Summary

1. Outline of the Project

Country: Republic of Turkey

Project Title: Project on the Establishment of Industrial Automation Technologies Departments in Anatolian Technical High Schools

Issue/Sector: Secondary education

Cooperation Scheme: Technical Assistance Project

Division in Charge: Technical and Higher Education Team, Group II, Human Development Department, JICA

Total cost (as of the time of evaluation): 956.46 million Japanese yen

Equipment supply: 41 million Japanese yen

Period of Cooperation (Duration):

Record of Discussions (R/D): April 16, 2001-April 15, 2006

Partner Country's Implementing Organization: Technical and Vocational Education, Ministry of National Education

Base school: Izmir Mazhar Zorlu Anatolian Technical High School

Dissemination school: Konya Adil Karaağaç Anatolian Technical High School

Supporting Organization in Japan: Ministry of Education, Culture, Sports, Science and Technology; The National Association of Principals of Technical Senior High Schools; Boards of Education in Gunma Prefecture, Shizuoka Prefecture, Chiba Prefecture (FY 2003-), Miyazaki Prefecture (FY 2005-), Yamaguchi Prefecture (2002), Saitama Prefecture (FY2002) and Tochigi Prefecture (FY2003-FY2004); industrial high schools and technical junior colleges nationwide which accepted trainees

Related Cooperation: Project-type technical cooperation (1987-1992)

Establishment of vocational Lycee in electrics and electronics, and technical Lycee in electrics, electronics and computer science in the Tuzla Vocational and Technical High School

1-1 Background of the Project

In the Republic of Turkey (hereinafter referred to as "Turkey"), fulfillment of qualitative and quantitative needs for mid-level engineers is becoming a task of pressing urgency, along with the recent rapid expansion of these industries. Human resource development is designated as one of the top priority issues in both the Seventh Five-Year Plan (1996-2000) and the Eighth Five-Year Plan (2001-2005). In order to meet these needs, the Ministry of National Education (MONE) of Turkey newly established

the Industrial Automation Technology Department at the Anatolian Technical High School, a five-year school for training mid-level engineers. However, due to lack in funds and technical skills, the preparation of facilities and instructor training is not progressing as expected. Therefore, in 1997 Turkey made a request for project-type technical cooperation with Japan.

In response to this request, a Basic Study Team was dispatched for a cooperation feasibility study at the Adana, Istanbul Zeytinburnu and Eskişehir vocational high schools, which made known their desire to serve as bases for cooperation. Thereafter, a new request was made by the government of Turkey for cooperation in the establishment of Izmir Mazhar Zorlu Anatolian Technical High School (hereinafter referred to as "Izmir ATH") and Konya Adil Karaağaç Anatolian Technical High School (hereinafter referred to as "Konya ATH"). As a result of confirmation on the implementation system in the two schools by way of the short-term study group dispatched in January 2000, it was decided that these schools were adequate in terms of cooperation targets. The Record of Discussions (R/D) on project-type technical cooperation was concluded between the Implementation Study Team dispatched October 2000 and the project was implemented for a period of five years from April 16, 2001 to April 15, 2006.

1-2 Project Overview

(1) Overall Goal

To introduce a new educational system for industrial automation technology for other Anatolian Technical High Schools.

(2) Project Purpose

To establish a new educational system as an extension model in the Izmir and Konya Anatolian Technical High Schools in order to train mid-level technicians that will meet the requirements of industries that utilize automation technology

(3) Project Outputs

(i) Development of an innovative curriculum

(ii) Development of suitable learning materials

(iii) Development of suitable teaching materials

(iv) Establishment of a training system for teachers (including teaching methods) and improvement of teachers' capabilities

(v) Introduction of suitable equipment to meet industry requirements

(vi) Proper operation and maintenance of the above-mentioned equipment

(vii) Dissemination of Outputs 1-6 above to the public, other schools and industries via

the Internet

(viii) Establishment of a system for ascertaining the needs of industry, and the dissemination of the new educational system

(4) Project Inputs (as of March 31, 2005)

Japanese side:

Long-term experts	10 persons in total (299M/M)
Short-term experts	15 persons in total (18.5M/M)
No. of trainees received in Japan	36 persons
Equipment supply	302.945 million Japanese yen
Local cost	44.968 million Japanese yen

Turkish Side:

Assignment of counterparts	22 persons in total
In Izmir ATH	9 persons for information electronics
	7 persons for information machinery
In Konya ATH	6 persons for information electronics

Procurement of land and facility for the Project 17 laboratories and training rooms, instructors' rooms, fixture and office supplies, etc.

Local cost 387,000 New Turkish Lira (approx. 283,000 USD)

2. Evaluation Team Overview

Members of the evaluation team

(Area in charge: name, title)

Team leader:

Motoharu Watanabe

Team Director, Technical and Higher Education Team, Group II, Human Development Department, JICA

Technical education administration:

Shigeru Ikemori

Subject Investigator under the Counselor, Elementary and Secondary Education Bureau, the Ministry of Economy, Culture, Sports, Science and Technology

Industrial automation technology:

Tateo Matsui

Principal, Chiba Prefectural Mobara Industrial High School

Evaluation analysis:

Shinji Nanbo

Vice Representative Director, Exidea Ltd.

Cooperation planning:
Kaido Ikeda
Technical and Higher Education Team, Group II, Human Development Department, JICA
Evaluation Period
From May 11, 2005 to May 29, 2005
Evaluation type: Terminal evaluation

3. Overview of Evaluation Results

3-1 Achievements

The performance, outputs and implementation process of this project from its outset to the time of evaluation has been studied and evaluated based on the project's purpose, outputs and activities.

Although all the students had yet to graduate at the time of evaluation, companies that had accepted students trained under the new education system have evaluated the ability of the students highly, and some of these companies are showing interest in employing these students upon their graduation. In addition, teachers at primary schools are viewing the new education system in a very positive light and many primary school students are visiting the school.

Theoretical instruction had been the mainstream in Turkey for a long time. However, this project created a curriculum aiming to combine theory and practical training.

Textbooks and teaching materials whose preparation has been planned as a part of the project are scheduled for completion. Also, instruction on knowledge and technology in subjects related to industrial automation and equipment maintenance methods are scheduled for provision to teachers ahead of the end of the project.

Since the launch of the project, more than 30 visits to companies and chambers of commerce have taken place in order to study human resource needs in the industry. Dissemination seminars on this new education system are also being implemented for companies.

In addition to above, MONE decided to disseminate the new education system to 20 other schools. Therefore, it is expected that the project purpose will be achieved by the end of the project's duration.

3-2 Summary of Evaluation Results

(1) Relevance

The Turkish government emphasized vocational technical education as one of its important development targets for human resources development in the Eighth Five-Year Plan (2001-2005). This project corresponds with this target. In addition, MONE has decided to expand its new education system to 20 other Anatolian Technical High Schools, and as such consistency with Turkish educational policy can also be identified. Furthermore, many chambers of commerce in various areas are requesting that the new system be disseminated to MONE, showing that the education being provided is meeting Turkey's industrial needs.

On the other hand, human resources development for socio-economic development is emphasized as one of the important issues in the Japanese ODA policy and the Country Assistance Plan of JICA in regards to Turkey, and therefore the project is consistent with the development policy of Turkey and the assistance policy of Japan.

(2) Effectiveness

The project has in general been progressing as planned without notable delays as of the time of evaluation. At the time of evaluation, while not all the outputs set in the Project Design Matrix (PDM) had been achieved 100%, it is expected that most of them will be achieved by the end of the duration of the project.

In addition, industries are highly praising the curriculum set under the project as well as the knowledge and skills possessed by the students being accepted as interns. Furthermore, it has been decided that the education system developed by the project will be introduced in 20 other Anatolian Technical High Schools. For these reasons, it is considered that the project purpose of the establishment of a new educational system as an extension model will be achieved.

(3) Efficiency

By learning about the industrial high school system, vocational education and the new education system and the significance thereof through training programs in Japan, the counterparts were able to efficiently absorb instructions from Japanese experts upon returning to Turkey.

The dispatch of Japanese experts is being implemented adequately based on the project plan, and counterparts are being allocated as was initially planned. Equipment is also being procured based on the project plan without delay.

Based on the cycle in the order of training in Japan, the development of

educational materials, technical transfers, the provision of classes and feedback, the dispatch of Japanese experts, equipment and counterparts are being inputted adequately and the project is being implemented efficiently.

(4) Impact

MONE is holding the output of the project in favorable regard and has already decided to introduce industrial automation technologies departments in 20 other Anatolian Technical High Schools; therefore, it is expected that the overall goal of introducing a new industrial automation technology-related educational system to other Anatolian Technical High Schools will be achieved. A framework for teacher training in the field of industrial automation technology has been formulated, and the Teacher Training Center (TTC) is being constructed in the premises of Izmir ATH.

Scores of those who have passed the entrance exams of the project site schools are performing at higher levels than those at other Anatolian Technical High Schools. The new education system is attracting a high degree of interest, with those who wish to enter the schools as well as university professors and business managers are making frequent visits in order to inspect the facilities and classes.

Industrial automation technology departments are also implementing practical industry training. The knowledge and skills of those who have participated in the training programs are receiving high praise from companies.

(5) Sustainability

In terms of educational policies, MONE has already made official its decision to expand this model to 20 other Anatolian Technical High Schools, introducing it as a new education system. Also, Izmir ATH and Konya ATH, which were covered by the project, are planning to be continuously positioned as bases of dissemination. Therefore, it is certain that support to both schools will be continuously provided into the future as well.

In terms of organization and funding, there are no school with equipment and facilities superior to the above-mentioned pair. The project is also gaining high recognition.

Therefore, the counterparts are willing to remain at both schools even after the conclusion of the project, and as such it is expected that these human resources will become entrenched. MONE clearly states that it will continuously allocate the funding necessary for the maintenance of equipment, so there are no anticipated problems in regards to organization or funding either.

In regards to technical aspects, the counterparts have already been trained in relation to the usage methods of most of the equipment and have obtained the necessary capability to use and maintain such equipment. On-the-job training (OJT) for training teachers, the first step to be taken in order to expand the model to the 20 other schools, is also being planned by the schools implementing the project. Therefore, there are no problems foreseen in regards to continuation and diffusion.

Considering the above aspects, it can be said that the level of sustainability of the project is high.

3-3 Factors Contributed in the Production of Effects

Factors that have contributed in the implementation process include the establishment of instructors' meeting rooms and support from the industry. In this project, Japanese-style instructors' meeting rooms wherein all instructors can sit together, whereat both Japanese experts and their Turkish counterparts are housed when not giving lectures. In Turkey, it is rare for instructors to remain at schools when not actually providing lectures, and there is usually only something along the lines of a reception room for them. In this project, through the introduction of the Japanese norm, whereby instructors remain on campus on a full-time basis, instructors are able to develop close relationship with each other. In addition, although there have been many cases in other cooperation projects that Japanese experts and counterparts were assigned different rooms, this project saw the development of a room to be shared by both parties, which ensured further smooth communication. It is considered that such processes contributed to the production of results.

The industrial sector also evaluated the curriculum highly and is actively accepting internship at plants, which is in large part supporting the project's implementation. In addition, chambers of commerce are offering help to the new education system in terms of publicity. These types of support from the industrial sector are also proving to be a factor contributing in producing results.

3-4 Problems and Factors that Raised Problems

(1) Planning

The curriculum established through this project is being highly praised by the government, industry, students and parents, and there have been no problem in terms of the direction in which the curriculum is aiming. However, in parallel with the provision of technical guidance to Turkish counterparts, the project is planning to

prepare a number of textbooks each year, and this effort has proven to be a heavy burden for the experts dispatched. It can be said that there is a need for further consideration in order to ease said burden and make adjustments throughout the entire framework.

(2) Implementation Process

The two schools selected for the project have proven to be suitable choices, judging from the state of the industrial sector in the areas surrounding of the schools. Izmir ATH was positioned as the base school whereat the experts reside, and Konya ATH as the diffusion model school aiming for technical transfers between counterparts. However, in reality, sufficient levels cannot be expected from technical transfers between counterparts alone, and many Japanese experts also visited Konya ATH directly in order to provide technical transfers. Technical transfers between counterparts are achieving a certain level of results, and thanks to the efforts by the counterparts at Konya ATH, no significant difference in the levels of technology between the two schools can be ascertained. It was expected from the beginning that there would be a difference in the degree of technical transfer from experts between the base school, where experts are stationed on a full-time basis, and the diffusion school. However, this should serve as a point for consideration in implementing future expansion plans, in order to maintain a certain level of technology.

3-5 Conclusion

As stated above, although some problems in terms of implementation have been pointed out, the project is, for the most part, being implemented as scheduled. The project has been receiving high praise from various quarters, and it is ensured that the diffusion of the new education system, which represents the project purpose, is achieved. Therefore, it is considered that the purpose of the project has been attained. However, in order to further ensure the establishment of the project's result, it is considered that an additional follow-up to the approach in the development of educational materials in the final year is necessary.

3-6 Recommendations (Specific Measures, Recommendations and Advices on this Project)

It is recommended that the following measures be taken in order to achieve the project's purpose and the overall goal.

(1) Revision of curriculum and textbook

Both sides have agreed to maintain the existing curriculum for the time being (as it is subject to revision in accordance with evaluations of graduates and changes in industrial needs). Textbooks should be revised whenever necessary (by the Turkish side) in accordance with technical innovation.

(2) Dispatch of Japanese short-term experts for follow-ups

In order to improve some aspects of developed textbooks and to make necessary technical transfers, requests have been made by the Turkish side for an extension of project period. As a result of discussions, it was decided that the dispatch of short-term Japanese experts during the period from July to August 2006, following the graduation of the program's first graduating class, would be necessary.

(3) Information sharing

In order to ensure the future dissemination of the education system, information pertaining to teaching skills, educational materials and technical transfers from Japanese experts in relation to technical experience is to be disseminated by the Turkish side to a further 20 schools.

(4) Maintenance of equipments

MONE will allocate the necessary maintenance costs and both Izmir ATH and Konya ATH will take the necessary measures for maintenance of the equipment provided.

(5) On-the-job training of trainees

On-the-job training for the instructors of the ten schools included within the expansion plan will be held at Izmir ATH and Konya ATH. The Turkish side will take necessary measures in order to avoid all hindrances during the period when the counterparts will be engaged in activities related to the implementation of the project.

(6) Strengthening relations with industrial sector

In order to strengthen relation with the industrial sector, the Turkish side should take the initiative in implementing technical seminars for companies, surveys of industry needs, career guidance seminars and career counseling for graduates from the inaugural graduating classes of both Izmir ATH and Konya ATH.

(7) Assignment of personnel

MONE should retain the current project counterparts for both schools so as to ensure the continued impact and sustainability of the project.

3-7 Lessons Learned (Matters Helpful for Discovering/Forming Similar Projects Derived from this Project and Implementation, Operation and Administration Thereof)

(1) Importance of planning at project's outset

The development of textbooks and educational materials may make a significant impact to the progress of the project, particularly in the context wherein actual education and training will commence during the cooperation period. Therefore, it is important to analyze the burden of development throughout the cooperation period at the outset of the project, and to consider development methods and implementation schedules based on such analysis.

(2) Establishment of instructors' room

The establishment of an instructors' room wherein both Japanese experts and their Turkish counterparts are stationed together on a full-time basis was an effective means of strengthening relations, by ways such as ensuring smooth communication.

(3) Cooperation with the industry

As part of this project, opinions on the subject of curriculum were solicited from the Industrial Automation Technologies Departments and a curriculum was prepared with consideration given to industry requests. Also, the project capitalized on companies who accepted students for practical training and included student internships within its educational framework.

In order to achieve expected educational effects in the area of technology education, it is important to strengthen cooperation with the industrial sector, ascertain industrial needs and reflect them in the education system.

3-8 Follow-ups

In order to improve certain aspects of developed textbooks and to make the necessary technical transfers, the Turkish side requested that the project be extended. As a result of discussions, it was decided that the dispatch of short-term Japanese experts during the period from July to August 2006, following the graduation of the first graduating class of the first year, was necessary.

The Turkish side requested continuous support from Japan in its

establishment of the TTC within the premises of Izmir ATH, which is currently under construction, and for the diffusion of the Industrial Automation Technologies Departments to 20 other Anatolian Technical High Schools.