Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Mexico Office: February, 2019

Country Name	Project for Human Resource Development in the Technology of Plastic Transformation
United Mexican States	

I. Project Outline

Background	In Mexico, the number of companies in the field of plastic transformation amounted to approximately 3,500, most of which were classified as small and medium-sized enterprises (2005). These companies had difficulties in recruiting qualified workers because skilled labor forces, especially supervisors, were in short supply. The Technological Industrial and Service Studies Centers (CETIS) and the Technological Industrial and Service High School Centers (CBTIS), which were expected to provide potential supervisors in the industrial sector, had neither a specific course nor qualified instructors on the plastic injection molding technology. Under these circumstances, a request by the Government of Mexico was made to the Government of Japan to establish the plastic injection molding technology course at CETIS/CBTIS.		
Objectives of the Project	Through curriculum development of the training courses on the plastic injection molding technology, capacity building of instructors, training of teachers of the model centers, the project aimed at improving capacity of the National Actualization Center for Teachers (CNAD) for training instructors of the plastic injection molding technology of CETIS/CBTIS, thereby contributing to increase in the quality labor force for the plastic industry in Mexico.		
	1. Overall Goal: CETIS/CBTIS which set up the course of the plastic transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico. 2. Project Purpose: The capacity to train the instructors of the plastic injection molding technology in CETIS/CBTIS is improved at CNAD.		
Activities of the project	Project site: Mexico City, Ciudad Victoria (Tamaulipas) and Tijuana (Baja California) 1. Main activities: training of CNAD instructors on the plastic injection molding technology, development of the training curriculum, training of CETIS/CBTIS teachers on the plastic injection molding technology, revision of the curriculum of CETIS/CBTIS for the plastic molding course, etc. 2. Inputs (to carry out above activities) Japanese Side 1) Experts from Japan: 6 persons 2) Training in Japan: 9 persons 3) Equipment: training equipment, etc. 4) Local cost: Cost for hiring local persons, travel expenses, communication, etc. Mexican Side 1) Staff allocated: 15 persons 2) Land and facilities: Office space, etc.		
Project Period	October 2010 to October 2014	Project Cost	(ex-ante) 448 million yen, (actual) 518 million yen
Implementing Agency	General Direction of Technological and Industrial Education (DGETI), National Actualization Center for Teachers (CNAD)		
Cooperation Agency in Japan	Japan Development Service Co., Ltd.		

II. Result of the Evaluation

<Special perspectives considered at the ex-post evaluation>

[Verification of project effects at the time of ex-post evaluation]

- Three indicators were established to verify achievement and continuation of the Project Purpose at the ex-ante evaluation. To verify continuity of the project effects at the time of the ex-post evaluation, the Indicator 2 (course operation based on the needs of the industry sector) and the Indicator 3 (result of the final examination of the course participants) were used, while the Indicator 1 (capacity building of the instructors) was confirmed as part of the technical aspect of sustainability.

1 Relevance

<Consistency with the Development Policy of Mexico at the time of ex-ante evaluation and project completion>

One of the five pillars in the "National Development Plan 2007-2012" was competitive economy and employment creation, and in the "National Development Plan 2013-2018," it was expected that the education sector would be linked with science technology and industry sectors. Thus, the project was consistent with Mexico's development policies, at both the ex-ante evaluation and the project completion.

<Consistency with the Development Needs of Mexico at the time of ex-ante evaluation and project completion>

The quantity and quality of produced plastic parts were not sufficient to cover their consumption in the country, and most of the parts were inevitably dependent on imports. The number of plastic molding enterprises was increasing, and supply of skilled labor forces were needed. Thus, the project was consistent with Mexico' development needs as well.

<Consistency with Japan's ODA Policy at the time of ex-ante evaluation>

Bilateral agreements on technical cooperation were made after 1986, and one of the priority areas was industry promotion (strengthening of competitiveness of small and medium-sized enterprises (SMEs) and supporting industries) at the time of the ex-ante evaluation[1].

<Evaluation Result>

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

2 Effectiveness/Impact

[1] Ministry of Foreign Affairs (2011). "ODA Databook 2010."

<Status of Achievement for the Project Purpose at the time of Project Completion>

The Project Purpose was achieved. At CNAD, nine instructors acquired equivalent skills to the second grade of plastic injection molding technical certificate in Japan (Indicator 1), and three passed even the first grade-equivalent test. CNAD strengthened its capacity for management of the course on the plastic injection molding technology (Indicator 2); it conducted courses based on the developed curriculum which consisted of five modules, and course evaluation was feedback for the next courses. And, CNAD trained 20 teachers of the model CETIS/CBTIS (Indicator 3).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have continued. CNAD revised the curriculum in 2017, adding thermoforming and rot molding in the Module IV, and it has continued courses. Since 2015, a total of 85 teachers of the model CETIS/CBTIS have completed the courses. Among the three CETIS/CBTIS, all of the teacher who completed were trained at CNAD during the project period have continued working as teachers at two CETIS/CBTIS (6 teachers at each school). At one CBTIS, two out of the six trained teachers have continued teaching, while others have got managerial responsibilities, but two have been newly trained at CNAD. At two CETIS/CBTIS, they have sustained in-company training in collaboration with private enterprises. At one CBTIS, there has been no in-company training, since there is no such company in the city.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

It is judged that the Overall Goal has been mostly achieved considering the following situations comprehensively. Less than 30% of graduates from the plastic transformation technology course has obtained Técnico with completion of in-company training (Indicator 1). However, this is because that since 2015, in-company training has not been compulsory requisite for student if they have more than 80% in their final examination. Another reason is that there are no plastic-related enterprises in the city where one of the three model CETIS/CBTIS (CBTIS 271) is located[2]. Graduates from CBTIS 271 have got employed in other cities. Less graduates from the plastic transformation technology course of the model CETIS/CBTIS got employed in the plastic industry than targeted (Indicator 3), because more graduates have preferred to proceed to the university and continued studies related to the plastic industry (Indicator 4) as they and their parents want to pursue a professional career. Thus, regardless careers after CETIS/CBTIS, all have chosen those related to the plastic industry. Regarding expansion of plastic transformation technology courses, one of the model CETIS/CBTIS have started two new courses, and six non-model CETIS have opened courses by learning the curriculum of the model CETIS/CBTIS, attributed to CNAD's efforts which trained 27 core instructors including teachers of the model CETIS/CBTIS who train other instructors and teachers on the plastic injection molding technology.

<Other Impacts at the time of Ex-post Evaluation>

First, according to the teachers of the interviewed model CETIS/CBTIS, students have become more conscious about the environment by understanding plastics and practicing recycle and reuse of plastic bottles and other materials. Second, there have been more enrollment of female students, though there used to be mostly male students before the project. Female students who entered in the plastic transformation technology course shared the importance of the courses with students around themselves, since the topic is related to the environment and familiar to them. As a female student of the plastic transformation course of CBTIS 271 got a scholarship to study at a university in Guanajuato State, nowadays more female students consider that they can continue the study even in a different state, according to CBTIS 271. Third, CNAD has shared and extended the project experience by supporting SMEs in JICA "Project for Automotive Supply Chain Development" (2012-2015) and by providing technical advices for JICA "Project for Human Resource Development for the Automotive Industry in El Bajio of Mexico" (2015-2020).

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Achievement of the Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) The capacity to train the instructors of the plastic injection molding technology in CETIS/CBTIS is improved at CNAD.	1. 9 instructors whose skill level is equivalent to Japanese second grade of plastic injection molding technical certificate are trained at CNAD.	Status of achievement: Achieved. (Project Completion) - Nine instructors passed the final evaluation test equivalent to the Japanese second grade of plastic injection molding technical certificate.
	2. The plastic injection molding technology course at CNAD is managed according to the needs of the plastic industry.	Status of achievement: Achieved (Continued). (Project Completion) - The curriculum with five modules was confirmed as relevant with needs of the industry sector by CVCC. Training courses were conducted based on the curriculum and each time evaluated for improvement of the next course. - Module I: Prepare materials for molding - Module II: Mold plastic by the extrusion process - Module III: Mold plastic by the injection process - Module IV: Mold plastic by the thermoset process - Module V: Prepare mold and dies for plastic transformation process (Ex-post Evaluation) - The curriculum was revised in 2017 and has been effective. The course has been evaluated each time for giving feedback to the next course. - Training courses on the molding technology for teachers of CETIS/CBTIS have been sustained.
	3. 18 teachers of the model CETIS/CBTIS are trained and pass the final evaluation at	Status of achievement: Achieved (Continued). (Project Completion) - A total of 20 teachers of the model CETIS/CBTIS completed the modules I, III

[2] Since there is a large industry of polymer in Tampico Port in Tamaulipas State, it had been expected that plastic transformation enterprises would be established. However, because of security issues, no enterprise has been established until August 2018.

<table>
<tr><td></td><td>CNAD.</td><td>and V and passed the final evaluation.
(Ex-post Evaluation)
- Out of 18 teachers of the model CETIS/CBTIS who took modules of the plastic injection molding technology course at CNAD during the project period, 14 have continued working as teachers as of May 2018. Four teachers have been newly trained at CNAD.</td></tr>
<tr><td rowspan="4">(Overall goal)
CETIS/CBTIS which set up the course of the plastic transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico.</td><td>1. 60% of the graduates from the plastic transformation technology course in CETIS/CBTIS obtain Técnico [3] with completion of in-company training.</td><td><u>Status of achievement: Unverified.</u>
(Ex-post Evaluation)
- There percentage of graduates from the plastic transformation technology course who obtained Técnico with completion of in-company training has not reached the target (60%). In-company training has not been compulsory.
<table><tr><td></td><td>2015</td><td>2016</td><td>2017</td></tr><tr><td>CBTIS 237</td><td>24%</td><td>26%</td><td>29%</td></tr><tr><td>CBTIS 271</td><td>0%</td><td>0%</td><td>0%</td></tr><tr><td>CETIS 06</td><td>14%</td><td>12%</td><td>10%</td></tr></table></td></tr>
<tr><td>2. At least 6 plastic transformation technology courses or classes in CETIS/CBTIS are increased.</td><td><u>Status of achievement: Achieved.</u>
(Ex-post Evaluation)
- Since 2015, a total of 8 classes on the plastic transformation technology has been newly started in 7 CETIS/CBTIS.</td></tr>
<tr><td>3. 25% of the graduates from the plastic transformation technology course in CETIS/CBTIS are employed in plastic industry.</td><td><u>Status of achievement: Not achieved.</u>
(Ex-post Evaluation)
- The percentage of graduates from the plastic transformation technology course who got employed in the plastic industry has not reached the target (25%).
<table><tr><td></td><td>2015</td><td>2016</td><td>2017</td></tr><tr><td>CBTIS 237</td><td>10%</td><td>10%</td><td>10%</td></tr><tr><td>CBTIS 271</td><td>5%</td><td>5%</td><td>5%</td></tr><tr><td>CETIS 06</td><td>10%</td><td>10%</td><td>10%</td></tr></table>Note: Official data were not available. Given data were based on the interview survey with graduates of each school on their desired career after graduation.</td></tr>
<tr><td>4. 50% of the students enrolling in university from the plastic transformation technology course in CETIS/CBTIS proceed to faculty/department of university related to plastic industry.</td><td><u>Status of achievement: Achieved.</u>
(Ex-post Evaluation)
- The percentage of graduates from the plastic transformation technology course who proceeded to the faculty/department of university related to the plastic industry has exceeded the target (50%).
<table><tr><td></td><td>2015</td><td>2016</td><td>2017</td></tr><tr><td>CBTIS 237</td><td>90%</td><td>90%</td><td>90%</td></tr><tr><td>CBTIS 271</td><td>95%</td><td>95%</td><td>95%</td></tr><tr><td>CETIS 06</td><td>90%</td><td>90%</td><td>90%</td></tr></table>Note: Official data were not available. Given data were based on the interview survey with each school.</td></tr>
</table>

Source: Project Completion Report and information provided by CETIS/CBTIS.

3 Efficiency

Although the project period was as planned (ratio against the plan: 100%), the project cost exceeded the plan (ratio against the plan: 116%). Outputs were produced as planned. Therefore, the project efficiency is fair.

4 Sustainability

<Policy Aspect>

Development of human resources for the plastic industry is prioritized in the "National development plan 2012-2018" and the "Educational Reform" (2013) which set quality education in which all courses are to be based on the country necessities and put emphasis on capacity development of teachers.

<Institutional Aspect>

CNAD has sustained its status as a national training institute in 40 different courses on mechatronics, mathematics, electronics, etcetera, with 18 permanent instructors including six who teach plastic injection molding technology courses. The Sectorial Coordination of Academic Development has been responsible for reviewing the curriculum. Since the project completion, CNAD has provided only one SME nearby with technical support. According to CNAD, the number of the instructors has been sufficient to manage plastic injection molding technology courses, although consultancy services for SMEs have been limited due to the personnel shortage. Development of the database for follow-up of graduates had been expected before the project completion. However, privacy protection has become stricter than that time due to the government policy, and therefore the database has not been established.

<Technical Aspect>

It has been judged that CNAD has sustained sufficient skills for training teachers on the plastic injection molding technology, as CNAD has taken responsibility for training teachers of 456 technical schools under DGETI and also 400 schools under another system, the National College of Professional and Technical Education. CONALEP has sustained the system of revision of the curriculum and evaluation of the instructors. When new instructors join CNAD, they are trained on instruction techniques.

<Financial Aspect>

Financial data of CNAD were not available at the ex-post evaluation. According to CNAD, same budgets have been allocated from DGETI since the project completion, and they have been sufficient at least for course operation. It is mentioned that more budgets would be allocated to CNAD in the new president's statement in 2018.

[3] Técnico is the degree which is obtained when completing the secondary level-technical education (professional technical bachelor)

<Evaluation Result>

Therefore, the sustainability of the effects is high.

5 Summary of the Evaluation

The Project Purpose was achieved and the effects have continued. CNAD strengthened its capacity of managing courses on the plastic injection molding technology, as it developed training modules, trained instructors and conducted course for model CETIS/CBTIS. Since the project completion, trained CETIS/CBTIS have sent most graduates to the related faculty/department of the university, which has been more favored than directly getting employed. Regarding sustainability, CNAD has sustained the organizations structure, techniques and budges for course management. As for efficiency, the project cost exceeded the plan.

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

III. Recommendations & Lessons Learned

Recommendations for Implementing agency:

- It is recommended to CNAD to train more instructors for providing consultancy services for SMEs. Through the services, CNAD could understand latest needs of the industry sector and reflect the curriculum. Also, it could collect service fees.
- Instead of the database development, it is recommended to CNAD to conduct questionnaires for students when they graduate to ask which career they would pursue. Even though the data accuracy may not be high, it is not very difficult to understand the situation by getting answers electronically.

Lessons Learned:

- CNAD has extended the project experience with other JICA projects and other organizations, by sharing the training curriculum and techniques and by sending its instructors for providing technical advices. This has been realized mainly because JICA Mexico Office, based on the accumulated lessons from similar projects, facilitated communication among JICA projects and related organizations. In order to disseminate developed techniques and experiences of a project with another, JICA country offices should understand lessons from similar projects and share the lessons with ongoing JICA projects at the project formulation and implementation phases, so that they could contact other projects and related organizations for technical exchanges.

Students receiving the practical lesson on the plastic injection molding technology (CETIS 6, Mexico City)

Six teachers trained by CNAD instructors under the project (CBTIS 237, Tijuana)