlos University (USAC) (Indicator 2).

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

By the time of the ex-post evaluation, the project effects have been continued. The student's textbooks and teacher's guides introduced by the project have been still utilized, although both have not been regularly reviewed and revised for reconsideration of the mathematics curriculum, because of the lack of human resources. A consultant has worked on this task at the General Directorate of Management of Education Quality. At the time of ex-post evaluation, the consultant was working on the revision of materials of the primary education, and it was expected she/he would move to work for those of the lower secondary education. The guide for the specialist mathematics courses in the teacher training course for lower secondary education introduced by the project has been effective, too.

<Status of Achievement of the Overall Goal at the Time of Ex-Post Evaluation>

At the time of ex-post evaluation, the Overall Goal has been achieved as planned. The methodology developed by the project for lower secondary education has been utilized, as both of the student's textbooks and teacher's guides developed by the project have been utilized in the mathematics classes (Indicator 1). In addition, the guide for the specialist mathematics courses has been utilized in the teacher training course for lower secondary education (Indicator 2). These materials have been utilized as digital versions.

<Other Impacts at the Time of Ex-Post Evaluation>

Firstly, according to MINEDUC, the achievement of the students in mathematics in lower secondary education has been improved, although the detailed results were not available. Secondly, the guides developed by the project have been diffused to all campuses of the Landivar University and USAC. In addition, the textbooks have been utilized in Cooperative Institutes (lower secondary schools), as JICA Guatemala Office donated 150,000 textbooks to 1,054 institutes in all of the 22 departments of the country. During the COVID-19 pandemic, many students moved from private schools to cooperative institutes due to the financial reasons, and such students have been benefited. Thirdly, the network with neighboring countries have continued. In 2022, MINEDUC invited two professors from the Ministry of Education of El Salvador and also school teachers to exchange experiences, and in 2023, staff of JICA Guatemala Office and volunteers visited El Salvador to learn the progress of mathematics education.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ③.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results	Source
(Project Purpose) Education activities in accordance with the updated mathematics curriculum are introduced in lower secondary education.	Indicator 1: Introduction of the student's textbooks and teacher's guides prepared by the project in mathematics of lower secondary education.	Status of the Achievement (Status of the Continuation): achieved as planned (continued) (Project Completion) ● The national materials-introduction training was implemented to INEB teachers by MINEDUC, and the student's textbook and teacher's guide were provided to not only INEBs in the focused areas but also all INEBs. A total of 174,327 textbooks were distributed in 776 INEBs. (Ex-Post Evaluation)	PCR, MINEDUC, EFPEM.

² ④ : very high, ③ : high, ② : moderately low, ① : low

³ ODA Country Data Collection (2015).

		<ul style="list-style-type: none"> The student's textbooks for lower secondary education prepared by the project have been officially effective. In 2022, a total of 217,226 textbooks were distributed in schools of all categories of secondary education (INEB, Program for Expanding and Improving Secondary Education, and Family Education Center for Development). The teacher's guides for lower secondary education prepared by the project have been officially effective. 	
	Indicator 2: Introduction of the guide for the specialist mathematics courses in the teacher training course for lower secondary education.	Status of the Achievement (Status of the Continuation): achieved as planned (continued) (Project Completion) <ul style="list-style-type: none"> The use of the professor's guide in the Mathematics Teaching courses was mentioned in the program in the first and second semesters of 2019. (Ex-Post Evaluation) <ul style="list-style-type: none"> The professor's guide for the specialist mathematics courses in the teacher training course for lower secondary education has been officially effective. 	PCR, EFPEM.
(Overall Goal) Education activities in accordance with the updated mathematics curriculum are implemented in lower secondary education.	1. Utilization of the methodology developed by the project for mathematics of lower secondary education	Status of the Achievement: Achieved as planned. (Ex-Post Evaluation) <ul style="list-style-type: none"> The mathematics classes have been conducted at lower secondary schools with the use of the teacher's guide and the student's textbook developed by the project. 	MINEDUC, EFPEM.
	2. Utilization of the guide for the specialist mathematics courses in the teacher training course for lower secondary education.	Status of the Achievement: Achieved as planned. (Ex-Post Evaluation) <ul style="list-style-type: none"> The professor's guide for the specialist mathematics courses has been utilized in the teacher training course for lower secondary education. 	MINEDUC, EFPEM.

3 Efficiency

Both the project cost and the project period slightly exceeded the plan (the ratio against the plan: 108% and 110%, respectively), due to the combined factors. Outputs were produced as planned.

	Project Cost (Japanese side only, yen)	Project Period (months)
Plan (ex-ante)	210 million yen	30 months
Actual	227 million yen	33 months
Ratio (%)	108%	110%

In the light above, the efficiency of the project is ③.

4 Sustainability

<Policy Aspect>

Mathematics education and teacher training were prioritized in the "Institutional Strategic Plan" (2020-2024) of MINEDUC.

<Institutional/Organizational Aspect>

There has not been a change in the organizational structure to promote the mathematics curriculum and material development, and the Department Directions have been in charge of disseminating the materials. MINEDUC answered that the structure would likely be sustained. MINEDUC has not had sufficient personnel for the revision, preparation of materials, and supervision of mathematics teachers. Several consultants who had worked for the project have been temporarily hired for these actions.

<Technical Aspect>

MINEDUC and EFPEM of USAC answered in the ex-post evaluation that their personnel have sustained sufficient skills and knowledge to promote the mathematics material development. MINEDUC, in collaboration with USAC, has implemented the Academic Program for Professional Development through which teachers of mathematics and communication in secondary education have been trained, although this program has not been institutionalized. The program has utilized the textbooks and methodology developed by the project. This was evidence of MINEDUC and USAC's have skills and knowledge to sustain the project effects. As mentioned earlier, the materials (teacher's guides, student's textbooks, and professor's guides) have been used.

<Financial Aspect>

Although MINEDUC has had a budget to distribute textbooks to all secondary education schools, MINEDUC and USAC have not continuously secured the necessary budget for the mathematics curriculum and material development. The reason for the budget shortage and prospects could not be confirmed in the ex-post evaluation. However, as MINEDUC has contracted a consultant for the material revision as stated earlier, it could be presumed that a certain budget has been assigned.

<Environmental and Social Aspect>

No issue on environmental and social aspects has been observed, and it has not been necessary to take any countermeasures.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the institutional and financial aspects of the implementing agency. Therefore, the sustainability of the project effects is ③.

5 Summary of the Evaluation

The project achieved the Project Purpose as planned which was to introduce the educational activities in accordance with the updated mathematics curriculum in lower secondary education. The materials developed by the project as the curriculum have been effective, and they have been still utilized as planned (Overall Goal). Regarding sustainability, although there has been an issue of budget shortage, the organizational structure and the technical level for the curriculum and material development have been mostly sustained.

Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- Some materials including the guide for the specialist mathematics courses have been digitalized. However, these cannot be easily reachable for students who cannot afford a computer or tablet and students who live in areas where internet access is limited. It is recommended to MINEDUC to distribute the printed materials to such students.
- It is recommended to confirm the current status of the ex-trainees of JICA training on mathematics of the secondary education level and utilize their knowledge and experience as resource persons for curriculum and material revision and teacher training depending on their expertise and availability.
- Before the contract of the temporal consultants for the revision, preparation of materials, and supervision of mathematics teachers, MINEDUC should make sure that there should be new personnel to take over the consultants' work and know-how to continue these tasks.

Lessons Learned for JICA:

- In the ex-post evaluation, no case was confirmed in which ex-trainees of JICA training have been directly engaged in promoting the curriculum and material development of mathematics, although a certain number of Guatemalan personnel had participated in the past training. Most of them had changed their work, retired or completed their contract. To respond this situation, JICA Guatemala Office updated the list of the ex-trainees to identify resource persons whom it could ask for support. Also, the office asked JICA volunteers to recommend teachers with high teaching skills for the purpose of developing a database. In the project formulation and implementation phases, it is important to investigate the human resources which had been developed by the past JICA training (number, area, etc.) and support the implementing agency for the utilization of such human resources as much as possible.
- It is important to continue monitoring the continuity of the project effects especially when the administrative change is coming near because the project outputs might not be handed over properly to the next administration, even if the project was considered successful by the preceding administration. It is necessary for JICA country office to communicate with the new administration and explain the importance of the project effects on the beneficiaries so that the necessary budget and personnel could be assigned.



A Volunteer teaching mathematics to students with the textbooks
(Department of Quiché, Chinique city)



Distribution of mathematics textbooks at the time of project completion with participation of the Vice President, Vice Minister of MINEDUC and Ambassador of Japan at the National Palace