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THE EX-POST EVALUATION STUDY

FOR

THE TECHNICAL AND VOCATIONAL EDUCATION AND

TRAINING IMPROVEMENT PROJECT

AT TECHNICAL HIGH SCHOOLS

IN

JAMAICA

FINAL REPORT

DECEMBER 2005

JAPAN INTERNATIONAL COOPERATIONN AGENCY

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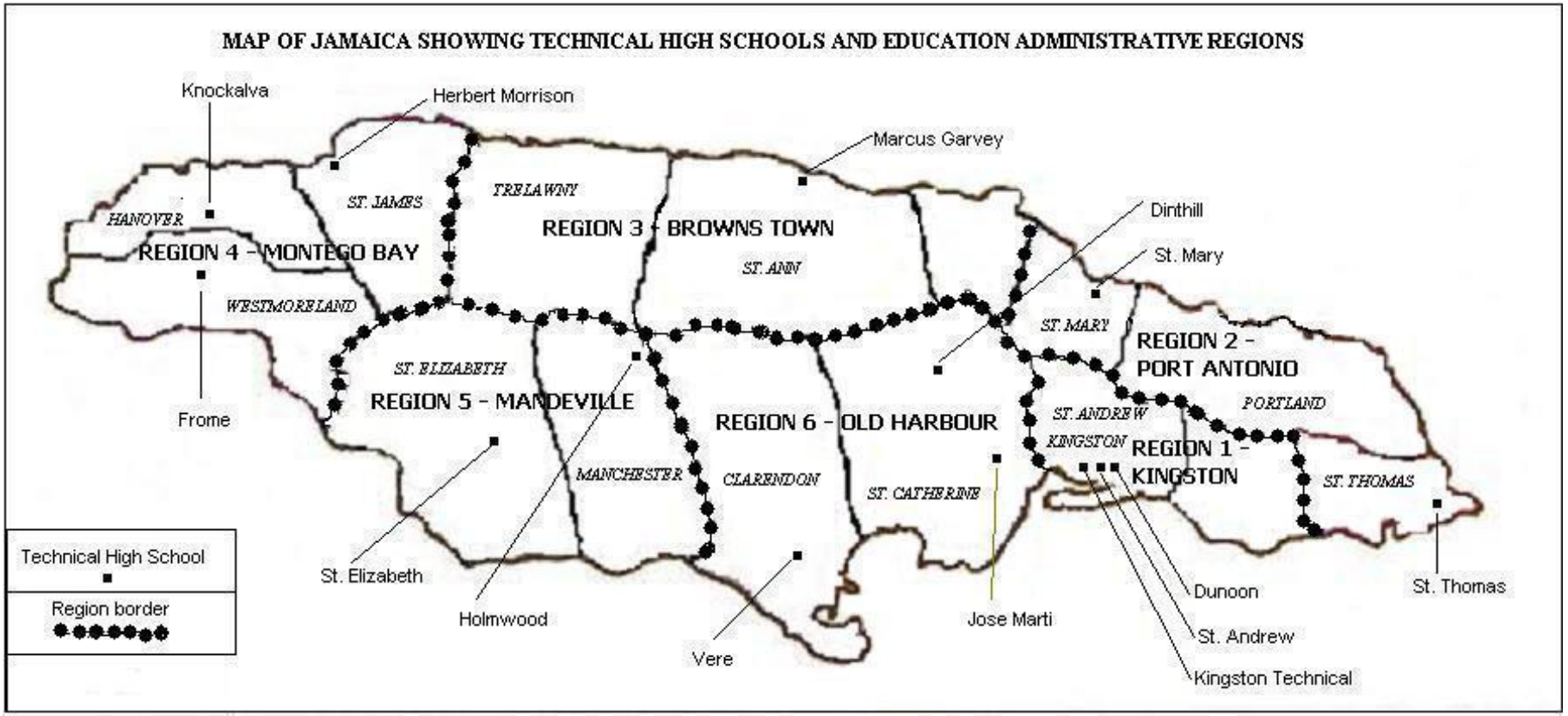
ANNEXES


MAP OF JAMAICA SHOWING TECHNICAL HIGH SCHOOLS AND EDUCATION ADMINISTRATIVE REGIONS
Knockalva
Herbert Morrison
Marcus Garvey
Dinthill
St. Mary
HANOVER
ST. JAMES
TRELAWNY
REGION 4 - MONTEGO BAY
REGION 3 - BROWNS TOWN
ST. ANN
WESTMORELAND
ST. MARY
REGION 2 - PORT ANTONIO
ST. ELIZABETH
REGION 5 - MANDEVILLE
REGION 6 - OLD HARBOUR
PORTLAND
ST. ANDREW
KINGSTON
REGION 1 - KINGSTON
MANCHESTER
CLARENDON
ST. CATHERINE
ST. THOMAS
Frome
St. Elizabeth
Holmwood
Vere
Jose Marti
Dunoon
St. Andrew
Kingston Technical
St. Thomas
Technical High School
Region border

Abbreviations

CXC:	Caribbean Examination Council
JMTHS:	Jose Marti Technical High School
MOEYC:	Ministry of Education, Youth and Culture
NTA:	National Training Agency
NVQJ:	National Vocational Qualification of Jamaica
PIOJ:	Planning Institute of Jamaica
THSDP:	Technical High Schools Development Project
TVET:	Technical and Vocational Education and Training
VTDI:	Vocational Training Development Institute

1. INTRODUCTION

1.1 Background

In Jamaica, the primary commodities, such as bauxite, agricultural products, etc., account for around 52.5 percent of exports in 1998 and around 66.0 percent of exports in 2004 at the time of the ex-post evaluation study. As the value of these products in international markets has been flagging, with the country's high dependency on imports for most of its industrial products, a trade deficit has resulted. To improve the situation, the government of Jamaica has been developing its tourism industry, promoting domestic production of products, and expanding exports by improving the quality of textile and industrial products. However, the technical level of domestic companies was low, and efforts to improve the trade balance were not producing the desired results.

Under these circumstances, the government of Jamaica recognized that fostering the development of middle-level engineers was a prime task and organized the "Technical and Vocational Education and Training Improvement Project (TVET project, 1995-2000)" to strengthen its international competitiveness. The plan was aimed at establishing a practical technical education program through the teaching of up-to-date techniques in technical high schools, one of the avenues of secondary education. In implementing the plan, the Ministry of Education, Youth and Culture (MOEYC) identified Jose Marti Technical High School (JMTHS) located in Spanish Town (the former capital) as a pilot school for vocational education, in order to improve technical education in four specialized fields, i.e., machine shop, electronics, auto mechanics, and computer assisted drafting (CAD). At the same time, the government of Jamaica requested the assistance of the government of Japan, which has wide-ranging experience in these fields, to Project-type Technical Cooperation to achieve the aforementioned objective.

1.2 Project Overview

The project had its primary aim at improving technical education in the four specialized fields: machine shop; electronics; auto mechanics; and CAD. It also involved the upgrade of facilities and equipment in line with the development of an educational curriculum and improved education, the transfer of techniques to the counterparts, and the implementation of training for high school teachers at JMTHS.

Project Name: The Technical and Vocational Education and Training Improvement Project at Technical High Schools in Jamaica
Target Group: Students and graduates at Technical High Schools in Jamaica
Target Area: Technical High Schools in Jamaica
Project Duration: May 1st, 1997 – April 30th, 2002
Implementing Agency: Jose Marti Technical High School (JMTHS), Ministry of Education, Youth and Culture (MOEYC)

(1) Overall Goal

To improve the quality of TVET in Jamaica.

(2) Project Purpose

To conduct improved TVET in the fields of auto mechanics, CAD, electronics, and machine shop at Jose Marti Technical High School as a pilot school for technical high schools in Jamaica.

(3) Outputs

1) To improve TVET in the fields of auto mechanics, CAD, electronics, and machine shop at Jose Marti Technical High School.
2) To disseminate improved TVET to other technical high schools in Jamaica.

1.3 Study Objectives

JICA has conducted ex-post evaluations of selected project-type technical cooperation projects, typically three years after their termination. On this occasion, JICA HQ's has decided to conduct an ex-post evaluation on "The Technical and Vocational Education and Training Improvement Project at Technical High Schools in Jamaica", which was completed three and a half years ago.

There are two main objectives of the ex-post evaluation: i) to draw lessons learned and recommendations to improve future JICA planning and implementation capacity for similar type of technical cooperation projects mainly through evaluating the impact and the sustainability of the selected projects; and ii) to meet accountability requirements to the Japanese tax payers by publicizing the results of the evaluation.

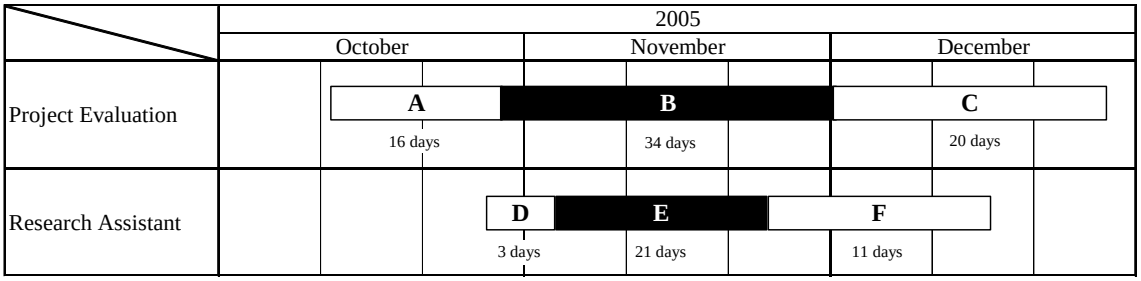
1.4 Evaluation Team and the Study Period

The members of the ex-post evaluation team are as follows.

Role	Name	Organization
Project Evaluation	Takaaki HIRAKAWA	INTEM Consulting, Inc.
Research Assistant	Justin K. MORGAN	Free-lance consultant

The Study started on October 11th, 2005 and ended on December 28th, 2005. The work schedule is summarized in the Table 1.1 below.

Table 1.1: Implementation Schedule for the Ex-post Evaluation Study



Note: During the above period, the Study Team conducted two ex-post evaluation studies.

Project Evaluation (Japanese Consultant)

A: Preparation Stage in Japan (October 11th to 28th, 2005)

- Prepare the TOR for the local consultant
- Prepare evaluation questions
- Develop evaluation grid
- Prepare questionnaires based on the evaluation grid, etc.

B: Field Study in Jamaica (October 29th to December 1st, 2005)

- Conduct interviews and meetings
- Compile all data and information from interviews, questionnaire surveys, etc.
- Analyze the outcomes aggregated through the evaluation study
- Prepare the draft report of the study

C: Summing-up Stage in Japan (December 2nd to 27th, 2005)

- Prepare and submit the Final Report and the Evaluation Summary Sheet

Research Assistant (Local Consultant)

D: Preparation Stage (October 31st to November 2nd, 2005)

- Attend a kick-off meeting
- Study the evaluation plan
- Prepare for fieldwork

E: Implementing Stage (November 3rd to November 23rd, 2005)

- Collect and compile data
- Conduct interviews and meetings
- Prepare the minutes of the interviews and meetings
- Conduct questionnaire surveys and process data
- Act as a field coordinator and facilitate fieldwork

F: Summing-up Stage (November 24th to December 9th, 2005)

- Prepare the Work Report
- Conduct supplemental study
- Assist in writing and translating the Final Report on the ex-post evaluation study prepared by the Japanese consultant

2. Evaluation Study Method

2.1 Methodology

Logical framework (Logframe)[1] is utilized by the evaluators in order to design the methodology of the evaluation study and develop evaluation questions. As shown in Figure 2.1, the narrative summary of the Logframe is utilized for preparing the evaluation questions, based on the five evaluation criteria, i.e., Relevance, Effectiveness, Efficiency, Impact, and Sustainability. After setting up the evaluation questions, the methodology of the evaluation study is designed according to the format of the evaluation grid consisting of "data needed", "data sources", and "data collection methods" shown in Figure 2.2.

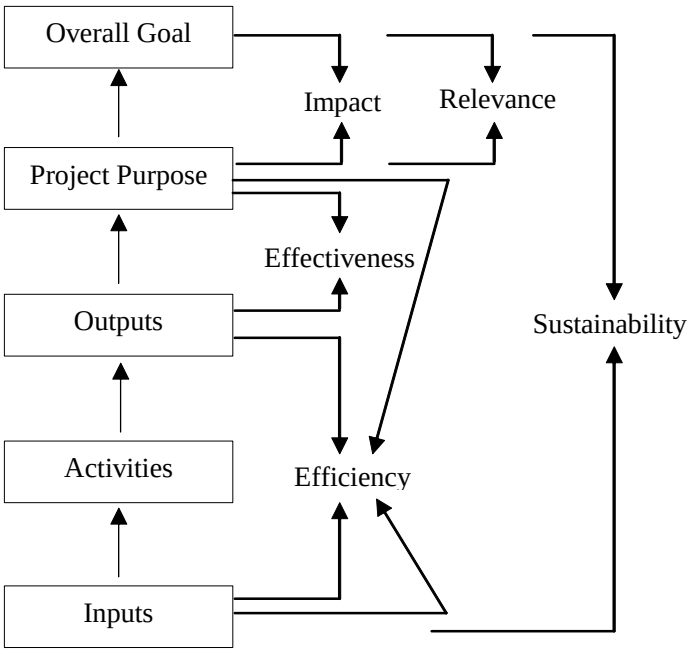


Figure 2.1 The Relationship between the Five Evaluation Criteria and the Logframe

In the ex-post evaluation, the impact and the sustainability of the project are mainly scrutinized. Five evaluation criteria are explained as shown below.

(1) Relevance:

A criterion for considering the validity and necessity of a project regarding whether the expected effects of a project (or project purpose and overall goal) meet with the needs of target beneficiaries; whether a project intervention is appropriate as a solution for

[1] In the revised JICA Project Evaluation Guideline (2004), JICA refers to the PDM as "Logframe."

problems concerned; whether the contents of a project is consistent with policies; whether project strategies and approaches are relevant, and whether a project is justified to be implemented with public funds of ODA.

(2) Effectiveness:

A criterion for considering whether the implementation of project has benefited (or will benefit) the intended beneficiaries or the target society.

(3) Efficiency:

A criterion for considering how economic resource/inputs are converted to results. The main focus is on the relationship between project cost and effects.

(4) Impact:

A criterion for considering the effects of the project with an eye on the longer term effects, including direct or indirect, positive or negative, intended or unintended.

(5) Sustainability:

A criterion for considering whether produced effects continue after the termination of the assistance.

Criteria	Evaluation Questions		Data needed	Data source	Data collection methods
	Main questions	Sub questions			
Relevance	Specify what is to be investigated.	Break down the main questions into detailed sub questions.	Specify what type of data and information is to be collected.	Specify from where the data and information is to be collected.	Identify how the data and information is to be collected.
Effectiveness					
Efficiency					
Impact					
Sustainability					

Figure 2.2 The Evaluation Grid Format

2.2 Evaluation Design

(1) Evaluation Questions

Evaluation questions are prepared along with the impact and sustainability as mentioned below.

(a) Impact

Achievement of the Overall Goal

- Do the industrial sectors employ graduates from the technical high schools including JMTHS?

Relationship between Overall Goal and Project Purpose

- Is the improved TVET conducted in the fields of auto mechanics, CAD, electronics, and mechanical engineering?

Inhibiting and promoting factors

- What are the factors inhibiting and promoting the achievement of the Overall Goal?

Important Assumptions

- Are the curriculums in the fields of auto mechanics, CAD, electronics, and mechanical engineering consistent with the needs of the industrial sectors?

Positive or negative Impacts

- Is the Caribbean Examination Council (CXC) utilizing parts of CAD syllabus developed by the project?
- Does Holmwood technical high school fulfill its function as the sub-center of JMTHS in the field of CAD?

(b) Sustainability

Inhibiting and promoting factors

- What are the factors inhibiting and promoting sustainability?

Policy and institutional aspects

- Does the MOEYC have a policy for disseminating the improved TVET across the country?

Administrative and financial aspects

- Are teaching staff appropriately assigned at 14 THS's?
- Will teachers of 14 THS's continue teaching in their school?
- Are their budgetary provisions made for the TVET activities?
- Is the operational budget secured for the in-service training sessions for the teachers at THSs?
- Has the maintenance system for equipment been established, including personnel assigned to maintenance? Also, is the budget necessary for the maintenance and the consumables of the equipment put in place?

Technical aspects

- Are the trained counterparts competent enough to promote the improved TVET activities in terms of in-service training sessions?
- Are the contents of TVET teachers' training materials appropriate for the in-service training sessions?

Cross-cutting issues

- Are there any factors inhibiting the TVET activities relating to a lack of concerns about social, cultural, and environmental aspects?

(2) Data Sources and Collection Methods

The data sources and data collection methods are specified as shown in the evaluation grid.

(a) Ministry of Education, Youth and Culture (MOEYC: Implementing body)

There is need to enhance international competitiveness of Jamaican industries through education and training in technical high schools. Thus, the MOEYC supports this project so as to increase the number of graduates available to work in the industrial sectors.

The MOEYC provides the institutional framework that supports schools and institutions and is comprised of a central administrative body and six administrative regions located across the island:

Region 1: Kingston, St. Andrew, and Western St. Thomas
Region 2: Eastern St. Thomas, Portland, and St. Mary

Region 3: St. Ann and Trelawny
Region 4: St. James, Hanover, and Westmoreland
Region 5: St. Elizabeth and Manchester
Region 6: Clarendon and St. Catherine

- Data collection methods: Interview, questionnaire, and literature survey

(b) Jose Marti Technical High School (JMTHS: Implementing body)

JMTHS was the technical high school selected as the pilot school for the project. JMTHS has been responsible for maintaining the equipment donated by JICA, hosting in-service training sessions in order to expose other technical high schools to the project, and developing curriculum in collaboration with Japanese experts for the four targeted subjects, i.e., auto mechanics, machine shop, electronics, and CAD.

Four teachers who attended counterpart training in Japan continue to teach the four targeted subjects at JMTHS. All students who do auto mechanics, machine shop, and electronics take CAD as a related subject even if they do not sit a national or external CAD examination.

- Data collection methods: Interview and questionnaire survey

(c) Technical High Schools in Jamaica (Implementing body)

There are 14 technical high schools in Jamaica. The Study Team chose 5 of the schools, which had teachers who attended in-service training sessions at JMTHS, in order to examine the effectiveness of the training sessions in spreading the project. The 5 schools were located in 4 of the 6 MOEYC administrative regions. The schools were Kingston Technical and St. Andrew Technical - region 1; Marcus Garvey Technical - region 3; Frome Technical - region 4; and Holmwood Technical - Region 5.

- Data collection methods: Interview and questionnaire survey

(d) Students/graduates of Technical High Schools (Beneficiaries)

Students and graduates of technical high schools are the ultimate beneficiaries of this project, so their performances are linked directly to the indicators of the project outcomes.

The questionnaires were distributed to students from JMTHS and the 5 other schools that the Study Team visited. The students evaluated the teachers at JMTHS who did counterpart training in Japan and the teachers who attended the in-service training sessions at JMTHS for machine shop, auto mechanics, electronics, and CAD.

- Data collection method: Questionnaire survey

(e) Heart Trust/National Training Agency (Heart Trust/NTA: Supporting body)

The Heart Trust/National Training Agency (Heart Trust/NTA) is a national institution which is able to offer valuable financial support to assist in the upgrading and maintenance of facilities at JMTHS and other technical high schools. It will improve the quality of TVET.

The Heart Trust/NTA is a statutory organization of the MOEYC. It is the facilitating and coordinating body for workforce development in Jamaica. Training is provided both in the workplace (enterprise-based), as well as through their 28 formal technical vocational and education training (TVET) institutions and over 120 TVET special programs (institution-based).

The HEART Trust/NTA is financed through a compulsory 3% payroll deduction levied on qualified private sector firms.

The Heart Trust/NTA has been involved in the development of technical high schools in Jamaica. One of the major TVET projects that the Heart Trust/NTA has been involved in has been the Technical High School Development Project (THSDP).

- Data collection methods: Interview and literature surveys

(f) Employers in the industrial sectors (Supporting body)

The goal of this project is ultimately to enhance international competitiveness of Jamaican industries by producing excellent workers for the industrial sectors. Thus, well-educated graduates from technical high schools are expected to be employed by the industrial sectors if their needs are consistent with the competency of the graduates. In order to facilitate the employment of the graduates, it is crucial to establish a linkage between the industrial corporations and the technical high schools.

- Data collection method: Questionnaire survey

3. Results

3.1 Impact of the Project

In order to measure its impact on other 13 technical high schools, the Study Team has selected six technical high schools[1] in five out of six educational administrative regions[2]. The data collected from technical high schools are attached to the Annex at the end of this report.

3.1.1 Achievement of the Overall Goal

In this study, the Study Team recognizes that it is difficult to obtain the number of the graduates who are employed in the industrial sectors because the technical high schools basically do not conduct tracer studies to track graduates' career paths. Thus, the Team focuses on the JMTHS graduates employed in the industrial sectors. In addition, it is very difficult to grasp the productivity of industrial sectors without any indication of what kind of data is necessary for measuring it. Moreover, there has not been enough time, since the termination of the project, to see project outcomes reflected in productivity. In this section, therefore, the Study Team primarily discusses the JMTHS graduates employed in the industrial sectors and the evaluation of the graduates by employers in the industrial sectors. The number of JMTHS graduates employed by the industrial sectors is shown in the Table 1[3] below. From the figures, more than 10 graduates from JMTHS have constantly been hired in the industrial sectors since 2003.

According to the questionnaire survey directed to the employers selected by JMTHS with reference to the question as to whether graduates are competent enough to successfully complete their work task, one half the number of respondents rated "5: Strongly agree" in the five rank evaluation as a highest remark and all the remaining respondents rated "4: Agree". Additionally, all the employers answered that they would like to employ graduates from technical high schools again. Although the sample size is eight, the results indicate that the graduates are highly rated and their employers would like to keep hiring technical high school graduates from now on. Thus, from a long-term perspective, it might be expected that a number of graduates will be employed in the industrial sectors as long as there is a need for highly skilled technical workers in the industrial sectors.

Realistically speaking, however, it might be difficult to determine whether or

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[1] Jose Marti, St. Andrew, Kingston, Holmwood, Frome, and Marcus Garvey technical high schools

[2] Region 1: Kingston, St. Andrew, and Western St. Thomas; Region 2: Eastern St. Thomas, Portland, and St. Mary; Region 3: St. Ann and Trelawny; Region 4: St. James, Hanover, and Westmoreland; Region 5: St. Elizabeth and Manchester; Region 6: Clarendon and St. Catherine

[3] All the TVET students are supposed to have the CAD course, so the CAD is omitted from the Table 1.

not the quality of TVET is improved through the in-service training sessions alone, in the absence of any mechanism through which JMTHS and other technical high schools are able to collaborate and communicate with each other.

Table 1: The number of JMTHS graduates employed by the industrial sectors

Fields	Categories	2001	2002	2003	2004	2005
Mechanical engineering	# of graduates employed by the industrial sector	4	4	10	11	14
	# of self-employed in the same field	-	1	-	-	1
	Graduates continuing the study in the same field	4	3	18	8	17
	# of graduates	10	8	36	19	35
Electronics	# of graduates employed by the industrial sector	14	10	12	10	12
	# of self-employed in the same field	3	4	-	-	-
	Graduates continuing the study in the same field	8	6	14	15	9
	# of graduates	25	21	29	27	22
Auto mechanics	# of graduates employed by the industrial sector	10	12	15	10	10
	# of self-employed in the same field	9	3	5	4	2
	Graduates continuing the study in the same field	10	10	11	15	14
	# of graduates	34	30	34	35	29

Source: Jose Marti Technical High School

3.1.2 Relationship between the Overall Goal and the Project Purpose

The in-service training sessions at JMTHS have not been carried out since the termination of the project because the MOEYC cannot secure the budget for the implementation. However, the improved TVET in the four fields has been conducted at technical high schools in Jamaica through the teachers trained at JMTHS during the cooperation period. According to the questionnaire survey targeting 246 students at six technical high schools as mentioned above, students are quite satisfied with the technical knowledge and teaching skills of their teachers who participated in in-service training sessions at JMTHS. As shown in the Figure 1 (A), 93.5% of students responded that they were either “5: Strongly satisfied” or “4: Satisfied” with their teachers’ technical knowledge. Moreover, in the Figure 1 (B), 95.9% of students responded that the teaching skills of the teachers were either “5: Excellent” or “4: Good”. However, it might be difficult to determine whether or not the quality of TVET is improved through the in-service training sessions alone.

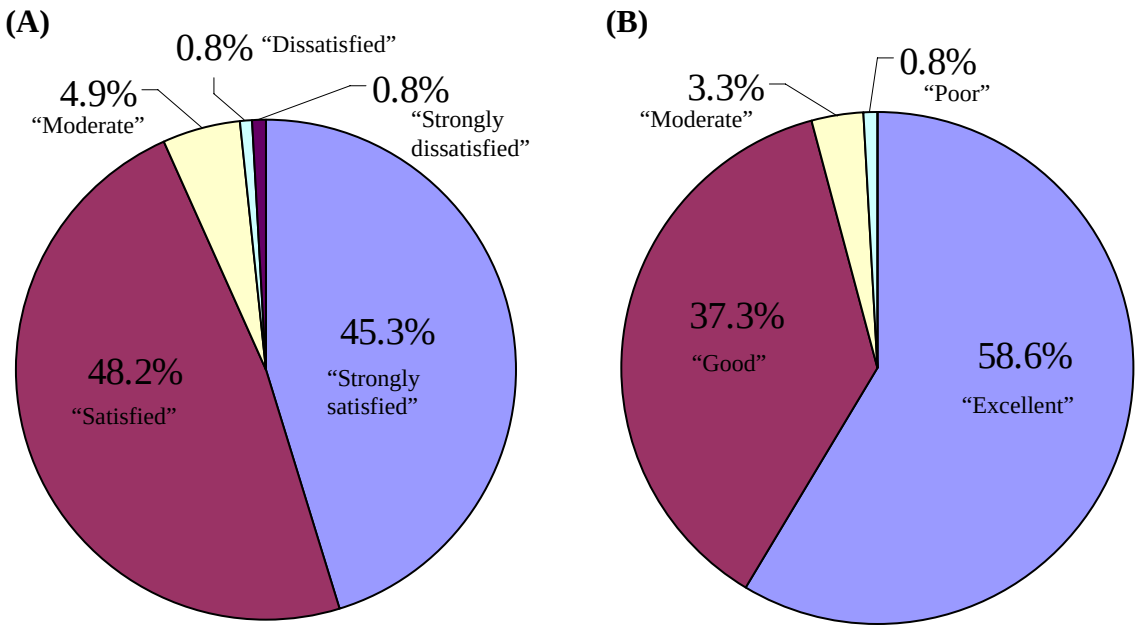

Figure1. (A) Teachers' technical knowledge and (B) teaching skills evaluated by 225 students at technical high schools

Additionally, the percentage of successful candidates of the CXC and City & Guilds examinations is gradually increasing at JMTHS in the fields of electronics and auto mechanics respectively as shown in the Table 2 below. On the other hand, the percentage of successful candidates in the NVQJ examination tends to decrease in the field of auto mechanics because one student did not attend the examination and two students failed in the practical parts although all the 11 students passed the theoretical parts. Moreover, although the percentage of successful candidates of the CXC examination increases from 2004 to 2005 in mechanical engineering, the percentage dramatically decreases from 2003 to 2004. This is because 7 students did not submit the School Based Assessment (SBA) for the practical lessons. As a consequence of this, it might be untimely to say, at this stage, that the number of successful candidates of the examinations has been increasing continuously. Thus, going forward, the number and the percentage of successful candidates of those examinations should be constantly monitored.

The information on the number of the enrolment and the performance of students is attached to the Annex 6 and 7.

Table 2: The number of successful candidates of the CXC, the City & Guilds, and the NVQJ examinations at Jose Marti Technical High School

Fields	Types of examinations	2003			2004			2005		
		candidate	passed	%	candidate	passed	%	candidate (*1)	passed (*2)	%
Mechanical engineering	CXC	19	16	84.2	15	8	53.3	27	17	63.0
Electronics	CXC	15	12	80.0	23	21	91.3	17	16	94.1
Auto mechanics	City & Guilds	15	12	80.0	15	12	80.0	11	9	81.8
	NVQJ	17	12	70.6	24	23	95.8	12	9	75.0
CAD	CXC	1	1	100.0	1	1	100.0	0	0	-

Source: Jose Marti Technical High School

*1: In the field of CAD, although no students had the CXC examination in 2005, 12 students have already registered for the CXC examination in 2006.

*2: In the mechanical engineering, 8 students failed in the theoritical parts and 2 students did not attend the CXC examination.

Technical high school teachers participating in the in-service training sessions evaluated the level of the in-service training sessions. According to the questionnaire survey to 19 teachers, 63.2% of teachers responded that the level of the in-service training sessions was either “very high” or “high” as shown in the Figure 2. Thus, the teachers are moderately satisfied with the level of the in-service training sessions. Although the sessions are very instrumental to gain technical knowledge for technical high school teachers, the sessions have not been conducted continuously because of the insufficiency of the budget for the training sessions.

In terms of the practical lessons, importantly, the issue is that other technical high schools do not have the same facilities and equipment utilized in the in-service training sessions, so trained teachers cannot transfer accurately and sufficiently to students what they have learned at JMTHS. In other words, the skills and knowledge gained by trained teachers are not necessarily utilized and applied at their schools in the same manner.

The contents of the in-service training sessions, including the number of the participants in the sessions, are shown in the Annex 8 and 9 at the end of this Report.

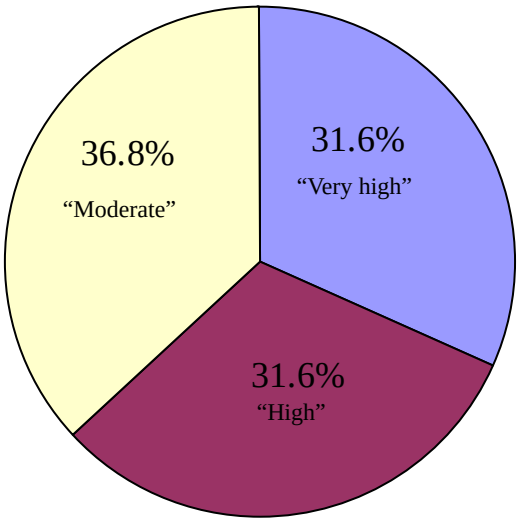

Figure2. The level of the in-service training sessions evaluated by technical high school teachers

3.1.3 Important Assumptions

There are two important assumptions from the project purpose to the overall goal: (1) the technical high school teachers remain teaching TVET and (2) the curriculums in the four fields are consistent with the needs of the industrial sectors.

Trained teachers at technical high schools are often leaving their schools and taking knowledge and skills with them, which are very crucial for the schools and students. This is an external condition which the schools have no control over, so it is critical that the relevant department of the schools document the knowledge and skills of the teachers before they leave the schools.

In terms of the curriculums in the four fields, the MOEYC is planning to change to a competency-based approach for teaching, instead of following a strict timeline aimed at completing the whole curriculum. In this approach, teachers will be asked to teach students at a pace with which the students feel more comfortable by splitting the curriculum into different modules. The aim is for students to be developed according to their competencies and be certified for the modules they have completed even though the whole curriculum may not be covered. Each module will then represent a job area. However, it poses the question as to whether or not the competency-based approach will meet the needs of the industrial sector.

3.2 Sustainability of the Project

3.2.1 Policy and institutional aspects

The HEART Trust/NTA[4] contributes to development of all the technical high schools, including JMTHS, in Jamaica so as to offer training sessions to support for workforce development in Jamaica and financial support to assist in the upgrading and maintenance of facilities in the technical high schools. The HEART Trust/NTA is involved in professional development for teachers' training programs. Some teachers, who are not fully qualified, are able to improve their qualifications by participating in the Vocational Training Development Institute (VTDI)[5] program. According to the education officer of the MOEYC, over 250 teachers in the school system do not have teaching diplomas, and the VTDI is currently to train 74 of these teachers. It will contribute to the quality of education in technical high schools.

In addition, the HEART Trust/NTA has been addressing the equipment needs of the technical high schools through the Technical High Schools Development Project (THSDP). The THSDP started in 1997 and aimed at upgrading and maintaining facilities for the 14 technical high schools in Jamaica. For example, the THSDP has provided and maintained several computers at the 14 technical high schools and has assisted in upgrading out-of-date computers. The Heart Trust/NTA can be a possible funding source for the equipment and maintenance needs in JMTHS and other technical high schools.

Furthermore, the TVET Rationalization project, which is to be formulated by the MOEYC, seeks to spread the use of equipment among technical high schools located in close proximity to each other, in order to share technological equipment at the satellite schools.

3.2.2 Administrative and financial aspects

(a) Teaching staff in the area of TVET

The number of JMTHS teaching staff in the area of TVET is maintained at the same level through 2001 to 2005 as shown in the Annex 10. Even if the technical high schools would like to increase the number of teachers, the MOU[6] creates certain restrictions with regards to hiring new staff. On the other hand, teachers at technical

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[4] The Heart Trust/National Training Agency is the quasi-governmental agency in Jamaica. It receives funding from a 3% levy on all employers in Jamaica, who have a payroll of over J$ 14, 000 per week.

[5] VTDI is the professional training arm of the Heart Trust/NTA. They offer tertiary level education in a variety of areas including information and communication technology, entertainment management, instructor training, and Career Guidance and Counseling.

[6] "The Memorandum of Understanding for the Public Sector", between the Government of Jamaica and the Jamaica Confederation of Trade Unions, includes general policies on wage and employment restrictions for public sector workers, for the period April 1, 2004 to March 31, 2006.

high schools are often leaving their schools as mentioned earlier. Although 17 technical high school teachers out of 19 answered “Yes” with reference to the question as to whether they wanted to continue teaching at technical high schools or not, these results do not guarantee that the teachers will continue teaching at their schools in the future.

(b) Budget for the educational sector

As shown in Annex 11, the MOEYC has kept the budget around 9 – 10 % of the national budget from FY 2000 – 2004. Also, the area of TVET in the MOEYC has been maintained around 3.5 % of the MOEYC budget from FY 2000 – 2004. Although multilateral/bilateral funding is allocated to projects for the TVET, the funds are not added in the budgetary sheet of Annex 11. Overall, the budgetary trend has favorably been kept at the decent level in the past five years.

(c) In-service training sessions

According to the comment from the MOEYC, unfortunately, there are factors that make it difficult to continue in-service training sessions at JMTHS, that is, the MOEYC does not have enough funds available to provide accommodation and transportation for the participants in the in-service training sessions.

(d) Teaching aids for practical lessons

Through the interview with the teachers at St. Andrew and Frome technical high schools, the Study Team recognizes that they are impressed with teaching aids used in the in-service training sessions, but they feel that their students are not able to receive the same benefits from the lessons because the students do not have these teaching aids and materials for the practical lessons in their schools. If teachers at the technical high schools are able to teach utilizing materials, such as, electronic kits used in the in-service training sessions, the students’ understanding will be greatly enhanced. Thus, the TVET Rationalization project and the THSDP will be able to contribute to the improvement of TVET activities at technical high schools as mentioned above.

(e) Maintenance system of equipment

In terms of budget allocation for the maintenance of equipment, the MOEYC sends funds to each technical high school, and then the schools have to decide on their own budget. Thus, each school has its own responsibility for the maintenance of equipment. In fact, there are no extra funds put aside by the MOEYC for the maintenance of equipment. In this connection, actual expenditure for maintenance of the

equipment at JMTHS is shown in Annex 12.

Although the conditions of the main equipment at JMTHS are good for the most parts, some of the equipment have been out of operation at JMTHS. For example, since some of the equipment from Japan are unique in Jamaica, it is difficult to repair them and to find an agent to fix them. For example, the Computer Numerical Control (CNC) machine has been out of operation at JMTHS for a long time, and they have not been able to find an agent to repair it. The result is that this cutting-edge machine has not been utilized for the past three years. Although a senior volunteer was dispatched to JMTHS as an educational equipment maintenance advisor for one year after the termination of the project, remarkable effects did not show up. Please see the Annex 13 for the current status of each piece of equipment in detail.

Importantly, in terms of maintenance of equipment, technical high schools can collaborate with the Heart Trust/NTA by sending in proposals for financial support to them. Although the Heart Trust/NTA has not currently allocated any financial resources for the maintenance of equipment donated to JMTHS by JICA, it could be expected that the Heart Trust/NTA will budget to assist JMTHS with its maintenance of equipment because the principal of JMTHS has been seeking assistance for the maintenance.

3.2.3 Technological aspects

(a) Competency of teachers at JMTHS

Technical high school teachers participating in the in-service training sessions highly rated the JMTHS teachers with reference to their competency for improving TVET through the in-service training sessions. According to the questionnaire survey directed to 19 technical high school teachers, 75.0% of teachers responded that the JMTHS teachers were either “5: extremely competent” or “4: competent” as shown in Figure 3. In addition, technical high school students also highly evaluated the trained teachers as explained in the section of 3.1.2 above. Therefore, the JMTHS teachers are quite competent to improve TVET.

The JMTHS teachers who were trained in Japan are resource persons for TVET in Jamaica, so technical high schools should employ them more effectively from now on.

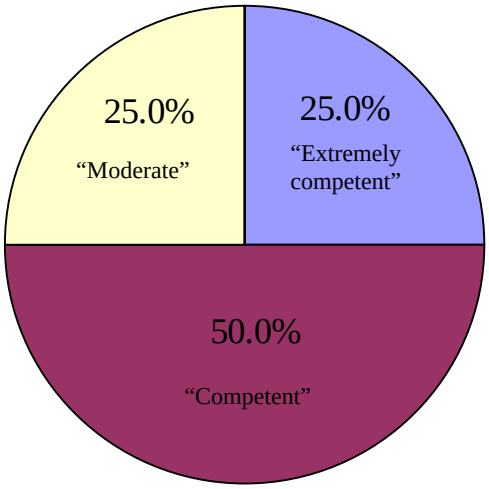

Figure 3. Competency of the JMTHS teachers in order to improve TVET through the in-service training sessions

(b) TVET teachers' training materials for the in-service training sessions

Teachers trained through the in-service training sessions evaluated the teachers' training materials for the in-service training sessions. According to the questionnaire survey directed to 19 technical high school teachers, 89.5% of teachers regarded the teachers' training materials as either "5: Excellent" or "4: Good" as shown in the Figure 4.

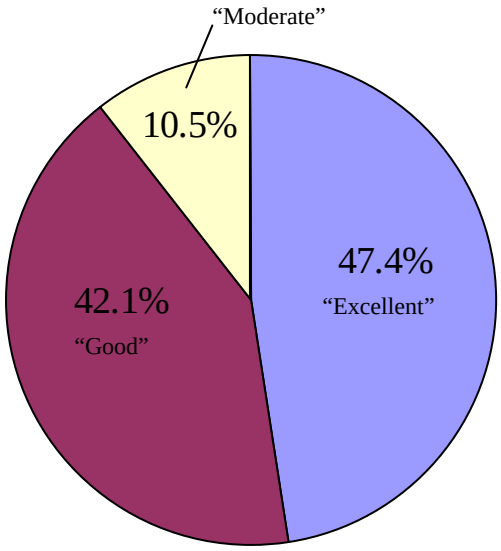

Figure 4: Teachers' training materials for the in-service training sessions

3.2.4 Cross-cutting issues

One of the factors inhibiting the improvement of TVET in Jamaica is that there has been a stigma attached to TVET by many Jamaican parents. TVET subjects have been seen as second class when compared to traditional subjects, such as mathematics, English, and the sciences. However, this perception has been changing, with the increase in the number of employers who hire graduates from technical fields and with the influence of the Heart Trust/ National Training Agency.

Also, violent behavior of students in schools has been a social phenomenon across the country, which negatively affects students' performances. Violence in some Jamaican communities and schools has affected students and teachers in different ways, such as physical fighting, infliction of bodily harm with or without the use of weapons, mischief making and provocation, the regular use of obscene and abusive language, disrespect towards teachers, etc. Some students become desensitized to the effects of violence, and others use it as a self-protective measure. Students have been psychologically discouraged for learning due to fear or a sense of hopelessness. In the same way, teachers might not feel that they want to continue teaching because some students do not respect teachers any more as did before.

3.3 Analysis of Factors of Impact and Sustainability

3.3.1 Factors promoting Impact

The Caribbean Examination Council (CXC) is utilizing parts of the CAD syllabus developed by JMTHS teachers and Japanese experts. According to a teacher at JMTHS, up to five years ago, there was no formal examination on CAD in the Caribbean. The CAD section is an optional section in the Technical Drawing of the CXC examination. Even though not many students in Jamaica take the CAD section in the CXC examination, the use of CAD in technical high schools across the country has increased.

At Holmwood Technical High School, the CAD facilities were established through the grant assistance for grassroots projects by the Embassy of Japan in December 2002. The design of the CAD facilities at JMTHS has heavily influenced the design of the CAD facilities at Holmwood. Holmwood plans to have the training sessions on CAD for teachers and students from other technical high schools in the same way that the in-service training at JMTHS was conducted. Presently, JMTHS and Holmwood technical high school are planning a workshop for teachers of technical drawing (TD) in all technical high schools. This was agreed upon after discussions between the principals of both schools.

3.3.2 Factors promoting Sustainability

A major promoting factor from the in-service training sessions is that the training sessions brought teachers at technical high schools together at JMTHS. Thus, the in-service training sessions provided technical high school teachers with opportunities to create a network, to share ideas, and to update each other on what was happening at their respective technical high schools from the long-term perspective.

As mentioned above, the VTDI put in place by the HEART Trust/NTA helps provide tertiary level training for teachers. Thus, the teachers should fully utilize this kind of training opportunity in order to enhance their technical knowledge and teaching skills.

3.3.3 Factors inhibiting Impact

The indicator of the Overall Goal was not set up appropriately. For instance, although the indicator of "employment (of technical high school graduates) by industrial sectors" was prepared, there were no tracer studies of the graduates in technical high schools, including JMTHS, in Jamaica. Under this circumstance, it is difficult to confirm the attainment of the Overall Goal as a part of positive impacts.

Several teachers in technical high schools have not yet received the certificates of completion for the in-service training sessions, which they were supposed to be provided with. This might hinder the TVET activities in terms of teachers' incentives and motivation for teaching. According to the interview survey, involving several teachers at the technical high schools, at the beginning of the in-service training sessions at JMTHS, the MOEYC explained to the trainees that certificates would be issued upon completion of the training sessions at JMTHS. However, certificates were not distributed to all the participants, even though they had completed the training sessions. In this sense, it might be true to say that "the project is incomplete because teachers were not certified as promised" (quoting the statement from one of respondents through the questionnaire survey). This might be due a lack of effective administration by the project team and the MOEYC during the cooperation period.

Moreover, a teacher at a technical high school who had the in-service training sessions was not teaching machine shop but teaching physical education instead. After returning from his leave, a new teacher for machine shop, who did not participate in the in-service training, was assigned to the machine shop and he was deployed as a physical education teacher. The teacher was disappointed with the fact that the school did not give him the opportunity to continue teaching in the field although, according to him, "the examination pass rate for the students was 98% at the CXC examination" under his

tutelage. In response to this, the school administration explained that he was the only teacher in the field at the time when the in-service training sessions were carried out. In addition, according to the school, “the teachers do not have the exact qualification for the field.” In terms of the efficiency of the project, it can be said that it is inefficient because the project resources were not utilized for the achievement of the Overall Goal. However, this observation may provide an indication of what is going on after the termination of the project.

In addition, there are other two inhibiting factors as shown below:

- There are not enough job opportunities for many graduates of technical high schools to practice their enhanced skills; and
- Violence of students in schools is widespread across the country, which negatively affects students’ performance.

3.3.4 Factors inhibiting Sustainability

A number of factors inhibiting the sustainability of the project were raised during the interview survey and are shown below:

- The in-service training sessions at JMTHS have not been carried out since the termination of the project because the MOEYC cannot secure the budget for the implementation. However, it might be difficult to determine whether or not the quality of TVET is improved through the in-service training sessions alone. Furthermore, although it is necessary to improve teachers’ technical knowledge and teaching skills at technical high schools continuously, there is the absence of any mechanism through which JMTHS and other technical high schools are able to collaborate and communicate with each other.
- Some of equipment have not been fixed and utilized yet because of a lack of makers to repair the equipment which are unique in Jamaica and also due to financial resources. Also, in the in-service training sessions at JMTHS, teaching aids which are not readily available in technical high schools were utilized in the practical lessons. However, it is of no value to learn the practical lessons with the kits and equipment which are only used at JMTHS because trainees in the in-service training sessions cannot continuously employ them in their technical high schools.
- Several highly trained teachers in Japan left technical high schools and were recruited to work abroad. Loss of the competent teachers negatively affects the sustainability of the project from the aspect of human resources. Thus, unless the trained teachers continue teaching at their schools for a certain period, it is limited to covey their knowledge and skills to teachers and students at their technical high schools.

3.4 Conclusions

The JMTHS graduates are highly rated by the employers, and they would like to keep hiring technical high school graduates from now on. From a long-term perspective, it might be expected that a number of graduates will be employed in the industrial sectors as long as there is a need for highly skilled technical workers in the industrial sectors. Furthermore, technical high school students are quite satisfied with the technical knowledge and teaching skills of their teachers who participated in in-service training sessions at JMTHS. Also, the CXC is utilizing parts of the CAD syllabus developed by the project and making use of it in the Technical Drawing of the CXC examination. These positive outcomes are produced by the efforts of the project-related personnel.

Although the positive outcomes appear in a certain degree at JMTHS as a pilot school, the impacts to other technical high schools have not been grasped because technical high schools did not track the indicator of the Overall Goal, “employment by industrial sectors”, at all. Also, the in-service training sessions at JMTHS have not been carried out since the termination of the project because the MOEYC cannot secure the budget for the implementation. Furthermore, it might be difficult to determine whether or not the quality of TVET is improved through the in-service training sessions alone. The MOEYC and JMTHS need to make efforts in order to achieve the Overall Goal. Altogether, it is considered that the impact of the project is low.

From the perspective of the project sustainability, there are two aspects of budget and equipment. In the budgetary aspect, the area of TVET has been maintained around 3.5 % of the MOEYC budget from FY 2000 – 2004 as shown in Table 2, but the MOEYC cannot secure the budget for the continuation of the in-service training sessions at JMTHS.

In the aspect of equipment, some of equipment have not been fixed and utilized yet because of a lack of makers to repair those equipment and also due to financial resources. Additionally, it is of no value to carry out the in-service training sessions with the practical kits and equipment which are only used at JMTHS.

In order to promote the sustainability of the project, it is desirable to conduct training sessions for teachers continuously and to upgrade and maintain facilities and equipment actively by employing the HEART Trust/NTA. Although it seems that the sustainability of the project is low at this time, it would be possible to enhance the sustainability of the project by strengthening the collaboration with the HEART Trust/NTA, etc.

4. Recommendations and Lessons Learned

4.1 Recommendations

To the MOEYC and Technical High Schools in Jamaica:

- In order to improve the quality of TVET, a network between JMTHS and other technical high schools should be established to facilitate collaboration with technical high schools and to share the knowledge, skills, ideas, etc. with technical high school teachers. If technical high schools establish a steering committee for the improvement of the TVET with the initiatives of the MOEYC as its center, it will contribute to the thrust of TVET in Jamaica.
- There are no tracer studies of graduates who have been employed in the industrial sectors. In order to assess the achievement of TVET, the MOEYC should set up the benchmarks, such as employment rate and tertiary education rate, which should be recorded by all the technical high schools. If this is done, it will be easier for all the technical high schools to compare their own performances year by year in order to understand their achievements.
- There are not enough job opportunities for many graduates to practice the knowledge and skills gained at their schools. It is recommended that the MOEYC and technical high schools establish a job placement service through which technical high schools will be able to provide assistance for the graduates by matching their skills with the needs of employers.
- Several teachers participating in the counterpart training in Japan are leaving their technical high schools. The knowledge and skill of those teachers are very crucial for the schools and teachers in the same fields. This is outside the control of the schools, but the responsible department in the schools should instruct those trained teachers to document their knowledge and skills learned through the training program before they leave their schools.
- Teachers regard the certificate as a testimony to the enhanced qualifications obtained in the field they are teaching. Because the certificates are able to provide incentives and a sense of accomplishment for the teachers, it is necessary to provide certificates to motivate, to satisfy, and to elevate the confidence level of the teachers in their field.
- During the interview survey at technical high schools, teachers expressed a desire to have opportunities for in-service training sessions in order to keep their technical knowledge and teaching skills. Because there are several teachers who had received the in-service training sessions at JMTHS leaving their schools, these training sessions should be held for sharing the knowledge and skills with the

teachers who did not participate in the training sessions before, for the purpose of the improvement of TVET in Jamaica.

To JICA:

As mentioned above, the certificates for some of teachers who completed the in-service training sessions have not yet been provided for them. This might be due a lack of effective administration during the training sessions. It is recommended that the certificates be provided for teachers, as soon as possible, in consultation with the MOEYC. In the event that there is another opportunity to hold training sessions in the future, it will be expected that the training program is run more smoothly, especially the administrative aspects.

4.2 Lessons Learned

- In order to reflect what teachers learned at a pilot school to their technical high schools, specific measures should have been put in place. Even if teachers learn practical skills with new kits and equipment, they cannot transfer the same practical lessons to their students without the necessary kits and equipment. In fact, a teacher stated in the questionnaire survey that “most of the technologies introduced were not common to Jamaica.” Thus, the kits used in the practical demonstrations at the pilot school should be selected, based on the conditions and environment in the recipient countries. It implies that kits and equipment which are readily available for each school at a reasonable cost should be employed in the practical lessons. Therefore, if an upcoming project wishes to extend what a pilot school has conducted to other schools *within the project period*, then the current situation and the circumstances at all the target schools should be carefully examined.
- The indicators should be clearly set up before and during the project. Thus, it is important to prepare the indicators which counterparts are able to track even after the termination of the project. Simultaneously, the means of verifications must be examined thoroughly in terms of cost, the credibility of data sources, and ease/difficulty of obtaining data. Otherwise, counterparts (and the project if during the cooperation period) cannot collect the specific data required for the logframe.
- Certificates for trainees are very crucial for the enhancement of their qualifications. Also, they would provide incentives for the teachers as well as motivate them. In order to satisfy the teachers in terms of the contents of training and administrative aspects, the preparation and pre-explanation for the certificates are necessary for

the training sessions.

- It should be confirmed whether or not trainees who join the counterpart training in Japan have the willingness to continue their present job for several years with a “written agreement” before launching the training program. Otherwise, it cannot be said that the resources are utilized efficiently. Thus, it might be necessary to have teachers, trained by the implementing agency and JICA, bonded to teaching in the field in which they were trained for at least a couple of years. This will help ensure that teachers spread the knowledge they gained from the training sessions to their students and other teachers.
- During the interview survey, the Team became interested in the following case. A teacher at Marcus Garvey joining the in-service training sessions was not teaching machine shop but is now teaching physical education. Thus, the school should keep the teachers who are involved in the training sessions in the applied fields, and the Ministry concerned should give the schools directives, which aim at having teachers continue teaching in the relevant fields in which they were trained.

4.3 Follow-up Situation

After the termination of the project, two senior volunteers were simultaneously dispatched to JMTHS as (1) an educational equipment maintenance advisor and (2) a vocational education curriculum advisor for one year. This is because the weaknesses were identified in the maintenance of equipment and in the development of curriculums and training materials. Thus, the advisor (1) provided necessary technical/educational guidance in equipment maintenance management for teachers, and the advisor (2) gave necessary technical/educational guidance to assist in developing curriculums and training materials for teachers. In this follow-up, however, because the counterparts did not exercise their ownership, remarkable effects did not show up although two senior volunteers were dispatched to JMTHS.

Annex 1:

Schedule of the study

Annex 1: Schedule of the Ex-post Evaluation Study

Day	Date		Schedule		Place	Remarks
			AM	PM		
1	Oct. 29th	Sat	Departure from Tokyo			
2	Oct. 30th	Sun	Arrival in Kingston	Meeting with Local Consultant	Kingston	
3	Oct. 31st	Mon	Kick-off meeting in JICA	Visit to MOH and PIOJ	Kingston	HC
4	Nov. 1st	Tue	Visit to SRHA	Visit to Health Center in Black River	Mandeville/ Black River	HC
5	Nov. 2nd	Wed	Visit to Health Center in May Pen	Modification of questionnaires	May Pen/Kingston	HC
6	Nov. 3rd	Thu	Interview and questionnaire survey to C/P in SRHA and Mandeville Health Center		Mandeville	HC
7	Nov. 4th	Fri	Visit and questionnaire survey at JMTHS		Spanish Town	TVET
8	Nov. 5th	Sat	Summarizing findings		Kingston	
9	Nov. 6th	Sun	Summarizing findings		Kingston	
10	Nov. 7th	Mon	Visit and questionnaire survey to MOEYC	Distribute the questionnaires in Black River	Kingston/Black River	HC
11	Nov. 8th	Tue	Interview and questionnaire survey at St. Andrew THSs	Interview and questionnaire survey to MOH	Kingston	HC/TVET
12	Nov. 9th	Wed	Questionnaire survey to patients at Wellness Clinic in Clarendon	Join the JACOSH meeting in Mandeville	Clarendon/ Mandeville	HC
13	Nov. 10th	Thu	Interview and questionnaire survey at Frome THS	Interview and questionnaire survey at Holmwood THS	Frome/ Christiana	TVET
14	Nov. 11th	Fri	Compiling findings	Interview and questionnaire survey at JMTHS	Kingston / Spanish Town	TVET
15	Nov. 12th	Sat	Summarizing findings		Kingston	
16	Nov. 13th	Sun	Summarizing findings		Kingston	
17	Nov. 14th	Mon	Interview to Health Promotion and Protection Division of MOH	Questionnaire survey at St. Andrew THSs	Kingston	HC/TVET
18	Nov. 15th	Tue	Interview and questionnaire survey at Kingston THS	Interview and questionnaire survey at Marcus Garvey THS	Kingston/ St. Ann's Bay	TVET
19	Nov. 16th	Wed	Compiling findings	Visit and interview to Heart Trust/ Interview with the Technical Director of NERHA	Kingston	TVET/HC
20	Nov. 17th	Thu	Interview to the Diabetes Association of Jamaica / Interview to Blue Cross	Compiling findings	Kingston	HC
21	Nov. 18th	Fri	Visit and interview to WRHA	Questionnaire survey at Frome THS	Montego Bay/ Frome	HC/TVET
22	Nov. 19th	Sat	Summarizing findings		Kingston	
23	Nov. 20th	Sun	Summarizing findings		Kingston	
24	Nov. 21st	Mon	Interview and data collection at SRHA	Interview and data collection at JMTHS/	Mandeville/ Spanish Town/ Kingston	HC/TVET
25	Nov. 22nd	Tue	Meeting with Dr. Skyers of NERHA	Compiling findings	Kingston	HC
26	Nov. 23rd	Wed	Meeting with Dr. Sandra Chambars/ Interview to the Heart Foundation of Jamaica	Questionnaire collection at Kingston THS/ University of West Indies	Kingston	HC/TVET
27	Nov. 24th	Thu	Visit and interview to SERHA	Questionnaire collection at Marcus Garvey THS/ Visit and interview to NERHA	Kingston/ St. Ann's Bay/ Ocho Rios	HC/TVET
28	Nov. 25th	Fri	Final meeting at JMTHS	Final meeting with technical director of SRHA/ Questionnaire collection at Holmwood THS	Spanish Town/ May Pen/ Christiana	TVET/HC
29	Nov. 26th	Sat	Summarizing findings		Kingston	
30	Nov. 27th	Sun	Summarizing findings		Kingston	
31	Nov. 28th	Mon	Meeting with PIOJ, MOH, MOEYC		Kingston	TVET/HC
32	Nov. 29th	Tue	Internal meeting with local consultant in JICA	Departure from Kingston	Kingston	
33	Nov. 30th	Wed				
34	Dec. 1st	Thu		Arrival in Tokyo	Tokyo	

HC: The Project for Strengthening of Health Care in the Southern Region of Jamaica
JMTHS: Jose Marti Technical High School
MOEYC: Ministry of Education, Youth and Culture
MOH: Ministry of Health
PIOJ: Planning Institute of Jamaica
SRHA: Southern Region
THS: Technical High School

Annex 2:

List of interviewees

Annex 2: List of Interviewees

Name	Position
(1) Ministry of Education, Youth and Culture (MOEYC)	
Patrick Facey	Assistant Chief Education Officer, Technical &Vocational Un
(2) Planning Institute of Jamaica (PIOJ)	
Leila Palmer	Director, External Cooperation Management Division
Pauline Morrison	Manager, Bilateral Unit
Marsha Woolcock	Project Economist
(3) Jose Marti Technical High School (JMTHS)	
Bevar E. Moodie	Principal
Dorothy Scott	Vice Principal
Earl Brown	Teacher, Machine Shop
Raston Scully	Teacher, Electronics
Lucille Blake	Teacher, Auto Mechanics
Ernest Donaldson	Teacher, CAD
(4) HEART Trust/ National Training Agency	
Loveda Jones	Director, Technical High Schools Development Project, HEART Trust/NTA
(5) St. Andrew Technical High School	
Curline Christie	Principal
Mr. Rhoden	Vice Principal
(6) Kingston Technical High School	
Robert Allen	Vice Principal
Christopher Brown	Teacher
Clive Rowe	Teacher
Arthur Pinnock	Teacher
Winston Davis	Teacher
Horace Sheperd	Teacher
Stenneth Peart	Teacher
(7)Marcus Garvey Technical High School	
Mr. Riley	Principal
Ms. Panton	Vice Principal
Mr. Tate	Teacher
Mr. Chedda	Teacher
(8)Frome Technical High School	
Silvera Ricketts	Principal
N. Vickers	Vice Principal
Ferron Campbell	Teacher
Rhon Harvey	Teacher
Cleveland Beharry	Teacher
Glenford Gardner	Teacher
(9) Holmwood Technical High School	
Paul Bailey	Principal
C. Mcarthy	Teacher
Mr. Brown	Teacher
Mr. Foster	Teacher

Annex 3:

Evaluation grid

Annex 3: Evaluation Grid

	Evaluation Questions		Data Needed	Data Sources	Data Collection Methods
	Main Questions	**Sub-questions**			
Impact	Has the Overall Goal already been achieved?	Do the industrial sectors employ graduates from the THSs[1] including JMTHS?	① **Employment of graduates from THSs by industrial sectors** ② **The number of graduates from THSs** ③ **Competency of graduates from THSs**	① Statistical material of MOEYC or JMTHS and 13 THSs ② Statistical material of MOEYC or JMTHS and 13 THSs ③ Employers	① Literature Survey or Questionnaire ② Literature Survey or Questionnaire ③ Questionnaire
	What is the relationship between the Overall Goal and Project Purpose?	Is the improved TVET conducted in the four fields?	① **The number of successful candidates of CXC (Caribbean Examination Council) in the field of mechanical engineering and electronics** ② **The number of successful candidates of the City&Guide examination in the field of auto mechanics** ③ **The number of enrolment to the TVET of 14 THSs in Jamaica** ④ **Performance of students** ⑤ **The contents of in-service training sessions in four fields for teachers of other THSs, the number of applicants and participants in each session, and the number of in-service training sessions** ⑥ **The level of in-service training sessions** ⑦ **Evaluation of the teachers of 14 THSs taking part in the in-service training sessions**	① Statistical material of MOEYC or JMTHS and 13 THSs ② Statistical material of MOEYC or JMTHS and 13 THSs ③ Statistical material of MOEYC or JMTHS and 13 THSs ④ 14 THSs ⑤ JMTHS, MOEYC ⑥ Teachers of 13 THSs taking part in the in-service training sessions ⑦ Students of THSs having the lectures from the left-hand teachers	① Literature Survey or Questionnaire ② Literature Survey or Questionnaire ③ Literature Survey or Questionnaire ④ Questionnaire ⑤ Questionnaire ⑥ Questionnaire ⑦ Questionnaire
	What are the factors inhibiting and promoting the achievement of the Overall Goal?		**Opinions of stakeholders**	① JMTHS ② MOEYC	① Questionnaire ② Questionnaire
	Are there any influences of the Important Assumptions from the Project Purpose to the Overall Goal?	Are the curriculums in the fields of auto mechanics, CAD, electronics, and machine shop consistent with the needs of the industrial sectors?	**Contents of curriculum**	① JMTHS ② MOEYC ③ Curriculum	① Questionnaire ② Questionnaire ③ Literature Survey
	Are there either positive or negative Impacts other than the Overall Goal?	Is the Caribbean Examination Council (CXC) utilizing parts of CAD syllabus developed by the project?	**Opinions of stakeholders**	① JMTHS ② MOEYC	① Interview ② Interview
		Does Holmwood technical high school fulfill its function as the sub-center of JMTHS in the field of CAD?	**Opinions of stakeholders**	① HWTHS ② JMTHS ③ MOEYC	① Interview ② Interview ③ Interview
	What are the factors inhibiting and promoting sustainability?		**Opinions of stakeholders**	① JMTHS ② MOEYC	① Questionnaire ② Questionnaire

[1] THSs: Abbreviation of "Technical High Schools"

	Are the policy and institutional aspects well-prepared?	Does the MOEYC have the policy for disseminating the improved TVET across the country?	**The relationship between "Five-year Educational Development Plan" by the MOEYC and TVET activities**	① Five-year Educational Development Plan ② MOEYC	① Literature Survey ② Interview
Sustainability	Are the administrative and financial aspects conducted favorably?	Are teaching staff appropriately assigned at 14 THSs?	**The number of teachers at 14 THSs**	① JMTHS and 13 THSs ② MOEYC	① Questionnaire ② Literature Survey
		Will teachers of 14 THSs continue teaching in their schools?	**Opinions of participants**	① Teachers of JMTHS and 13 THSs ② MOEYC	① Questionnaire ② Interview
		Are budgetary measures taken for the TVET activities?	**① Budget for the educational sector and the ratio of the budget to the national one** **② Opinions of participants**	① Budgetary sheet by MOEYC ② JMTHS, MOEYC	① Questionnaire ② Questionnaire
		Is the operational budget secured for the in-service training sessions for the teachers at THSs?	**Tendency and present status of the budget for the in-service training sessions**	① JMTHS ② MOEYC	① Questionnaire ② Questionnaire
		Has the maintenance system of equipment already been established, including personnel assignment of maintenance? Also, is the budget necessary for the maintenance and the consumables of the equipment secured?	**① Current condition and operational status of equipment** **② Budget for the maintenance and the consumables of the equipment**	① Checklist of equipment by JMTHS ②−1 JMTHS ②−2 MOEYC	① Questionnaire ②−1 Questionnaire ②−2 Interview
	Are the transferred technologies continuously utilized?	Are the trained C/P competent enough to promote the improved TVET activities in terms of in-service training sessions?	**① Self-evaluation by C/P** **② Evaluation by the students of THSs**	① JMTHS ② Students of THSs	① Questionnaire ② Questionnaire
		Are the contents of TVET teachers' training materials appropriate for the in-service training sessions?	**Opinions of teachers of 13 THSs taking part in the in-service training sessions**	① Teachers of 13 THSs taking part in the in-service training sessions ② JMTHS	① Questionnaire ② Questionnaire
	Are there any factors inhibiting the TVET activities by lack of concerns about social, cultural, and environmental aspects?		**Opinions of stakeholders**	① JMTHS ② MOEYC	① Questionnaire ② Questionnaire

Annex 4:

Evaluation questions and its results

Annex 4: Evaluation Questions and the Results

<table>
<tr><th></th><th colspan="2">Evaluation Questions</th><th>Results</th></tr>
<tr><th></th><th>Main Questions</th><th>Sub-questions</th><th></th></tr>
<tr><td rowspan="2">Impact</td><td>Has the Overall Goal already been achieved?</td><td>Do the industrial sectors employ graduates from the THSs including JMTHS?</td><td>
• Employment of JMTHS graduates in the industrial sectors
<table>
<tr><th>Fields</th><th>Categories</th><th>2001</th><th>2002</th><th>2003</th><th>2004</th><th>2005</th></tr>
<tr><td rowspan="4">Mechanical engineering</td><td># of graduates employed by the industrial sector</td><td>4</td><td>4</td><td>10</td><td>11</td><td>14</td></tr>
<tr><td># of self-employed in the same field</td><td>-</td><td>1</td><td>-</td><td>-</td><td>1</td></tr>
<tr><td>Graduates continuing the study in the same field</td><td>4</td><td>3</td><td>18</td><td>8</td><td>17</td></tr>
<tr><td># of graduates</td><td>10</td><td>8</td><td>36</td><td>19</td><td>35</td></tr>
<tr><td rowspan="4">Electronics</td><td># of graduates employed by the industrial sector</td><td>14</td><td>10</td><td>12</td><td>10</td><td>12</td></tr>
<tr><td># of self-employed in the same field</td><td>3</td><td>4</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Graduates continuing the study in the same field</td><td>8</td><td>6</td><td>14</td><td>15</td><td>9</td></tr>
<tr><td># of graduates</td><td>25</td><td>21</td><td>29</td><td>27</td><td>22</td></tr>
<tr><td rowspan="4">Auto mechanics</td><td># of graduates employed by the industrial sector</td><td>10</td><td>12</td><td>15</td><td>10</td><td>10</td></tr>
<tr><td># of self-employed in the same field</td><td>9</td><td>3</td><td>5</td><td>4</td><td>2</td></tr>
<tr><td>Graduates continuing the study in the same field</td><td>10</td><td>10</td><td>11</td><td>15</td><td>14</td></tr>
<tr><td># of graduates</td><td>34</td><td>30</td><td>34</td><td>35</td><td>29</td></tr>
</table>
Source: Jose Marti Technical High School

• Evaluation of JMTHS graduates by the employers (the sample size is eight)
According to the questionnaire survey directed to the employers selected by JMTHS with reference to the question as to whether graduates are competent enough to successfully complete their work task, one half the number of respondents rated “5: Strongly agree” in the five rank evaluation as a highest remark and all the remaining respondents rated “4: Agree”.

Additionally, all the employers answered that they would like to employ graduates from technical high schools again.
</td></tr>
<tr><td>What is the relationship between the Overall Goal and Project Purpose?</td><td>Is the improved TVET conducted in the four fields?</td><td>
• The number of successful candidates of each examination at JMTHS
<table>
<tr><th rowspan="2">Fields</th><th rowspan="2">Types of examinations</th><th colspan="3">2003</th><th colspan="3">2004</th><th colspan="3">2005</th></tr>
<tr><th>candidate</th><th>passed</th><th>%</th><th>candidate</th><th>passed</th><th>%</th><th>candidate</th><th>passed</th><th>%</th></tr>
<tr><td>Mechanical engineering</td><td>CXC</td><td>19</td><td>16</td><td>84.2</td><td>15</td><td>8</td><td>53.3</td><td>27</td><td>17</td><td>63.0</td></tr>
<tr><td>Electronics</td><td>CXC</td><td>15</td><td>12</td><td>80.0</td><td>23</td><td>21</td><td>91.3</td><td>17</td><td>16</td><td>94.1</td></tr>
<tr><td rowspan="2">Auto mechanics</td><td>City & Guilds</td><td>15</td><td>12</td><td>80.0</td><td>15</td><td>12</td><td>80.0</td><td>11</td><td>9</td><td>81.8</td></tr>
<tr><td>NVQJ</td><td>17</td><td>12</td><td>70.6</td><td>24</td><td>23</td><td>95.8</td><td>12</td><td>9</td><td>75.0</td></tr>
<tr><td>CAD</td><td>CXC</td><td>1</td><td>1</td><td>100.0</td><td>1</td><td>1</td><td>100.0</td><td>0</td><td>0</td><td>-</td></tr>
</table>
Source: Jose Marti Technical High School

• The number of the enrolment to the TVET at JMTHS
Please see the Annex 6.

• Performance of JMTHS students
Please see the Annex 7.

• Frequency and contents of the in-service training sessions
Please see the Annex 8 and 9.

• The level of in-service training sessions
According to the questionnaire survey to 19 teachers, 63.2% of teachers responded that the level of the in-service training sessions was either “very high” or “high”.

• Evaluation of the technical high school teachers taking part in the in-service training sessions by students
According to the questionnaire survey targeting 246 students at six technical high schools, students are quite satisfied with the technical knowledge and teaching skills of their teachers who participated in in-service training sessions at JMTHS. 93.5% of students responded that they were either “5: strongly satisfied” or “4: satisfied” with their teachers’ technical knowledge.

Moreover, 95.9% of students responded that the teaching skills of the teachers were either “5: excellent” or “4: good”.
</td></tr>
</table>

	What are the factors inhibiting and promoting the achievement of the Overall Goal?		• Several teachers in technical high schools have not yet received the certificates of completion for the in-service training sessions, which they were supposed to be provided with. This might hinder the TVET activities in terms of teachers' incentives and motivation for teaching. • A teacher at a technical high school who had the in-service training sessions was not teaching machine shop but teaching physical education instead. After returning from his leave, a new teacher for machine shop, who did not participate in the in-service training, was assigned to the machine shop and he was deployed as a physical education teacher. • There are not enough job opportunities for many graduates of technical high schools to practice their enhanced skills. • Violence of students in schools is widespread across the country, which negatively affects students' performance.
	Are there any influences of the Important Assumptions from the Project Purpose to the Overall Goal?	Are the curriculums in the fields of auto mechanics, CAD, electronics, and machine shop consistent with the needs of the industrial sectors?	• The MOEYC is planning to change to a competency-based approach for teaching, instead of following a strict timeline aimed at completing the whole curriculum. The aim is for students to be developed according to their competencies and be certified for the modules they have completed even though the whole curriculum may not be covered. However, this poses the question as to whether or not the competency-based approach will meet the needs of the industrial sector.
	Are there either positive or negative Impacts other than the Overall Goal?	Is the Caribbean Examination Council (CXC) utilizing parts of CAD syllabus developed by the project?	• The Caribbean Examination Council (CXC) is utilizing parts of the CAD syllabus developed by JMTHS teachers and Japanese experts. According to a teacher at JMTHS, up to five years ago, there was no formal examination on CAD in the Caribbean. The CAD section is an optional section in the Technical Drawing of the CXC examination. Even though not many students in Jamaica take the CAD section in the CXC examination, the use of CAD in technical high schools across the country has increased.
		Does Holmwood technical high school fulfill its function as the sub-center of JMTHS in the field of CAD?	• At Holmwood Technical High School, the CAD facilities were established through the grant assistance for grassroots projects by the Embassy of Japan in December 2002. The design of the CAD facilities at Jose Mart has heavily influenced the design of the CAD facilities at Holmwood. Presently, JMTHS and Holmwood technical high school are planning a workshop for teachers of technical drawing (TD) in all technical high schools. This was agreed upon after discussions between the principals of both schools.
Sustainability	What are the factors inhibiting and promoting sustainability?		Promoting factors: • A major promoting factor from the in-service training sessions is that the training sessions brought teachers at technical high schools together at JMTHS. Thus, the in-service training sessions provided technical high school teachers with the opportunities to create a network, to share ideas, and to update each other on what was happening at their respective technical high schools. • The VTDI put in place by the HEART Trust/NTA helps provide tertiary level training for teachers, in order to enhance their technical knowledge and teaching skills. Inhibiting factors: • The in-service training sessions at JMTHS have not been carried out since the termination of the project because the MOEYC cannot secure the budget for the implementation; • Some of equipment have not been fixed and utilized yet because of a lack of makers to repair the equipment which are unique in Jamaica and also due to financial resources; and • Several highly trained teachers in Japan left technical high schools and were recruited to work abroad.
	Are the policy and institutional aspects well-prepared?	Does the MOEYC have the policy for disseminating the improved TVET across the country?	• The HEART Trust/NTA is involved in professional development for teachers' training programs. Some teachers, who are not fully qualified, are able to improve their qualifications by participating in the Vocational Training Development Institute (VTDI) program. • The HEART Trust/NTA has been addressing the equipment needs of the technical high schools through the Technical High Schools Development Project (THSDP). The THSDP started in 1997 and aimed at upgrading and maintaining facilities for the 14 technical high schools in Jamaica. • The TVET Rationalization project, which is to be formulated by the MOEYC, seeks to spread the use of equipment among technical high schools located in close proximity to each other, in order to share technological equipment at the satellite schools.
	Are the administrative and financial aspects conducted favorably?	Are teaching staff appropriately assigned at 14 THSs?	• **The number of teaching staff at JMTHS** Please see the Annex 10.
		Will teachers of 14 THSs continue teaching in their schools?	• Although 17 technical high school teachers out of 19 answered "Yes" with reference to the question as to whether they wanted to continue teaching at technical high schools or not, these results do not guarantee that the teachers will continue teaching at their schools in the future.
		Are budgetary measures taken for the TVET activities?	• **The budgetary trend of the MOEYC (2001-2005)** Please see the Annex 11.

		Is the operational budget secured for the in-service training sessions for the teachers at THSs?	• According to the comment from the MOEYC, there are factors that make it difficult to continue in-service training sessions at Jose Marti, that is, the MOEYC does not have enough funds available to provide accommodation and transportation for the participants in the in-service training sessions.
		Has the maintenance system of equipment already been established, including personnel assignment of maintenance? Also, is the budget necessary for the maintenance and the consumables of the equipment secured?	• **Expenditure for the maintenance and the consumables of the equipment at JMTHS** Please see the Annex 12. • **Operation and maintenance of the main equipment** Please see the Annex 13.
	Are the transferred technologies continuously utilized?	Are the trained C/P competent enough to promote the improved TVET activities in terms of in-service training sessions and the field in charge to teach for students?	• According to the questionnaire survey directed to 19 technical high school teachers, 75.0% of teachers responded that the JMTHS teachers were either “5: extremely competent” or “4: competent”.
		Are the contents of TVET teachers’ training materials appropriate for the in-service training sessions?	• According to the questionnaire survey directed to 19 technical high school teachers, 89.5% of teachers regarded the teachers’ training materials for the in-service training sessions as either “5: Excellent” or “4: Good”.
	Are there any factors inhibiting the TVET activities by lack of concerns about social, cultural, and environmental aspects?		• There has been a stigma attached to TVET by many Jamaican parents. TVET subjects have been seen as second class when compared to traditional subjects, such as mathematics, English, and the sciences. However, this perception has been changing, with the increase in the number of employers who hire graduates from technical fields. • Violent behavior of students in schools has been a social phenomenon across the country, which negatively affects students’ performances. Students have been psychologically discouraged for learning due to fear or a sense of hopelessness. In the same way, teachers might not feel that they want to continue teaching because some students do not respect teachers any more as did before.

Annex 5:

Questionnaires to counterparts

Questionnaire to Teachers at the Technical High School

The Ex-post Evaluation Team (hereinafter referred to as the Team) entrusted by the Japan International Cooperation Agency (hereinafter referred to as JICA) will conduct ex-post evaluation under the cooperation with the Jamaican authorities concerned on the progression and achievement of the Japanese Technical Cooperation Project regarding the Technical and Vocational Education and Training Improvement Project at Technical High Schools in Jamaica (hereinafter referred to as the Project).

During its stay in Jamaica, the Team will exchange views and have a series of discussions about the ex-post evaluation of the Project with Jamaican authorities concerned as well as stakeholders of the Project including Jamaican counterparts. Would you please allow me to ask you several questions that will assist us in evaluating the progression and achievement of the Project? Your kind cooperation in answering the following questions would be greatly appreciated.

Note)

① The underlines after each question, such as 2-5, are used by the Study Team only.

② Please write your answers in ***block letters***.

Q1. What is the name of your technical high school? **0-1**

(1) Jose Marti ☐ (2) Kingston ☐ (3) Dinthill ☐
(4) Vere ☐ (5) Holmwood ☐ (6) St. Andrew ☐
(7) St. Elizabeth ☐ (8) Dunoon ☐ (9) Frome☐
(10) Herbert Morison ☐ (11) Marcus Garvey ☐ (12) St. Thomas☐
(13) Knockalva☐ (14) St. Mary ☐

Q2. What is your field? **0-2**

(1) Mechanical engineering (Machine shop) ☐ (2) Electronics ☐
(3) Auto mechanics ☐ (4) CAD ☐

Q3. What do you think about the level of in-service training sessions? **2-4**

(1) Very high ☐ (2) High ☐ (3) Moderate ☐
(4) Low ☐ (5) Very low ☐

Please describe the reason(s) why you have selected as shown above.

Q4. Are the curriculums in the fields of auto mechanics, CAD, electronics, and mechanical engineering consistent with the needs of the industrial sectors? 5

(a) Auto mechanics:

(1) Consistent ☐ (2) Inconsistent ☐ (3) Don't know ☐

Please explain the reason(s) why you have selected as shown above.

(b) CAD:

(1) Consistent ☐ (2) Inconsistent ☐ (3) Don't know ☐

Please explain the reason(s) why you have selected as shown above.

(c) Electronics:

(1) Consistent ☐ (2) Inconsistent ☐ (3) Don't know ☐

Please explain the reason(s) why you have selected as shown above.

(d) Mechanical engineering:

(1) Consistent ☐ (2) Inconsistent ☐ (3) Don't know ☐

Please explain the reason(s) why you have selected as shown above.

Q5. Have you ever taken the counterpart training course in Japan? **9**

(1) Yes ☐ (2) No ☐

Do you think that there are any impacts on TVET activities at your school by the above training course?

Q6. Do you think that the trained teachers at JMTHS are competent enough to improve TVET through means, such as the in-service training sessions for teachers of technical high schools, etc.? **15-1 (a)**

(1) Extremely competent ☐ (2) Competent ☐ (3) Moderate ☐

(4) Incompetent ☐ (5) Extremely incompetent ☐

Please clarify the reason(s) why you have selected as shown above.

Q7. (a) Do you want to continue teaching at technical high schools from now on? **16**

(1) Yes ☐ (Please go to (b)) (2) No ☐ (Please go to (c))

(b) Please explain the reason(s) why you have answered "Yes."

(c) If "No", what type of job/education do you want to pursue?

Q8. What do you think about the TVET teachers' training materials for the in-service training sessions? **20**

(1) Excellent ☐ (2) Good ☐ (3) Moderate ☐

(4) Poor ☐ (5) Terrible ☐

Please describe the reason(s) why you have answered as shown above.

Overall Remarks (if you have any additional comments):

Thank you very much for your understanding and cooperation.

Questionnaire to Students

The Ex-post Evaluation Team (hereinafter referred to as the Team) entrusted by the Japan International Cooperation Agency (hereinafter referred to as JICA) will conduct ex-post evaluation under the cooperation with the Jamaican authorities concerned on the progression and achievement of the Japanese Technical Cooperation Project regarding the Technical and Vocational Education and Training Improvement Project at Technical High Schools in Jamaica (hereinafter referred to as the Project).

During its stay in Jamaica, the Team will exchange views and have a series of discussions about the ex-post evaluation of the Project with Jamaican authorities concerned as well as stakeholders of the Project including Jamaican counterparts. Would you please allow me to ask you several questions that will assist us in evaluating the progression and achievement of the Project? Your kind cooperation in answering the following questions would be greatly appreciated.

Note)

① The underlines after each question, such as 2-5, are used by the Study Team only.

② Please write your answers in ***block letters***.

Q1. What is the name of your technical high school? **0-1**

(1) Jose Marti ☐ (2) Kingston ☐ (3) Dinthill ☐
(4) Vere ☐ (5) Holmwood ☐ (6) St. Andrew ☐
(7) St. Elizabeth ☐ (8) Dunoon ☐ (9) Frome☐
(10) Herbert Morison ☐ (11) Marcus Garvey ☐ (12) St. Thomas☐
(13) Knockalva☐ (14) St. Mary ☐

Q2. What is your field of study? **0-2**

(1) Mechanical engineering (Machine shop) ☐ (2) Electronics ☐
(3) Auto mechanics ☐ (4) CAD ☐

Q3. What is your grade? **0-3**

(1) Grade 9 ☐ (2) Grade 10 ☐ (3) Grade 11 ☐

Q4. Sex **0-4**

(1) Male ☐ (2) Female ☐

Q5. **2-5**

(a) Are you satisfied with the technical knowledge of your teacher?

(1) Strongly satisfied ☐ (2) Satisfied ☐ (3) Moderate ☐
(4) Dissatisfied ☐ (5) Strongly dissatisfied ☐

Please give a reason(s) for your selection.

(b) How would you rate the teaching skills of your teacher?

(1) Excellent ☐ (2) Good ☐ (3) Moderate ☐
(4) Poor ☐ (5) Terrible ☐

Please give a reason(s) for your selection.

Additional Remarks (Optional):

Thank you very much for your understanding and cooperation.

Questionnaire to Employers

The Ex-post Evaluation Team (hereinafter referred to as the Team) entrusted by the Japan International Cooperation Agency (hereinafter referred to as JICA) will conduct ex-post evaluation under the cooperation with the Jamaican authorities concerned on the progression and achievement of the Japanese Technical Cooperation Project regarding the Technical and Vocational Education and Training Improvement Project at Technical High Schools in Jamaica (hereinafter referred to as the Project).

During its stay in Jamaica, the Team will exchange views and have a series of discussions about the ex-post evaluation of the Project with Jamaican authorities concerned as well as stakeholders of the Project including Jamaican counterparts. Would you please allow me to ask you several questions that will assist us in evaluating the progression and achievement of the Project? Your kind cooperation in answering the following questions would be greatly appreciated.

Note)

① The underlines after each question, such as 2-5, are used by the Study Team only.

② Please write your answers in ***block letters***.

Q1. Please indicate the technical high school(s) from which you have employed? (possible for multiple answers) **0-1**

(1) Jose Marti ☐ (2) Kingston ☐ (3) Dinthill ☐
(4) Vere ☐ (5) Holmwood ☐ (6) St. Andrew ☐
(7) St. Elizabeth ☐ (8) Dunoon ☐ (9) Frome☐
(10) Herbert Morison ☐ (11) Marcus Garvey ☐ (12) St. Thomas☐
(13) Knockalva☐ (14) St. Mary ☐

Q2. Which field(s) do you employ? (possible for multiple answers) **0-2**

(1) Mechanical engineering ☐ (2) Electronics ☐
(3) Auto mechanics ☐ (4) CAD ☐

Q3. Do you think that the graduate of the technical high school are competent enough to successfully complete his/her work task? **1-4 & 1-5**

(1) Strongly agree ☐ (2) Agree ☐ (3) Don't know ☐
(4) Disagree☐ (5) Strongly disagree ☐

Please explain the reason(s) why you have selected as shown above.

Q4. Would you employ a technical high school graduate again? **1-9**

(1) Yes ☐ (2) No ☐

Please describe the reason(s) why you have answered "Yes" or "No."

Overall Remarks (if you have any additional comments):

Thank you very much for your understanding and cooperation.

Contact person for particular about the answers: _____

Division/position: _____

Tel/Fax or Email: _____

Annex 6:

Number of the enrolment to the TVET at JMTHS

Annex 6: The number of the enrolment to the TVET at Jose Marti Technical High School

Programs	Fields	2001	2002	2003	2004	2005	Total
3-year program (Grade 9 - 11)	Mechanical engineering	13	37	33	35	38	156
	Electronics	34	27	36	33	24	154
	Auto mechanics	57	45	40	48	39	229
	CAD	-	-	-	-	-	-
2-year program (Grade 10 - 11)	Mechanical engineering	30	20	33	19	13	115
	Electronics	6	8	7	9	12	42
	Auto mechanics	10	12	8	7	14	51
	CAD (*1)	46	40	48	35	39	208

Source: Jose Marti Technical High School

*1: In the two-year program, the students are supposed to have the CAD, so the total number of students in the three fields is the same number of the students in CAD.

Annex 7:

Performance of JMTHS students

Annex 7: The performance of JMTHS students (Mid-year evaluation of Grade 11) with the Grade in the field of mechanical engineering, electronics, auto mechanics, and CAD

Categories	Grade	2001		2002		2003		2004		2005		Total	
		No. of students	%	No. of students	%	No. of students	%	No. of students	%	No. of students	%	No. of students	%
Mechanical engineering	A		0.0%	1	12.5%	2	5.1%		0.0%	1	3.1%	4	3.7%
	B	6	60.0%	1	12.5%	5	12.8%	4	20.0%	3	9.4%	19	17.4%
	C	4	40.0%	2	25.0%	7	17.9%	6	30.0%	10	31.3%	29	26.6%
	D		0.0%	4	50.0%	25	64.1%	10	50.0%	18	56.3%	57	52.3%
	E		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%
Electronics	A	3	9.4%	1	4.3%		0.0%		0.0%	1	3.7%	5	3.5%
	B	5	15.6%	2	8.7%	4	12.5%	2	7.4%	2	7.4%	15	10.6%
	C	4	12.5%	6	26.1%	10	31.3%	13	48.1%	8	29.6%	41	29.1%
	D	20	62.5%	14	60.9%	18	56.3%	12	44.4%	16	59.3%	80	56.7%
	E		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%
Auto mechanics	A	4	11.8%	2	6.1%	1	2.9%	2	5.3%	2	7.1%	11	6.5%
	B	7	20.6%	6	18.2%	1	2.9%	10	26.3%	3	10.7%	27	16.1%
	C	9	26.5%	11	33.3%	8	22.9%	13	34.2%	7	25.0%	48	28.6%
	D	14	41.2%	14	42.4%	25	71.4%	13	34.2%	16	57.1%	82	48.8%
	E		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%
CAD	A	6	7.9%	8	12.5%	2	1.9%	1	1.2%		0.0%	17	4.1%
	B	15	19.7%	15	23.4%	16	15.1%	9	10.6%	6	6.9%	61	14.6%
	C	30	39.5%	20	31.3%	45	42.5%	40	47.1%	41	47.1%	176	42.1%
	D	25	32.9%	21	32.8%	43	40.6%	35	41.2%	40	46.0%	164	39.2%
	E		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%

A = 85% -100% (Outstanding); B = 70% - 84% (Good); C = 55% - 69% (Average); D = 40% - 54% (Unsatisfactory); E = < 40% (Poor)

Source: Jose Marti Technical High School

Annex 8:

Frequency of the in-service training sessions

Annex 8: The frequency, the number of the applicants, and the number of the actual participants in the in-service training sessions

Fields	Categories		2000		2001		2002	
(1) **Mechanical engineering**	Frequency of the training sessions		1 session (x 2 groups) per month for 9 months (Total 9 sessions in each group: one session had 2 days)		1 session (x 2 groups) per month for 9 months (Total 9 sessions in each group: one session had 2 days)		One session (3 days) for one group only	
	No. of the applicants to the training sessions	(A)	10	Total 20	10	Total 20	10	Total 20
		(B)	10		10		10	
	No. of the actual participants to the training sessions	(A)	10	Total 20	8	Total 14	14	
		(B)	10		6			
(2) **Electronics**	Frequency of the training sessions		1 session (x 2 groups) per month for 9 months (Total 9 sessions in each group: one session had 2 days)		1 session (x 2 groups) per month for 9 months (Total 9 sessions in each group: one session had 2 days)		Two sessions (3 days per session) for two groups	
	No. of the applicants to the training sessions	(A)	14	Total 29	14	Total 29	14	Total 29
		(B)	15		15		15	
	No. of the actual participants to the training sessions	(A)	14	Total 29	14	Total 29	14	Total 29
		(B)	15		15		15	
(3) **Auto mechanics**	Frequency of the training sessions		2 sessions per month for 9 months (Total 18 sessions: one session had 2 days)		2 sessions per month for 9 months (Total 18 sessions: one session had 2 days)			
	No. of the applicants to the training sessions		12		12		-	
	No. of the actual participants to the training sessions		12		12		-	
(4) **CAD**	Frequency of the training sessions		1 session (x 2 groups) per month for 9 months (Total 9 sessions in each group: one session had 2 days)		1 session (x 2 groups) per month for 9 months (Total 9 sessions in each group: one session had 2 days)		One session (3 days) for one group only	
	No. of the applicants to the training sessions	(A)	10	Total 20	10	Total 17	17	
		(B)	10		7			
	No. of the actual participants to the training sessions	(A)	10	Total 20	10	Total 17	15	
		(B)	10		7			

Source: Jose Marti Technical High School

Annex 9:

Contents of the in-service training modules in four fields

Annex 9: The Contents of the in-service training modules in four fields for technical high school teachers

Title of the in-service training sessions	Contents of the training sessions
Mechanical engineering	
(1) Introduction to Project	1)Introduction to the general project. 2) Stating of objectives. 3) Commencement of machine shop. 4) Introduction and tour of machine shop.
(2) Lathe Practice	1) Safety practices in operating engine lathe. 2) Factors affecting gear selection of the centre lathe. 3) Parallel turning, cutting grooves, taper turning and screw cutting lathe operations.
(3) Gear Cutting practice	1) Gear toothe profile, classification of gears and gear cutting indexing. 2) Milling machine operations. 3) Gear cutting calculations
(4) Welding Practice	1) Safety practices in operating welding plant, high speed cutter, power shear and grinding disc. 2) Welding of 'T' joint. 3) Testing of material strength. 4) Microscopic test.
(5) Programming of C.N.C Machine	1) Introduction of C.N.C (Computer Numerical Control). 2) Setting up specimen using CAD/CAM. 3) Programming and operating C.N.C machine.
(6) Instructional Lesson Using Visual Aid	1) Operating digital camera. 2) Studying the various features. 3) Selecting a lesson and developing an aid using a digital camera.

Title of the in-service training sessions	Contents of the training sessions
Electronics (Group A)	
(1) 280 Programming of One Board Micro Computer	Explanation of Architecture of 280 one board computer. Explanation of interface of 280 one board computer. Practice about machine language. Explanation of the word IC 8255.
(2) The Outline of The Power Equipment	The Manufacturing of the primary side, and inspection of it. The manufacturing of the secondary side. The manufacturing of the voltage part and current. The operation test and general evaluation.
(3) Study Lesson Using Grade 10 Practical	Discussion of study lessons. Logic circuits practical. (a) About logic circuits (b) Making of gate circuit board (c) Check the action and practice (d) Conclusion and questionnaire survey.
(4) Electronics Course Curriculum	(a) Fundamental thinking. (b) how to make curriculum, and practical plan. (c) the practical side of the curriculum. Oscillope practical. (d) What is AC. (e) Measurement of AC with tester. Principle of oscillescope.
(5) The Outline of The Practical System	The correlation practice manual and curriculum. The development of the practical text book and instruction manual. Ohm's law practical, instrumentation practical, question about guidance.

Title of the in-service training sessions	Contents of the training sessions
Electronics (Group B)	
(1) Amplification of Transistors	Transistor amplification circuit practical. Pre-practical (soldering). Calculation of circuit. The making of amplification circuit. Measuring the characteristics of amplification circuits.
(2) Experimentation No. 1	The measuring of resistor of transistor and record it in table 1. Place apparatus in the same position for each checking. Explain how to check completed circuit. Measure IB and IC.
(3) For Good Lesson-A Lecture	The lesson plan about Ohm's Law practical board. Oscillator circuits practical. The development of educational materials. Making of phase-shifting oscillator.
(4) Explanation of Architecture of 280 one board microcomputer	The practice about machine language and expalnation on the IC8255. The making of the simple program and control word of the machine language.
(5) Outline of the Power Equipment	The manufacturing of voltage part and electric current. The manufacturing of the resistance measurement part. The observation test. General evaluation of the practice

Title of the in-service training sessions	Contents of the training sessions
Auto mechanics	
(1) Introduction to the General Project. Introduction and Tour.	Introduction: equipment and material curriculum.
(2) Measurement, Vernier Caliper, Micrometer Dial Indicator.	Curriculum, lesson plan and practical text and fundamental way of thinking.
(3) Engine System 4-stroke cycle.	Leson plan and practical text.
(4) Drive Train and Chassis , Manual Transmission, Steering Gearbox.	Make lesson plan and practical text. How to make a cut model.
(5) Electrical System Distributor, Altenator Universal Test Batch.	Disassemble, test, using m/meter the altenator, then doing final test using the universal test bench.
(6) Engine Scope, Engine Analyzer, Starter, L-Jetronic Trainer & D-Jetronic Trainer.	Teachers learn how to use the engine scope; connected and read the signal on engine analyzer, etc. Dis-assemble test and assemble starter.
(7) Presentations: All teachers presented year plans and model.	Evaluation
(8) Make a Practical Video.	Lesson plan, practical text and video. All teachers were asked to do a lesson which was video taped
(9) Presentation Discussion.	Evaluation. Lesson plan and practical videos.

Title of the in-service training sessions		Contents of the training sessions
CAD		
(1)	Introduction to CAD: Dimensioanl Basic Drawing by AUTOCAD.	Drawing of the wood block. Drawing of the "v" block. Basic dimensioning. The use of snap, setting up snap and grid. Drawing of flange, drawing of shaft, using shaft generator method. Preparing drawing text.
(2)	Two Dimensional Drawing (Mechanical): Mechanical Drawing & Building Drawing	(a) Drawing of gear. (b) Drawing of mechanical parts (pump body). (c) Laying out of floor plan and elevation.
(3)	Three Dimensional Drawing & Planning: Basic Three Dimensional Drawing by Mechanical Desktop, Assembly Drawing, Planning & Lesson Presentation	(a) How to do assembly drawing (basic). (b) How to do advanced assembly drawings. (c) How to make teching aids and lesson planning. (d) Drawing of wood block, drawing of flange (e) Demonstration of Lesson Planning and presentation of lesson by participants.

Source: Jose Marti Technical High School

Annex 10:

Number of teaching staff at JMTHS

Annex 10: The number of teaching staff at Jose Marti Technical High School

Fields	2001	2002	2003	2004	2005
Mechanical engineering	2	2	2	2	2
Electronics	2	2	2	2	2
Auto mechanics	2	2	2	2	2
CAD	2	2	2	2	2
Total No. of teaching staff in the four fields	8	8	8	8	8
All the teaching staff	59	60	60	62	70

Source: Jose Marti Technical High School

Annex 11:

Budgetary trend of the MOEYC (2000-2004)

Annex 11: The budgetary trend of the MOEYC and TVET from 2000 to 2004 **Unit: $J**

	2000-2001		2001-2002		2002-2003		2003-2004		2004-2005	
TVET	637,519,000	3.5%	684,050,000	3.4%	794,902,000	3.7%	910,848,000	3.8%	1,063,355,000	3.5%
MOEYC	18,370,000,000	11.0%	20,153,000,000	10.9%	21,734,800,000	10.3%	23,674,453,000	9.1%	30,213,600,000	9.2%
NATIONAL BUDGET	167,387,973,000	100.0%	185,436,857,000	100.0%	210,064,493,000	100.0%	261,408,028,000	100.0%	328,153,402,000	100.0%

Notes: The fiscal year is from April1 -March 31.

(1) The percentage of "TVET" represents the ratio of "TVET" to the "MOEYC."

(2) The percentage of the "MOEYC" represents the ratio of "MOEYC" to the "National Budget."

Source: Ministry of Finance and Planning

Annex 12:

Expenditure for the maintenance and the consumables at JMTHS

Annex 12: The actual expenditure for the maintenance and the consumables of the equipment at JMTHS

(Unit: $J)

Items necessary for maintenance of the equipment	2002 (*1)	2003	2004
Expenditure for maintennace of the equipment at JMTHS	**16,260.27**	**41,103.00**	**31,294.08**
Expenditure for the consumables of the equipment at JMTHS	**24,390.41**	**61,654.50**	**55,942.93**

Source: Jose Marti Technical High School

*1: The project terminated on April 30th, 2002.

Annex 13:

Operation and maintenance of the main equipment

Annex 13: Operation and Maintenance of the main equipment

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
1	Transistor Diode	9		1998	A	D		Electronic
2	Potentio Meter Circuit	9		1998	A	C		Electronic
3	Semiconductor	9		1998	A	B		Electronic
4	Electronic Control	9		1998	A	C		Electronic
5	Sensor Apparatus	9		1998	A	D		Electronic
6	DC Circuit Practice	9		1998	B	D		Electronic
7	Stabilized Source	9		1998	B	C		Electronic
8	Wood working sets	2		1998	B	D		Electronic
9	Metal working tools	2		1998	A	D		Electronic
10	electric Soldering	10		1998	B	D		Electronic
11	Screens Tripod	1		1998	A	D		Electronic
12	Video Soft Set	1		1998	A	A		Electronic
13	Using Dual trace	1		1998	A	C		Electronic
14	Programmable	1		2000	A	A		Electronic
15	Personal Computer	2		2000	B	D		Electronic
16	Software Ms. Visual	4		2000	A	C		Electronic
17	Whealston Bridge	2		2000	B	B		Electronic
18	Vacuum Cleaner	1		2000	A	B		Electronic
19	Riveting tools	2		1999	B	D		Electronic
20	Socklet Wrench	2		1999	A	C		Electronic
21	Bench Drilling	1		1999	A	A		Electronic
22	Drill chuck(13mm)	2		1999	B	A		Electronic
23	Drill chuck(1-13mm)	1		1999	A	B		Electronic

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
24	Multimedia projector	1	ELP-5500	1999	A	D		Electronic
25	Screen with tripod	1		1998	B	D		Electronic
26	Video with Soft set	1		1998	A	A		Electronic
27	Dualtrace oscilloc.	1		1998	A	D		Electronic
28	Three phase induction	1	Cut-Away Model	1998	A	D		Electronic
29	Modeling Machine	1		1998	A	A		Electronic
30	Data Communications	1		1998	A	D		Electronic
31	Dial Resistor	8		1998	A	C		Electronic
32	Slide Rhesostate	6		1998	A	C		Electronic
33	Digital/Multimeter	5		1998	A	A		Electronic
34	osilloscope Circuit	9		1998	A	D		Electronic
35	Electrostatic	9		1998	A	D		Electronic
36	Electro-Magnetic	9		1998	A	B		Electronic
37	Electromagnetics	9		1998	A	B		Electronic
38	Dial Resistor	8		1999	A	C		Electronic
39	Slide Rheostat	6		1999	A	B		Electronic
40	Digital Multimeter	5		1999	A	A		Electronic
41	Osilloscope	9		1998	A	D		Electronic
42	Electrostatic	9		1998	A	B		Electronic
43	Electo-magnetic	9		1999	A	D		Electronic
44	Electromagnetics induction	9		1999	A	C		Electronic
45	Coil (800T)	9		1999	A	B		Electronic
46	Coil (400T)	9		1999	A	B		Electronic
47	Coil (16T)	9		1999	A	B		Electronic

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
48	Transistor Diode Circuit	9		1999	A	D		Electronic
49	Electronics Control Aparatus	9		1999	A	D		Electronic
50	Potentiometer	9		1999	A	B		Electronic
51	Semiconductor Elements	9		1999	B	C		Electronic
52	Sensor Apparatus	9	KENWOOD	1999	A	D		Electronic
53	Regulated DC. Power Supply	10		1999	A	A		Electronic
54	Regulated Power Supply	10		1999	A	A		Electronic
55	DC.Circuit Practice	9		1999	B	C		Electronic
56	stabilized DC. Circuit	9		1999	B	C		Electronic
57	Overhead Project	1	UH300	2000	D	---	Need parts	Electronic
58	Digital IC Tester	1	Li 255	2000	A	D		Electronic
59	Computer	2	IBM	2000	C-D	A-D	Needs to be Serviced, Not working properly	Electronic
60	Software Ms.	2		2000	A	D		Electronic
61	Computer	2		2001	C-D	D	Needs to be Serviced, it needs a second piece of equipment	Electronic
62	21inch CRT	1		2001	D	---		Electronic
63	Laser Printer	1		2001	A	A		Electronic
64	Hydraulic Press	1	BANZAL	1997	D		Bracket broken	Auto Mec
65	Micro Hone	1		1997	A	B		Auto Mec
66	Bearing Gear Puller	1		1997	A	D		Auto Mec
67	Mechanical Kit	1		1997	A	B		Auto Mec
68	Vice Bench	2		1997	A	A		Auto Mec
69	Portable work Bench	5	KOKUYO	1997	B	A		Auto Mec
70	Pipe Flare	1		1997	A	D		Auto Mec
71	Wheel Balancer	1		1997	A	B		Auto Mec

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
72	Tyre changer	1		1997	A	B		Auto Mec
73	Hot water car washer	1		1997	D		Possible pump damaged	Auto Mec
74	Parts washing stand	1		1997	A	A		Auto Mec
75	Carburetor Gas Eng.	5		1997	B	B		Auto Mec
76	Engine Stands	7		1997	A	A		Auto Mec
77	Inline pump Diesel	1		1997	B	C		Auto Mec
78	Rotary Diesel Engine	1		1997	B	C		Auto Mec
79	Assistant Eq. with meter	1		1997	B	A		Auto Mec
80	Carburetor Gas Eng	1		1997	B	A		Auto Mec
81	Supporting Stage	1		1997	B	A		Auto Mec
82	EGI Gasoline Engine	1		1997	A	A		Auto Mec
83	Supporting stage with Bracket	1		1997	B	B		Auto Mec
84	Electric Equipment	1		1997	A	B		Auto Mec
85	Inline Type Pump Diesel	1		1997	B	B		Auto Mec
86	Assistant Equipment with meter	1		1997	B	B		Auto Mec
87	Supporting stage with Bracket	1		1997	B	B		Auto Mec
88	Lift osp-25F	1	BISHAMON	1997	A	A		Auto Mec
89	Engine Crane WN20	1		1997	A	A		Auto Mec
90	Exhaust Emission An.	1		1997	B	D		Auto Mec
91	Model Variable Valve Timing	1	P101-VTCSK	1997	B	B		Auto Mec
92	Carburetor Model	1	CO71-CABSK	1997	A	D		Auto Mec
93	Turbo Charger Model	1	VO21 -TRSSK	1997	A	D		Auto Mec
94	Wall picture steering	1	DO25-DFWSK	1997	A	D		Auto Mec
95	Wall picture steering	1	DO21-DFWSK	1997	A	D		Auto Mec

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
96	Wishbone suspension	1	P121DWSSK	1997	A	D		Auto Mec
97	MacPherson Strut Suspension	1	P131-MSSSK	1997	B	D		Auto Mec
98	Oil Brake Model	1	VO71-OBSSK	1997	B	B		Auto Mec
99	Viscous Coupling	1	P111-BISSK	1997	A	D		Auto Mec
100	Differential Gear	1	PO41-DFGSK	1997	B	B		Auto Mec
101	Planetary Gear Model	1	PO32-TPGSK	1997	B	D		Auto Mec
102	Clutch Model	1	POT1-OWCSK	1997	A	B		Auto Mec
103	Wall Picture Planetary Gear	1	KOZO-SPGSK	1997	B	B		Auto Mec
104	Wall Picture starter	1	C121-STSSK	1997	B	B		Auto Mec
105	Starting Motor Model	1	C121-STSSK	1997	B	B		Auto Mec
106	Alternator Model	1	C101-ALTSK	1997	B	B		Auto Mec
107	Wall Picture Ignition	1	DO14-DIGSK	1997	B	C		Auto Mec
108	Wall Picture ignition advance	1	DO22-GSSSK	1997	A	C		Auto Mec
109	Distributor Model	1	CO91-DTBSK	1997	A	C		Auto Mec
110	Wiper motor model	1	C111-WYPSK	1997	B	C		Auto Mec
111	4 Cylinder Gas	1	NO.1201	1997	B	B		Auto Mec
112	4 Cylinder Diesel	1	NO.1209	1997	B	B		Auto Mec
113	2 Cycle Gasoline	1	NO.1216	1997	B	B		Auto Mec
114	Rotary Engine model	1	NO.1220	1997	B	A		Auto Mec
115	Fuel injection pump model	1	NO.1609	1997	B	D		Auto Mec
116	Vacuum Power Brake	1	NO.1706	1997	B	D		Auto Mec
117	Clutch Coupling Mod.	1	NO.1801	1997	B	D		Auto Mec
118	Working tables	5	FWKT127FB	1997	B	A		Auto Mec
119	Engine analyzer	1	BOSCH	1997	B	B		Auto Mec

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
120	Universal Test Bench	1	FB-500A	1997	B	C		Auto Mec
121	Milling Machine	2	Stm 2V	1997	A	A		Mechanic
122	Universal Grinder	1	MZ 8BG	1997	A	D		Mechanic
123	Surface Grinder	1	G5 62 Z	1997	B	D		Mechanic
124	Precision Lathe	5	Takizawa	1997	A	B	Two (2) without tailstock	Mechanic
125	Electric Furnace	1	Thermal TL-4x	1999	A	D		Mechanic
126	Robot “Uni”	1	KVM	1999	B	D		Mechanic
127	Quick change tool holder	1	H50 32B	1997	B	A		Mechanic
128	Hacksaw Machine	1	PBS 21	1997	B	A		Mechanic
129	Boring Head	1	MU	1997	A	D		Mechanic
130	Milling Vice	1	VG 150	1998	A	A		Mechanic
131	Universal Dividing Head	1	Tsudakoma	1998	A	D		Mechanic
132	Clamping set	1	N- 1614-CK	1998	A	D		Mechanic
133	Straight shank drill Set	1		1998			These are perishable tool easily damage	Mechanic
134	Block Gauge Set	1	Mituoyo 526- 344	1998	A	D		Mechanic
135	Inside Micrometer	1	Mitutoyo 368-953	1998	A	D		Mechanic
136	Inside Micrometer	1	Mitutoyo 368-954	1998	A	D		Mechanic
137	Precision Surface Plate	1		1998	A	A		Mechanic
138	Air Compressor	1	Anest	1998	A	D		Mechanic
139	Digital Multiplex	1		1998	A	D		Mechanic
140	Stepping Motor	6		1998			These have not being used because the project was cancelled	Mechanic
141	AC Ark Welding	4		1998	A	A		Mechanic
142	Mini Machine	2						Mechanic
143	Bending Machine	2	NOGUCHI	1998	A	A		Mechanic

No.	Name of Equipment	Q'ty	Brand/Model	Year	Condition	Usage	Problems	
144	Metal Microscope	1	F1 jita DG 508	1998	B	A		Mechanica
145	Hardness Tester	1	Imai seiki	1999	A	D		Mechanica
146	Three Jaw Chuck	5	Kitagawa	1999	A	A		Mechanica
147	Welding Tables	3	Kyowa		A	A		Mechanica
148	Uninterrupted power supply	4	Su420 net	2000			All need batteries	Mechanica
149	Overhead Projector	2	1-134-0062	2000	A	A		Mechanica
150	Laser Printer	1	4100	2000	A	A		Mechanica
151	Vacuum Cleaner	2	JE - 520	2000	A	D		Mechanica
152	Software Pocket Cam	1		1999	A			Mechanica
153	Television / VCR combo	1	Sony		A	A		Mechanica
154	Auto CAD Release 14	10	Auto Desk	1997	D	A	Replaced /Updated	CAD
155	Mechanical Desk Top / Auto CAD	20	Auto Desk	1997	D	A	Replaced /Updated	CAD
156	Genus for AutoCAD Release 14	20	Auto Desk	1997	D	A	Replaced / Updated	CAD
157	Display Monitor 9260 display 21	20		2000	B	A	One out of use, Replace with 17	CAD

Category of Condition (Annual average)
A: Excellent
B: Fair
C: Poor
D: Unable to use

Category of Usage (Annual average)
A: Every week
B: Every other week
C: Every month
D: Less than every month

Source: Jose Marti Technical High School