

The Summary of Terminal Evaluation

1. Outline of the Project		
Country: Kingdom of Cambodia		Project Title: The Project for Educational Capacity Development of the Institute of Technology of Cambodia
Issue/Sector: Higher Education		Cooperation Scheme: Technical Cooperation
Division in Charge: Technical and Higher Education Team, Human Development Department		Total Cost (at the time of Terminal Evaluation): 271million yen
Period of Cooperation	October 2011 – October 2015 (Scheduled for 4 years)	Partner Country’s Implementation Organization: Ministry of Education, Youth and Sports (MoEYS) and Institute of Technology of Cambodia (ITC)
		Supporting Organization in Japan: Tokyo Institute of Technology, Kyushu University, Hokkaido University, Waseda University and Doshisha University, Kyoto University, Meisei University, Hiroshima University Other Related Cooperation: The Project for Improvement of Facility and Laboratory Equipment in the Institute of Technology of Cambodia (Grant aid), The Project for the Improvement of Educational Equipment of the Department of Geo-Resources and Geotechnical Engineering of the Institute of Technology of Cambodia (Cultural grant aid), Southeast Asia Engineering Education Development Network (AUN/SEED-Net) Project (Technical Cooperation)

1-1 Background of the Project

Although the agriculture, forestry and fisheries sector shares as high as 32% in GDP of Cambodia, the industrial sector shares only 22%, and the major industries are limited to garment and construction industries. Since 2010, Japanese companies including manufacturing companies have accelerated extending its operations to Cambodia, and the Royal Government of Cambodia has aimed to diversify its industries by expanding the manufacturing using those foreign investments for sustainable economic growth of Cambodia. On the other hand, the foreign companies including Japanese companies have pointed out the shortage of engineers, who have practical skills to design, manage and identify the problems of the production lines.

Institute of Technology of Cambodia (ITC) is regarded as the top university in Cambodia to train these engineers. Since 2003, JICA has carried out “Southeast Asia Engineering Education Development Network (AUN/SEED-Net) Project” and ITC has functioned as its member university. However, since the gap for the level of education and research activity in the universities of the ASEAN 10 countries are large, the importance of supporting ITC is recognized to improve its curriculum introducing practice and experiments. Under these circumstances, JICA launched “the Project for Educational Capacity Development of the Institute of Technology of Cambodia” (hereinafter, “the Project”) in October, 2011 for the period of 4 years with the purpose of strengthening the educational capacity of the Department of Electrical and Energy Engineering (GEE), the Department of Industrial and Mechanical Engineering (GIM) and the Department of Geo-resources and Geotechnical Engineering (GGG). In the Project, ITC and Ministry of Education, Youths and Sports

(MoEYS) have worked as Counterparts (C/P) and JICA has assisted the practical education of ITC, improving its coursework and teaching methods of the academic staff by dispatching Chief Advisor (short-term), Project Coordinator (long-term) and Japanese professors (short-term) from supporting universities, and by providing C/P with the training in Japan and with related equipment.

In November, 2013, the Mid Term Review was conducted and it was confirmed that the Project had been working favorably. However, some challenges were pointed out such as sharing information on planning and activities among people concerned, the system for equipment management, and the contents of the training in Japan. Therefore the Project has been implemented paying attention to these challenges. Before the completion of the Project in October, 2015, the Terminal Evaluation was carried out to assess the outcome and achievements of the Project and to identify the challenges of the Project to be tackled during the remaining period.

1-2 Project Overview

Outline of the Project

With the purpose of introducing practical education in ITC, Chief Advisor and Japanese professors from the supporting universities assist ITC by improving the coursework and teaching method of the academic staff. The activities are conducted in ITC or in Japan, and the equipment provided by the Project is also utilized for the improvement of the coursework.

(1) Overall Goal

Graduates with stronger practical skills are developed by the target departments of ITC.

(2) Project Purpose

The quality of education is improved with more emphasis on practices and experiments at the target departments of ITC as a leading university.

(3) Outputs

1. Coursework in the target departments is improved with more practices and experiments.
2. Teaching method of academic staff is enhanced to conduct practice-oriented education.
3. Equipment for experiments is properly utilized for practice and experiment.

(4) Inputs

【Japanese side】

Total costs: JY 271 million

Short-term Experts: A total of 37 experts (1 Chief Advisor, 10 experts for GEE, 13 experts for GIM, 13 experts for GGG, in total 50.8 M/M)

Long-term Expert: 1 Project Coordinator (40.4 M/M)

Training in Japan: 43 counterparts (15 from GEE, 15 from GIM, 13 from GGG)

Equipment: JY131 million worth equipment by the Project

Operation cost: JY16,388,000 (excluding the equipment)

【Cambodian side】

Counterpart: 3 counterparts at the managerial level and 65 teachers and staff in 2014/2015 (24 from GEE, 26

<p>from GIM, 15 from GGG) <u>Facility:</u> Office space for experts <u>Operational cost:</u> USD 970,120</p>		
<p>2 Terminal Evaluation Team</p>		
<p>Members of Terminal Evaluation Team</p>	<p>Japanese side:</p> <ol style="list-style-type: none"> 1) Team Leader: Mr. Daisuke UEDA, Director, Technical and Higher Education Team, Higher Education and Social Security Group, Human Development Department, JICA 2) Engineering Education: Dr. Koichiro WATANABE, Professor, Faculty of Engineering, Kyushu University 3) Cooperation Planning: Ms. Harue TOMINO, Program officer, Technical and Higher Education Team, Higher Education and Social Security Group, Human Development Department, JICA 4) Evaluation Analysis: Ms. Yuko Ogino, Senior Consultant, KRI international Corp. <p>Cambodian side:</p> <ol style="list-style-type: none"> 1) H.E. Dr. Youk NGOY, Secretary of State, Ministry of Education, Youth and Sport 2) Dr. Romny OM, Director General of ITC 3) Mr. Norith PHOL, Deputy Director of ITC 	
	<p>Period</p>	<p>From June 3 to 12, 2015</p>
<p>3 Results of Evaluation</p>		
<p>3. Results of Evaluation</p>		
<p>3-1 Achievement of the Project</p>		
<p>(1) Output</p>		
<p>Output 1 has been nearly achieved.</p>		
<p><u>Indicator 1.1.: The ratio of practices and experiments to lectures in coursework increases.</u></p> <p>As the ratio of the practices and experiments to lectures was not surveyed at the beginning of the Project, the extent of increase of the ratio is difficult to find out. However, according to the heads of the target departments and the teaching staff, after the equipment is provided, the subjects in which the new equipment is utilized have more hours of practices and experiments. Accordingly, it can be said that the ratio of practices and experiments to lectures in the coursework increased. (Hours increased for GEE are 174 per year, for GIM 144 per year, and for GGG 112 per year.)</p>		
<p><u>Indicator 1.2.: The number of students per equipment decreases.</u></p> <p>The number of students per equipment has been decreased (though the number depends on the department and equipment, approximately 5 to 6 students use 1 equipment and the microscopes used in GGG are allocated to smaller number of students). It is also confirmed that the equipment of the 3 target departments are utilized without any defects and without particular problems of high ratio of students per equipment.</p>		
<p><u>Indicator 1.3.: 100% of the subjects in which new equipment is installed is improved with more practices and experiments.</u></p> <p>100 % of the subjects, in which new equipment is installed, is improved with more practices and</p>		

experiments and the increased hours are 143 on average. The revised curriculums of the 3 departments were approved officially and have been implemented.

Indicator 1.4.: 100% of the student laboratory manuals for the above improved subjects is drafted.

100% of necessary student laboratory manuals been drafted by faculty of each department. Some of them are under review by Japanese professors, which will be completed by the end of the Project.

Output 2 has been mostly achieved.

Indicator 2.1.: Model teaching conducted by the Japanese and/or ASEAN country experts are shared and applied to their teaching among the teaching staff of the target departments.

Indicator 2.2.: The lessons learned from the knowledge and skills of the training participants in Japan are shared with the other members of the target departments.

The knowledge from the model teaching and training in Japan has been shared among the teaching staff in the departmental regular meetings and presentation sessions organized by faculty members as part of faculty development (FD) activities (FD activities: activities to enhance the knowledge and quality of the teachers. For example, workshop, training programs and so on to improve the contents of the classes). With regards to their application to their teaching, it is not possible to evaluate the status of application by the experts because of their limited numbers and duration of visits. However, according to the interviews to Chief Advisor, Chairman of Project Support Committee, ITC teachers (3 from GEE, 2 from GIM, 3 from GGG) and students (3 from GEE, 5 from GIM, 4 from GGG), the following improvements are confirmed:

- Improved coursework with more practices and experiments is implemented based on the revised curriculum framework
- Number of subject/topics that can be taught by lecturers increased.
- Students are inspired by improved teaching methods

Output 3 has been already achieved.

Indicator 3.1.: The survey on the conditions and utilization of the equipment and consumable supplies and materials is implemented by each department in each semester.

Conditions and utilization of equipment and consumable supplies and materials are regularly surveyed by academic staff and laboratory technicians of each department almost every month. The survey findings are confirmed in the monthly departmental meetings. In addition, Central Office for Technical Service started operation from April 2015, and did the initial inventory survey on the condition of equipment in all departments. According to the interviews to relevant personnel, at the time of the Terminal Evaluation, all the equipment is overall properly utilized for practice and experiment.

(2) Project Purpose

Project Purpose is mostly achieved.

Indicator 1.: The rate of satisfaction of the fifth-year students increases.

The survey for the satisfaction of the fifth-year students has not been conducted and to what extent the students satisfied for the improved education cannot be identified. Also, it is difficult to measure the extent of satisfaction by the interviews to students because the interviewees are students who will graduate in 2015 and have received support by the Project since entering university. However, during the interview, they requested more hours of practices and experiments and model classes, it can be said that they are

mostly satisfied at the revised coursework. Also, through interviews to Japanese experts (Chief Advisor, Chairman of Project Support Committee and Project Coordinator), it is confirmed that curriculum together with coursework and syllabus of the 3 target departments were improved with more hours of practices and experiments by using new equipment.

Indicator 2.: The evaluation of the quality of education given by the Japanese experts improves.

In the opinions of the Japanese experts (Chief Advisor, Chairman of Project Support Committee and Project Coordinator) who are interviewed, improving the quality of education in the 3 departments has been in progress. Many subjects of each department incorporated more practices and experiments which were not included in the previous curriculum in absence of necessary equipment. As a result, the improved curriculum, coursework and syllabus have contributed to allowing students to gain practical knowledge and experience. Also, ITC teachers expanded their teaching areas and skills in the classes given the professional inputs from Japanese and ASEAN experts. This is a notable development brought by the Project.

Indicator 3.: The information on equipment is updated in each semester, and necessary consumable supplies and materials are prepared.

Conditions and utilization of equipment and consumable supplies and materials are regularly (almost every month) surveyed by academic staff and laboratory technicians. Lists of equipment and consumable supplies required annually in each department are already developed.

(3) Overall Goal

The prospect of achieving Overall Goal is on track.

Indicator: The ITC interns are highly evaluated by the companies which receives them.

The results of the survey on companies' evaluation on the ITC interns 2014 (they were in the 3rd year when the Project commenced.) show the positive trends. On a major question item regarding "ability to adapt and use of knowledge", 43% (30 out of 70 responses) of GEE, 66% (45 out of 68) of GIM and 64% (21 out of 33) of GGG interns were rated at A (5 scales from A to E).

3-2 Summary of Evaluation Results

(1) Relevance: *high*

- The Project is consistent with the policies of both Cambodia and Japan. According to Policy on Higher Education Vision 2030 (April 2014), the achievement and consolidation of an effective primary and secondary education sub-sector, the shift in economic structure and labour market need together with the need for regional and global integration urged the Cambodian government to revisit its higher education sub-sector. Within this context, higher education was given more priority in Education Strategic Plan (ESP) 2014-2018 compared with its ESP predecessors. The new priority given to the higher education sub-sector is also in line with "Human Resource Development" strategy, one of the four pillars of the Royal Government Rectangular Strategy (RS) III (2014-2018). Japan's country assistance strategy for Cambodia (April 2012) prioritizes the strengthening of the private sector as one of the three thrusts for the strengthening of the economy. Program for Industrial Human Resource development capturing creating good environment for trades and investments is mentioned as part of private sector development strategy.
- The Project is in line with the needs of human resource development in Cambodia. In order for the country to maintain economic growth, especially with ASEAN integration approaching in 2015, it is urgently

needed to diversify industries by developing import substitution industries and supporting industries and to foster high value-added industries. In addition, it is relevant to support GGG by the Project as a newly created department in 2012 and only one in Cambodia.

- The strategy of the Project is appropriate in terms of selection of target institute and the departments as well as appropriately designed to produce synergy effects with other assistance. In particular, the budget supports by Belgium for University-Industry linkage and for maintenance of equipment through Académie de Recherche et d'Enseignement supérieur (ARES) is important developments in view of increasing sustainability of the Project effects. Other Japanese assistances also contributed to the Project. Human resources have been strengthened through higher degree programs by ASEAN University Network/ Southeast Asia Engineering Education Development Network (AUN/SEED-Net) Project. The equipment and facility have been upgraded through the cultural grant aid and the general grant aid as well.

(2) Effectiveness: *high*

- Project Purpose is mostly achieved. Syllabus as well as curriculum was revised and numbers of hours for practices and experiments have largely increased. The improved coursework is implemented by using equipment provided by the Project and other Japanese assistances, and educational capacity improved through technical inputs by Japanese and ASEAN experts. Such improvement for quality of education at the 3 target department has been brought by the Project.
- Critical issues relating to the quality of education are human resources. High teaching workload due to the hourly wage (however, the amount and the situation depend on the departments), and the fact that teachers have to teach subjects/topics different from their specialization particularly in GGG may be impeding factors to maximize the Project effects, although it does not prevent the outcome of the Project itself.

(3) Efficiency: *moderate in consideration of some issues*

- Output 1~3 have been mostly achieved as planned as accelerated during the 2nd half of the Project by utilizing inputs from both Japan and Cambodia efficiently in spite of delays observed in the 1st half of the Project.
- Issues on efficiency are as follows:
 - two to three trained academic staff of each department drained due to transfers/changes/further studies
 - high teaching workload impeding active research activities and industrial linkages
 - some equipment provided by the cultural grant aid and the Project causing inefficiency in installation of proper equipment in the 1st half of the Project and requiring the Project and ITC teachers occupied to respond
 - weak project management as well as fielding short-term experts at an appropriate timing and duration as observed in the 1st half of the Project

(4) Impact: *high and expected to be higher if some issues are improved*

- Prospect of achieving Overall Goal is good. Developments for promoting university-industry linkages are observed as a facilitation factor to achieve Overall Goal. Many activities under the Industrial Linkages and Cooperation Office including the 1st ITC-Industrial Consortium with a participation of 25 industries (2 Japanese industries included) in February 2015 is a notable development.
- There are positive ripple effects that include planning of establishing the first-ever academic association in

GGG field in Cambodia, more extra-curricular activities like Robot Contest with improved teaching and upgrading 2-year technician programs through the trained academic staff although the primary target of the Project is to upgrade 5-year engineer programs. The networking between ITC and supporting universities and professors in Japan is also a valued asset to continue even after the project completion.

- As stated in the Effectiveness parts, critical issues relating to the quality of education are human resources. High teaching workload due to the hourly wage and the fact that teachers particularly in GGG have to teach subjects/topics different from their specialization are current challenges. The impact will be higher if ITC prepares proper environment for teachers in terms of such salary system and securing time for preparation for their classes.

(5) Sustainability: *high in terms of policy, institutional and technical aspects, but efforts expected in terms of organizational and financial aspects*

- Policy and institutional aspects: As mentioned in Relevance, policy and institutional environment is likely to be sustained. More policy priority is given to higher education in ESP (2014-2018) and RS Phase 3, and ITC has a leading role in developing engineering education in Cambodia. Public administration reform including public financing is a promoting factor to ensure autonomy in terms of finance and management of ITC.
- Organizational aspect: ITC and the 3 target departments are expected to be able to independently function after the Project as an established, top university in Cambodia. Academic staff are able to improve coursework and utilization of equipment including consumable supplies, because existing systems at department level are already functional. Central Office for Technical Service and University-Industry Linkage and Cooperation Office are also favorable developments for the sustainability of the Project effects. International Consortium has been instrumental to ensuring the academic quality of ITC. A major issue identified is related to human resources management (e.g. insufficiency of academic staff in terms of quantity and specialties, remuneration system connecting with number of teaching hours) which are regarded as constraints for all the departments in general and for GGG in particular as a newly created department.
- Financial aspect: Budget for maintenance and consumable supplies after the Project completion is an issue. Some developments improving financial situation of ITC include creation of Central Office for Technical Service with an annual budget of US\$20,000 for repairing. Small maintenance and consumable supplies may possibly be managed by ITC for some years, but larger maintenance as well as repairing of high-spec equipment would face a problem. With increase of equipment including those by the general grant aid, budget for maintenance and consumable supplies also need to increase. It is essential to take measures to raise ITC incomes through proposing budget to MoEYS for 2016/2017 as a new initiative under the public financial reform and more service activities to industries to obtain some amounts for maintenance and repair.
- Technical aspect: Most of the project activities (review the students' lab manuals, learning from model teaching and training in Japan, and sharing in departments) have been conducted as normal duties of C/Ps, and therefore, C/Ps will continue to be technically independent at certain level. However, maintenance of sophisticated equipment is an issue as it is technically difficult to solve locally in Cambodia.

3-3 Contributing Factors

(1) Factors related to planning

- Other programs supported by other donors particularly ARES and by other Japanese assistance such as AUN/SEED-Net, cultural grant aid and general grant aid etc. are complementary and yielding a synergy effects.

(2) Factors related to implementation process

- Project Coordinators with technical background stationed in ITC has promoted the effective and efficient implementation of the Project activities.
- International Consortium is an effective forum to ensure quality of education, which is a purpose of the Project (International Consortium was established initially by the government of France and as of March, 2015, the 16 universities from France, Belgium and Japan (Tokyo Institute of Technology and Kyushu university), Thailand and Vietnam join the Consortium. The representatives of the member universities gather once a year and review the quality of Education in ITC and suggest improvements.
- C/Ps and students are highly dedicated and motivated.
- Project management system including communication has been largely improved in the 2nd half of the Project through identifying issues during the Mid Term Review and shared them among those concerned.

3-4 Hampering Factors

(1) Factors related to planning

- Finalizing the list and specification of equipment prior to the arrival of Project Coordinator and project activities caused problems in the 1st half of the Project that such equipment were not usable and made the Project busy to respond to them in absence of essential accessories and spare parts which were dropped from the lists. Equipment for GGG through the cultural grant aid also caused delay of utilizing equipment due to the problems of unlisted essential equipment as well as lack of proper manuals in the initial stage of the Project and required the Project for extra efforts in fixing them.

(2) Factors related to implementation process

- Issues related to human resources including high teaching workload, high turnover of lab technicians, teacher's teaching assignment different from their specialization etc. are observed as hampering factors to maximize the Project effects.
- Project management was weak in the 1st half of the Project and fielding short-term experts at an appropriate timing and duration was difficult due to the time constraints of the Japanese professors. In particular, GGG is a new department and the inputs by the professors were needed.
- Some activities of the Project (e.g. sending C/P to training in Japan, installation of equipment etc.) have to be canceled/re-scheduled due to other commitments of C/P.

3-5 Conclusions

The Project has achieved most of its purpose by improving the quality of education of the target 3 departments of ITC to have more emphasis on practices and experiments.

Output 1 has been achieved (partly to be achieved) with the increased hours of practice and experiments, decreased number of students per equipment and drafting of 100% of student laboratory manuals. Output 2 has been mostly achieved with sharing of knowledge of model teaching by Japanese professors and the lessons from training program in Japan among the academic staff, while their application to improvement

of teaching method is in progress. Output 3 has been achieved with periodical survey on the conditions and utilization of equipment. In terms of the implementation process, progress of the activities, technical transfer/capacity development as well as project management has been largely improved after the Mid Term Review.

From the perspective of Five Evaluation Criteria, relevance, effectiveness, and impact of the Project are high. On the other hand, efficiency of the Project is moderate and there are also some concerns with the sustainability of the Project from organizational and financial aspect. Quality of teaching, promotion of research activities and industrial linkages would not be maximized if the issues of high workload and salary/incentives of the academic staff remain. Budget for operation and maintenance of equipment is to be secured after the completion of the Project.

As the Project will achieve its purpose by the end of the completion of the Project, extension of the period of the Project will not be considered. On the other hand, the Director General of ITC requested the introduction of Lab-Based Education (LBE) which would be effective to further promote practical education in ITC. However, it would be difficult to carry out LBE because LBE is based on research activity but the academic staff lack incentive for the research under the current salary system. Therefore, it is appropriate to carry out training programs in Japanese universities and universities in other countries where JICA supported the implementation of LBE in order to facilitate formulation of environment for conducting research. Also, JICA will continue to support for ITC by utilizing AUN/SEED-Net Project, including dispatching teachers, research and industry-university linkage, and through Science and Technology for Research Partnership for Sustainable Development (SATREPS) which starts in October this year.

3-6 Lessons

- It took long time to introduce the equipment provided by the Project appropriately and efficiently. Although the equipment and its specification were decided before the dispatch of the long-term expert, the equipment could not be used because its attachments and spares essential for the operation were not in the list. At the beginning of the Project, it took long time for the delivery of equipment provided by the cultural grant aid. In addition, there were many other problems in the selection of the equipment, including inadequate information on local supply companies, inaccurate understanding of the needs, dropping out of indispensable equipment from the list and a lack of operation manuals. The Project and academic staff of ITC had to cope with these problems.
- Adopting the recommendations of the Mid Term Review, the communication between the Project, ITC and Japanese professors has been accelerated through the Skype meetings and monthly reports. However, progress of the Project and achievement level towards the Project purpose needed to be checked based on the PDM and be shared among the people concerned.
- A base-line survey is needed to be conducted before the beginning of the Project. Some indicators: “The ratio of practice and experiments to lectures in coursework” (indicator 1.1 for Output 1), “the rate of satisfaction of the fifth-year students” (indicator 1 for Project Purpose), and “the ITC interns are highly evaluated by the companies” (indicator for Overall Goal) could not be obtained for the Terminal Evaluation.
- The Project implementation structure is needed to be prepared well from the beginning. After the Mid-Term Review, the number of short-term experts from supporting universities has largely increased and the Project operation has been strengthened. However, in the first place, the implementation structure is needed to be prepared well. To secure this, it was necessary to include time to share the project concept among people concerned and time to prepare the system in the activity schedule, as well as to arrange experts input plan according to the project purpose.