Performance Evaluation Report

Reference Number: PPE: INO 2009-56
Project Number: 27527
Loan Number: 1432-INO
December 2009

Indonesia:
Engineering Education Development Project

Independent Evaluation Department

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 15 December 2009)

Currency Unit	–	Indonesian Rupiah (Rp)
Rp1.00	=	$0.000109
$1.00	=	Rp9,185

ABBREVIATIONS

ADB	–	Asian Development Bank
AFC	–	Asian financial crisis
ATMI	–	Akademi Tehnik Mesin Industri (Technical Academy of Engineering and Mechanical Manufacturing
BNI	–	Bank Negara Indonesia
CPIU	–	central project implementation unit
D2	–	2-year diploma course
D3	–	3-year diploma course
DGHE	–	Directorate General of Higher Education
EIRR	–	economic internal rate of return
EQAC	–	engineering quality assurance committee
HEI	–	higher education institution
HELTS	–	Higher Education Long-Term Strategy
IEM	–	Independent Evaluation Mission
IRM	–	Indonesia Resident Mission
ITB	–	Institut Teknologi Bandung (Bandung Institute of Technology)
LPIU	–	local project implementation unit
PBME	–	project benefit monitoring and evaluation
PCR	–	project completion report
REPELITA VI	–	Sixth Five-Year Development Plan (1994/95–1998/99)
RRP	–	report and recommendation of the President
S1	–	*Sarjana* 1 - Bachelor's degree (undergraduate level)
S2	–	*Sarjana* 2 - Master's degree
S3	–	*Sarjana* 3 - Doctoral degree
SDP	–	staff development program
TPSDSP	–	Technological and Professional Skills Development Sector Project
UGM	–	University of Gadjah Mada
UNAND	–	University of Andalas
UNLAM	–	University of Lampung
UNRI	–	University of Riau
UNUD	–	University of Udayana

NOTES

(i) The fiscal year (FY) of the Government of Indonesia and its agencies ends on 31 December.
(ii) In this report, "$" refers to US dollars.

Key Words

indonesia, adb, adb education project, asian development bank, higher education, education loan, engineering, engineering education, staff development, capacity development, monitoring and evaluation, performance evaluation

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CONTENTS

		Page
BASIC DATA		i
EXECUTIVE SUMMARY		iii
I.	INTRODUCTION	1
	A. Evaluation Purpose and Process	1
	B. Expected Results	2
II.	DESIGN AND IMPLEMENTATION	2
	A. Formulation	2
	B. Rationale	3
	C. Cost, Financing, and Implementation Arrangements	4
	D. Procurement, Construction, and Scheduling	4
	E. Design and Implementation Changes	5
	F. Outputs and Outcomes	6
	G. Consultants	14
	H. Loan Covenants	14
	I. Policy Framework	14
III.	PERFORMANCE ASSESSMENT	15
IV.	OTHER ASSESSMENTS	18
	A. Impact on Institutions and Policy	18
	B. Socioeconomic Impact	18
	C. Environmental Impact	18
	D. Asian Development Bank Performance	18
	E. Borrower and Executing Agency Performance	18
V.	ISSUES, LESSONS, AND FOLLOW-UP ACTIONS AND RECOMMENDATIONS	19
	A. Issues	19
	B. Lessons Identified	19
	C. Follow-Up Actions and Recommendations	20

The guidelines formally adopted by the Independent Evaluation Department (IED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. Sukanto Tedjokusuma and Kriswanto Widiawan were the consultants. Ms. Leah Gutierrez (Principal Evaluation Specialist), then an IED staff member, guided the evaluation mission. To the knowledge of the management of IED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

APPENDIXES

1.	Educational System and Organizational Structure	21
2.	Completed Higher Education Loans to Indonesia	22
3.	Cost Breakdown by Project Components	23
4.	Project Universities and Polytechnics and the Sample Surveys	24
5.	Project's Key Components, Outputs, and Achievements	26
6	National Accreditation Board for Higher Education: Accreditation of Courses and Institutions	31
7.	Summary of Staff Development Program	33
8.	Summary of Civil Works Covered by the EEDP	34
9.	Trends by Region for Human Development Index and Gross State Domestic Product	35
10.	Project and Nonproject Institutions Visited	36

BASIC DATA

Engineering Education Development Project (Loan 1432-INO)

Project Preparation/Institution Building

TA No.	Technical Assistance Name	Type	Person-Months	Amount	Approval Date
2096	Engineering Education Development	PPTA	45	$800,000	7 June 1994

Key Project Data ($ million)	Per ADB Loan Documents	Actual
Total Project Cost	176.0	120.0
ADB Loan Amount/Utilization	102.0	71.4
ADB Loan Amount/Cancellation		30.6

Key Dates	Expected	Actual
Fact-Finding		11–31 May 1995
Appraisal		4–22 Sep 1995
Loan Negotiations		4–6 Dec 1995
Board Approval		6 Feb 1996
Loan Agreement		18 Mar 1996
Loan Effectiveness	7 May 1996	7 May 1996
Completion	1 Apr 2001	30 Sep 2002
Loan Closing	1 Oct 2001	12 Dec 2002
Months (effectiveness to completion)	58.0	77.3

Borrower Government of Indonesia

Executing Agency Directorate General of Higher Education

Mission Data

Type of Mission	No. of Missions	Person-Days
Fact-Finding	1	60
Appraisal	1	112
Inception	1	4
Review	9	145
Project Completion Review	1	15
Independent Evaluation Mission	1	20

ADB = Asian Development Bank, PPTA = project preparatory technical assistance, TA = technical assistance.

EXECUTIVE SUMMARY

Background

This project performance evaluation report presents the findings of the evaluation of the Engineering Education Development Project, which was approved in February 1996 to assist the Government of Indonesia in improving the quality, relevance, and capacity of engineering education, while enhancing the access of economically disadvantaged but qualified students who wish to study in the seven project universities and seven polytechnics located in strategic locations in the country.

The rationale for the project was that the Government of Indonesia recognized, through its development planning process, that a strong competitive workforce is necessary for sustainable national progress and that an increased share of higher education graduates, particularly engineering graduates, in the labor force is a key to rapid industrialization and increased competitiveness. The project was expected to improve the academic standards of engineering education and its relevance to the requirements of its surrounding industries in its region and, at the same time, increase the capacity of quality engineering programs to provide more opportunities to students at different income levels.

Evaluation Approach

The evaluation approach involved (i) a desk review of relevant project documents and reports; (ii) consultations with concerned operations divisions and government agencies to solicit their views on key issues; (iii) field visits to some project and nonproject universities and polytechnic institutions; (iv) focus group discussions and/or interviews with major stakeholder groups (Ministry of National Education; Directorate General of Higher Education; central project implementation unit; local project implementation unit; and university administrators, lecturers, alumni, and students); (v) field surveys of sample beneficiaries including photographs; and (vi) analysis of available nationwide secondary data, supplemented by primary data collected during the field surveys.

Evaluation Results

The project is rated *successful*. It was (i) highly relevant at the time of appraisal and at evaluation to the government’s and the Asian Development Bank's objectives and strategies; (ii) effective in achieving its objectives, with project outputs and outcomes sometimes exceeding targets despite the financial crisis it experienced during project implementation; (iii) efficient in terms of resource utilization; and (iv) likely sustainable in terms of tangible and intangible benefits.

The project is rated *highly relevant*. It was formulated in response to the government’s Sixth Five-Year Development Plan. The project was designed within the framework of the Asian Development Bank's operational strategy to meet the government’s development objectives at the time of appraisal. Staff development also remains relevant in the face of the government goal of all lecturers in higher institutions possessing a minimum of master's degree qualification by 2014. Improving the relevance and quality of engineering programs has helped address the human resource requirements of industries and other employers. The resources and assets provided to project institutions, including modern equipment, books, and instructional materials, were relevant to their needs. The project design was appropriate to meet its main objectives despite the financial crisis that occurred during project implementation.

The project achieved its purpose of improving the quality, relevance, and capacity of engineering education in the project institutions visited by the Independent Evaluation Mission (IEM) despite the Asian financial crisis during project implementation. It contributed to balanced regional development by expanding the capacity of engineering programs through the provision of new and updated facilities and staff training in 14 project institutions throughout the country. Upgraded staff, improved curricula, modern training equipment, and latest learning materials have contributed to improving the quality and relevance of the programs, including the academic experience of the students. These are being reinforced by the quality assurance systems in place for which the project provided some support. New buildings and student facilities in these programs have been created, and new programs are being currently created. The IEM received expressions of appreciation from lecturers who benefited from staff development and from alumni and students who used the project-provided facilities and equipment. The project is rated *effective*.

The project met most of its appraisal targets, and exceeded some (specifically for the targets in staff development), with the final total project cost being lower than budgeted. The project's economic viability could not be reasonably established due to the absence of tracer studies and data constraints. Neither the report and recommendation of the president (RRP) nor the project completion report (PCR) included a financial/economic analysis, nor did they present a least-cost or cost effective analysis for the project. Due to data limitations, IEM was unable to calculate economic and financial viability ratios as planned. While most targets were met, the IEM observed that the use of some of the most expensive equipment was suboptimal. Given the efficient use of resources under the main components for improving quality and relevance and enhancing capacity access and participation (e.g., staff development and training, civil works, curriculum development, instruction materials and books) and the suboptimal utilization under the subcomponent for provision of equipment, the overall efficiency is assessed and downgraded as *efficient* in achieving its purpose instead of the highly efficient rating in the PCR.

All the sampled universities and polytechnics are operating in varying degrees. All the three components of the project have been established sufficiently for each project institution and are functioning as expected. The IEM observed that in the project universities and polytechnics, quality assurance systems have been set-up and accreditation is being taken seriously. Outcomes associated with quality assurance and curriculum development are also most likely to be sustainable, as these are rewarded within the program accreditation framework.

As for outcomes associated with capacity access and participation, this project has resulted in meaningful and significant changes in terms of capacity and conditions for the project institutions. During the IEM visits, it was observed that the improvement of facilities and other learning means had resulted in the possibility of conducting afternoon class sessions. Aside from the engineering program that were planned to be established, some of the universities have now the capacity to start and offer new engineering programs not covered by the project. The outcomes associated with staff development inputs are most likely to be sustainable, as the large majority of project assistance recipients have returned to the project institutions and are teaching in the areas of their education.

In terms of the outcomes associated with civil work and equipment, civil works in three universities and training equipment of visited project institutions seem to require improved maintenance and repair management systems and greater budget allocation. Some physical facilities need repair and repainting, while some expensive training equipment, specifically those with electronic controls, are nonfunctional or need calibration. Thus, more budget allocation would be necessary to render them functional again. Some project institutions have forged

training partnerships with government agencies and enterprises and are providing consulting services in exchange for payments. Some of these revenues are being directed toward repair and maintenance of their training equipment. Some project institutions are also eligible to compete for grants from the government, and some have been successful with their proposals.

Regarding the strengthening of institutional capacity, DGHE and BAN was strengthened and the experience and lessons gained by DGHE, BAN, and project universities and polytechnics in implementing the project help in coping up with the new developments in higher education.

Taking into consideration the sustainability of all the components of the project described above and the expected commitment of the government to education in the budget, the IEM, at this time, considers the project's sustainability to be *likely* rather than most likely.

Issues

To improve the efficiency and sustainability of the project's impact, outcomes, and inputs, and the evaluation of a project, the following issues need to be addressed in the near future:

(i) Maintenance and management of project-supported facilities and equipment needs to be improved and properly funded, particularly those needing repairs to ensure long-term sustainability. This would require project institutions to develop other sources of revenue and/or improve cost recovery.

(ii) Setting up and proper accessibility of baseline data on output and outcome indicators for each university and polytechnic should be done prior to a project, and implementation should be regularly maintained even after project completion.

(iii) Coordination and consultation between the archive section of the Office of Administrative Services, resident mission, and its regional department and the Independent Evaluation Department (IED) should be encouraged, as records storage needed could span several years for different kinds of IED studies. In this particular case, LPIU progress reports submitted to IRM were believed to have been disposed of, since no LPIU report was found in the archive section, and the IEM had to resort to the availability of LPIU reports in the project institutions visited.

Lessons

Reviewing and analyzing the information gathered, the IEM identified the following lessons for future projects in higher technical education in Indonesia:

(i) The monitoring and evaluation system should not be done only once or twice, but should be integrated and implemented within the regular activities of the project institutions and should also be linked to DGHE's management information system. Baseline data for specific outcome indicators like enrollment rate, pass rate or graduation rate of students, job search period, etc., should be established and continuously updated in an easily accessible database for each project institution

(ii) Partnering with other educational institutions, organizations, and enterprises can improve the utilization of facilities and be a source of revenue to increase cost recovery.

(iii) Integrated management of equipment for each university and polytechnic institution, involving an informative inventory system, operation and maintenance manuals, and staff training and accountabilities, should be instituted to permit easy monitoring of its status to promote its optimal use.

(iv) Entrepreneurship capability development would be useful as one of the future project programs due to limits in government funding for higher education institutions to be capable of developing or acquiring alternative means of funding.

(v) Real-time assessments or postevaluation studies on quality of engineering education and academic standards would always need time-series trends of key education indicators. These indicators would help each university or polytechnic institution identify needed improvements for curriculum development, industry-institution linkage, staff development and access to engineering education.

(vi) An effective screening method used in enhancing college access to the underprivileged and women could be institutionalized for each project universities and polytechnic institution. Expansion of coverage of the scholarship scheme to far-flung areas may be encouraged including the achievement of 50:50 female and male ratio goal. In line with this, mechanics of disbursement of scholarship should be properly designed to avoid delays in disbursement described in para. 49.

Follow-Up Actions and Recommendations

Sustainability. The IEM identified follow-up actions and recommendations for future projects in higher technical education in Indonesia to improve sustainability especially for equipment. An increase in the allocation for maintenance and of equipment and physical facilities at each project institution is needed. For earthquake prone areas, design of civil works should also take into account human safety concerns and emergency funds should be allocated as needed. In addition, a development plan for improving the quality of its program curricula, staff as well as for improving the networking with other private universities and private enterprises needs to be established.

Monitoring and Evaluation. A post completion monitoring and evaluation system should be set-up and maintained regularly to obtain meaningful impact assessment and identify needed improvements to sustain the project (paras. 54 and 76[v]).

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I. INTRODUCTION

A. Evaluation Purpose and Process

1. The Asian Development Bank (ADB) Engineering Education Development Project[1] was approved in February 1996 to assist the Government of Indonesia in improving the quality, relevance, and capacity of engineering education, while enhancing the access of economically disadvantaged but qualified students who wish to study. The institutions and disciplines supported by the project were selected based on the industrial demand for graduates in these areas and planning directions within each region. The purpose of this evaluation is to draw lessons from the project's experience that can be used in formulating new education projects and in improving the implementation of ongoing education assistance not only in Indonesia but also in ADB's other developing member countries. The project completion report (PCR) was completed in June 2004,[2] and an Independent Evaluation Mission (IEM) was fielded in July 2008 to evaluate the project. The IEM visited 10 of 14[3] project institutions and 4 nonproject institutions.[4]

2. The project performance evaluation report approach involved (i) a desk review of relevant project documents and reports; (ii) consultations with concerned operations divisions and government agencies to solicit their views on key issues; (iii) field visits to some project universities and polytechnic institutions; and (iv) focus group discussions and/or interviews with major stakeholder groups (Ministry of National Education; Directorate General of Higher Education [DGHE]; central project implementation unit [CPIU]; local project implementation units [LPIUs]; and university administrators, lecturers, alumni, and students); (v) field surveys[5] of sample beneficiaries; (vi) analysis of available nationwide secondary data, supplemented by primary data collected during the field surveys; including photographs. The project was evaluated according to the guidelines for the preparation of project performance evaluation reports[6] using the evaluation criteria of relevance, effectiveness, efficiency, and sustainability.

3. The PCR assessed the project as highly relevant, efficacious (i.e., effective), highly efficient, likely sustainable, and with significant institutional and other development impacts (including its long-term positive impact on society and the economy).[7] Some major weakness of the PCR are (i) the absence of baseline data, specifically for enrollment rate, graduation rate, and other specific outcome indicators for the education sector; (ii) economic/financial analysis was not carried out; and (iii) it did not assess to what extent the project succeeded in improving college access to the under privileged and women except for stating that project increase the intake of students. Overall, the PCR rated the project as highly successful, indicating that it achieved its objective of improving the quality and relevance of engineering education. In completing the report, the views of ADB's concerned departments and offices and those of the borrower and executing agencies have been considered.

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1 ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of Indonesia for the Engineering Education Development Project*. Manila (Loan 1432-INO, for $102 million, approved on 6 February).

2 ADB. 2004. *Project Completion Report on the Engineering Education Development Project*. Manila.

3 Based on ADB's report and recommendation of the President and PCR.

4 The 10 projects visited were located in Bandar Lampung, Banjarmasin, Denpasar, Jogjakarta, Kupang, Manado, Mataram, Padang, Pontianak, and Riau. The nonproject institutions were located in Bandung, Jakarta, and Jogjakarta.

5 The survey was based on purposive sampling, taking into account accessibility, security, willingness to respond, and budget and time constraints. The IEM opted to visit projects in regions across most of the project area to have a better picture of the project's impact.

6 ADB. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations.* Manila.

7 ADB. 2004. *Project Completion Report on the Engineering Education Development Project in Indonesia*. Manila.

B. Expected Results

4. The project's expected outcomes were improved quality, relevance, and capacity of engineering education, and enhanced access for economically disadvantaged but qualified students to study engineering in the seven project universities and seven polytechnics located in strategic locations in the country. This was to be achieved through the project's three main components: (i) improving quality and relevance, (ii) enhancing capacity access and participation, and (iii) strengthening institutional capacity to plan and manage engineering education. The project was expected to improve the academic standards of engineering education and its relevance to the requirements of the industries in the region and at the same time increase the capacity of quality engineering programs to provide more opportunities to students from different income levels.

5. Component 1 included (i) establishment of an engineering quality assurance committee (EQAC), which would be the prime mover in setting up a quality assurance system for higher education; (ii) formation, promotion, and support linkages with industrial companies or employers in each of the project areas for involvement in sharing of ideas for identifying programs to help in course and curriculum design/development through the project's provision of engineering program relevancy funds; (iii) engineering course and curricula review; (iv) training and fellowship awards of staff for selected private institutions; (v) upgrading of the university engineering program; and (vi) upgrading engineering programs in polytechnics. Component 2 included (i) creation of additional student slots for the 3-year diploma program and additional slots in the university engineering program, and (ii) improving opportunities for students to study through a student financial assistance scheme. Component 3 included strengthening of the institutional/technical capacity of DGHE to plan and manage engineering education and to undertake and manage the project in the context of new and emerging demands. The project was also expected to upgrade the 2-year diploma (D2) to 3-year diploma (D3) courses in the polytechnics such that all public polytechnics would offer 3-year engineering diploma programs. All of these components would entail provision of equipment, instructional materials, civil works, furniture, staff development, specialist services, and special programs for each project area that would increase the supply of professional engineers and technicians to complement the system-wide improvements of DGHE. Appendix 1 shows the focus of the project on official school age 19–22 from D2 to D3 and the Sarjana 1 (S1) - Bachelor's degree (undergraduate level).

II. DESIGN AND IMPLEMENTATION

A. Formulation

6. In June 1994, ADB approved preparatory technical assistance[8] that prepared detailed feasibility studies of sample projects in the eastern, central, and western region of Indonesia. Project preparation activities included two studies—a market signals survey of 240 selected industries in 12 provinces, and an institution survey of all public sector institutions offering engineering—to guide the selection of prospective beneficiary institutions and study programs. Based on the results, a fact-finding mission was fielded from 11 to 31 May 1995. This was followed by an appraisal mission from 4 to 22 September 1995. These missions conducted technical and economic analysis of the project, assessed its environmental and social implications, and discussed relevant policy issues with concerned Indonesian government agencies.

[8] ADB. 1994. *Technical Assistance to the Republic of Indonesia for Engineering Education Development*. Manila (TA 2096-INO, for $800,000, approved on 7 June).

7. At the time of appraisal, DGHE had successfully implemented several higher education development projects. ADB supported the development of Indonesia's higher education system since 1975 through nine projects that addressed the required professional manpower for the country's socioeconomic development (Appendix 2). Except for the University of North Sumatra Project, which was not rated, and the Six Universities Development and Rehabilitation Project, which was rated partly successful, the seven remaining loans were all rated successful at project completion.

8. During project preparation, consultation was held with all major aid agencies working on higher education in Indonesia, including the World Bank, Overseas Economic Cooperation Fund, Japan International Cooperation Agency, and Overseas Development Administration (ODA)[9] on project approach, design, and institutions covered. Aid agency consultation was facilitated by DGHE and the ADB Indonesia Resident Mission (IRM). The project was approved for $102 million on 6 February 1996. It was delegated to IRM on 1 July 1999 for better coordination and implementation.

B. Rationale

9. The Government of Indonesia recognized, through its development planning process, that a strong competitive workforce is necessary for sustainable national progress and that an increased share of higher education graduates, particularly engineering graduates, in the labor force is key to rapid industrialization and increased competitiveness. The Sixth Five-Year Development Plan (REPELITA VI), which spanned 1994/95 through 1998/99, included measures to increase long-term industrial growth by improving the relevance and quality of manpower training, encouraging businesses to shift from low-cost labor to higher skill-intensive products, and improving and expanding training institutions. Around the same period, Indonesia's third Higher Education Long-Term Strategy (1996–2005) was developed based on the assumption that the economy would grow steadily at the rate of 6%–8% per annum. Three major issues were identified: (i) the need for a more dynamic management mode in higher education to cope with many changes; (ii) the need to take quality and relevance as the basic reference for higher education development, and (iii) the need for enhancing social mobility and equity through higher education development.[10]

10. From 1994 to 1999, ADB's country operational strategy[11] focused on the development of physical and social infrastructure, particularly human resource development, that was perceived to be critical in sustaining socioeconomic development. The basic thrust of the activities in the education sector was to consolidate achievements through quality improvements to increase internal and external efficiencies and to redress imbalances between urban and rural areas, paying particular attention to ensuring access to educational opportunities for the poor, remote, and marginalized sectors of the population.

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[9] ODA is now known as the Department of International Development of United Kingdom set up in 1997. This marked a turning point for Britain's aid program, which until then had mainly involved economic development. On the other hand, the Overseas Economic Cooperation Fund merged with the Export-Import Bank of Japan in October 1999 and established the Japan Bank for International Cooperation. Beginning 1 October 2008, the Overseas Economic Cooperation Operations, a part of the Japan Bank for International Cooperation providing Japanese ODA loans and the grant aid dispersed by the Foreign Ministry, has been merged with the Japan International Cooperation Agency into one organization now known as the "new Japan International Cooperation Agency."

[10] DGHE. 2003. *Higher Education Long-Term Strategy 2003–2010*. Indonesia.

[11] ADB. 1994. *Indonesia: Country Operational Strategy*. Manila.

11. There was substantial demand for science and technology graduates, science and engineering teachers, engineering graduates, and graduates with appropriate skills for different sectors, while graduates of liberal arts and social science programs had low rates of employment. Thus, there was a need to improve regional and/or provincial engineering universities and polytechnic institutions to increase their ability to serve local needs through selective improvements of facilities, educational content and methodology, and staff. The improvement was to give students access to good regional engineering universities; help them meet the higher costs of education at major urban centers; and improve their suitability for locally available employment opportunities, thereby increasing their likelihood of remaining in their regions.

12. At the time of evaluation, the rationale for this project remained sound, given the current trends in education around the world, fast technological advances, and changes that required raising the absorptive capacity of professional and skilled people.

C. Cost, Financing, and Implementation Arrangements

13. At the time of appraisal, total project cost was estimated as $176.0 million, of which $79.7 million was in foreign exchange cost and $96.4 million equivalent in local currency cost (Appendix 3). ADB was to finance about 58% of the entire project cost through a $102.0 million loan from its ordinary capital resources, including $79.7 million of foreign exchange cost and $22.3 million equivalent in local currency cost. The Government of Indonesia was to contribute $74.0 million equivalent of the local currency cost.

14. Total actual project cost amounted to $120.0 million, 31.8% lower than anticipated at the time of appraisal. Foreign exchange cost accounted for almost 52.8% of the entire project cost, compared with the 45.3% expected share at the time of approval. The ADB loan was reduced by 30.0%, from $102.0 million to $71.4 million, through five loan cancellations totaling $30.6 million. The share of the government decreased by 34.2% from $74.0 million to $48.7 million equivalent. The reduction of loan amount was due primarily to the Asian financial crisis (AFC), which led to a sharp depreciation of the rupiah against the US dollar during the project period.

15. DGHE was the executing agency. A CPIU was established at DGHE to manage the project. It coordinated and directed the activities related to project implementation, while the LPIUs coordinated with the rectors/directors and with the universities/polytechnic project units. Although there were initial difficulties with monitoring, coordination, and quality control, these were overcome, and the CPIU performed its role satisfactorily. A project steering committee was established to give policy guidance to the CPIU. It met as and when required at least every 6 months to monitor, review, and supervise the functioning of the CPIU.

D. Procurement, Construction, and Scheduling

16. The procurement methods used in this project were based on ADB guidelines.[12] Goods and services (i.e., equipment, instructional materials, and international consulting services) were procured through international competitive bidding. Local competitive bidding was done for civil works and local consultants. With a few exceptions, the performance of the contractors was generally satisfactory for civil works. As assessed by the PCR, the performance of the suppliers, as well as the quality of the goods supplied, was satisfactory. However, the IEM discovered that a number of the supplies provided by an Indonesian company were defective. Due to its

[12] ADB. 1995. *Procurement Guidelines*. Manila.

performance in the Technological and Professional Skills Development Sector Project (TPSDSP),[13] this company was later blacklisted as a supplier in the TPSDSP.

17. The project, which was supposed to be completed on 1 April 2001, was completed by 30 September 2002 and financially closed on 31 December 2002. The reason for the extension and consequent delay of the project was mainly attributed to the AFC of 1997/1998. Other reasons were to complete the procurement, installation, and training for seven packages of equipment at 13 locations, to finish the remedial and alignment work in engineering laboratories and classrooms for some project institutions, and to put in place a plan for ensuring the sustainability of project facilities. In addition, the unforeseen AFC also affected project implementation in terms of additional procedures in relation to reallocation of funds and slight changes in project implementation and design.

E. Design and Implementation Changes

18. The main design and implementation changes in the project were due mainly to the 1997 AFC, which affected project implementation in terms of slight and few deviations made on the project components, including the funds allocation and project inputs.

1. Financial Crisis-Related Changes

19. **Financial Assistance.** The student financial assistance scheme of the project was affected by the 1997 AFC. Many students were unable to continue their studies. The student financial assistance scheme, which was supposed to provide student loans, was revised, and ADB and the Government of Indonesia decided to change it to provide assistance through the new student grant program scheme. This program covered both public and private universities offering engineering programs. The scheme became purely grants for students who were affected by the AFC, specifically those in remote areas. Students had to present evidence of inability to study as a result of the financial crisis. The grants were channeled through Bank Negara Indonesia (BNI).

20. **Additional Staff Development Programs.** The staff development program (SDP) underwent several changes in budget allocation. These changes were made due to the savings obtained from the rupiah depreciation as a result of the AFC. The savings from SDP came mainly from the implementation of the in-country fellowship program, which was financed in local currency. Savings were also generated from the overseas degree program due to the lower actual cost of the program than the estimated cost at appraisal. As a result, new short-term training was added to the staff development component. In anticipation of the DGHE policy for competency-based education for the polytechnic system, a learning improvement workshop was proposed. A one month training program was put in place, and subsequently the project implemented the program for six batches involving 400 fellows. Short-term training in support of project sustainability was also established before the project was completed.

21. **Financing of Equipment.** Equipment was supposed to be financed 80% from ADB and 20% from the Government of Indonesia. The government requested ADB to change its proportion into 100% ADB-financed, and ADB approved the request.

[13] ADB. 2000. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Indonesia for the Technological and Professional Skills Development Sector*. Manila (Loan 1792-INO, for $180 million, approved on 29 November).

22. **Downgrading of Materials Used in Construction.** There was a sharp price escalation for major materials for construction such as cement, wood, and steel. The IEM observed that to complete construction as scheduled, a few changes were made in terms of downgrading class of wood, flooring, and roofing materials. Some items such as fire hydrants, outdoor sewerage, and lighting were also cancelled. The effects of these changes were felt before the project was closed, as a number of buildings constructed needed additional works for completion (e.g., mechanical, electrical, fire protection, sewerage, and utility requirements for equipment such as installing wire) to be used optimally and to function properly. A second phase of construction was then implemented for these affected project areas taken from the loan savings.

2. Other Design Changes

23. **Multipurpose Building Construction in Polytechnics and in the University of Udayana and Civil Works.** DGHE decided to separate the administration of several polytechnics from their universities in 1998. To anticipate this condition, the construction of multipurpose buildings for the seven target polytechnics was proposed to ADB. The project also proposed to build a multipurpose building for the University of Udayana (UNUD) in Bali, since this was the only target institution that did not have that type of building. In addition, extended site development and special drainage systems were made for Politeknik Negeri Pontianak and Politeknik Negeri Banjarmasin to avoid flooding, since they were located in swampy areas.

24. **Non-Establishment of Engineering Quality Assurance Committee.** DGHE did not establish the EQAC as indicated in the Loan Agreement[14] of the project. The reason for this was that the functions of EQAC were already being performed by the National Accreditation Board (Badan Akreditasi Nasional [BAN]),[15] which was established in 1994. The establishment of EQAC would have duplicated the quality assurance function.

F. Outputs and Outcomes

25. This section assesses the achievement of project outputs under each component and their contributions to achieving project outcomes or objectives. The main data below are based on the information gathered during the IEM visit to project sites from interviews and focus group discussions conducted; desk review of project documents; data collected from project institutions and publications; and data collected from a sample survey[16] of administrators, lecturers, alumni, and students of project and nonproject institutions (Appendix 4). The project components and achievements can be seen in Appendix 5.

1. Improving Quality and Relevance

26. **Quality Assurance Mechanism Operational.** The project supported the development of quality assurance for engineering education programs. Through the 368 person-months of academic consultants, curriculum development guidelines for S1 (undergraduate) programs and

[14] Loan Agreement, Schedule 6, para. 9(a).

[15] BAN is an independent body under the Ministry of National Education, tasked with accrediting higher education study programs in both public and private institutions.

[16] The administrator respondents were mainly directors of polytechnics, vice rectors/directors, deans of engineering faculty, vice deans, and heads of departments of the project institutions and nonproject institutions. The lecturer respondents numbered 10–16 for each institution from the beneficiary engineering departments. Those who received fellowships during the loan period were categorized as priority respondents. The student respondents were 15–18 current students for each institution who used the building, library, books, laboratory, equipment, and information and communications technology facilities, and interacted with the lecturers and technicians. They were asked to give their opinion regarding current conditions. The alumni respondents numbered 30–36 for each institution who studied there during the loan period (1996–2002).

a quality assurance handbook were developed, which provided input to the current edition of DGHE's quality assurance handbooks. The handbook was distributed to most higher education institutions offering engineering programs. The expected role of the EQAC was already being conducted by BAN (para. 24).The quality assurance handbook and the quality assurance responsibilities taken on by BAN contributed to stimulating higher education institutions, developing internal quality assurance systems, and developing and improving the accreditation of programs and institutions. Questionnaires for teacher and course evaluations are regularly given to students, and regular updates on the results of evaluation are provided to students in the form of forum discussions. Based on the IEM surveys, 87.5% of sampled administrators from project institutions and 85.7% of sampled administrators from nonproject institutions have setup quality assurance systems in their institutions. This trend was confirmed during actual visits to some project institutions, where it was observed that some universities and polytechnics are still at an early stage of developing their respective quality assurance units at the highest levels, while others have already adopted the concept at the lower organizational levels, e.g., academic departments. The IEM observed that in the project and nonproject universities and polytechnics, quality assurance and accreditation are being taken seriously.

27. The accreditation of programs and institutions through BAN is discussed in Appendix 6. The accreditation process is intended to strengthen and sustain the quality and integrity of higher education, making it worthy of public confidence. It aids institutions in developing and sustaining effective educational programs and assures the educational community, general public, and other organizations that an accredited program or institution has met high standards of quality and effectiveness. Accreditation status indicates that a university, institution, or program generally meets the standards of quality set by BAN in terms of faculty, curriculum, administration, libraries, financial well-being, and student services.

28. **Industry-Institutions Link Improved.** Innovative ideas for linkages and partnerships between project institutions and industry were supported through the Program Relevancy Fund, which funded 341 proposals from engineering departments across the country. The proposals were selected on a competitive basis in six batches. In general, the criteria used for selection were the potentials for (i) developing the "local" content of the curriculum, (ii) improving the syllabus (course content), (iii) improving the learning process in engineering education, (iv) improving the competency of faculty members, (v) improving activities of the existing laboratory, (vi) strengthening cooperation with industry, (vii) sustainability of the activity after completion of the Program Relevancy Fund, (viii) increasing close relationships between universities or polytechnics and industry, and (ix) using the results of the proposal[17] in the institution or industry. The proposals aimed at improving the linkages between the academic and training institutions and the industries they served, specifically research and development activities to help strengthen the relevance of higher education to industrial demands. Recipient institutions included both public and private institutions. The Fund covered all programs in engineering education, including those specifically designed to provide continuing professional development, either as standalone courses or as modular programs organized in partnership with industry. As a result of some of the proposals, partnerships were forged. The IEM observed that some companies provided internship places for students of the University of Gadjah Mada (UGM) ranging from 1 month to 3 months. For other universities and polytechnic institutions, other

[17] Some of the proposals cover local curriculum development under the electrical engineering (EE) study program of Politeknik Negeri Pontianak, curriculum development of the EE Department under the EE study program of Lampung University, curricular reconfiguration in the mechanical engineering department under the mechanical engineering program of the University of Andalas (UNAND), and computer-base traffic light simulation for traffic engineering education under the civil engineering study program of Soegijapranata Catholic University.

companies provided training equipment,[18] while others[19] funded research studies. Some recipient institutions contracted agreements with organizations to provide training to their employees.[20]

29. Based on the survey, 90.9% of sampled administrators of project institutions indicated that their institutions had established linkages with other universities and/or polytechnic institutions, while sampled administrators of nonproject institutions indicated 100.0%. Of the sampled administrators of project institutions, 88.2% indicated that there was an active link established between the industries and/or companies in the region and the institution, while sampled administrators of nonproject institutions indicated 88.9%. Although one can argue that there is only a small difference in percentage between sampled project and nonproject institutions, it should be noted that the nonproject institutions are well-known engineering education institutions, thus indicating that project institutions are catching up with other high-ranking institutions.

30. **Engineering Courses and Curricula Reviewed and Updated.** The project provided consulting services and special programs for course and curriculum development. Competency-based curricula were prepared, pilot-tested, refined, and adopted in each institution. The capacity of several lecturers in curriculum development in their respective subject specializations was developed. In the project and nonproject universities and polytechnic institutions visited, the IEM observed that curriculum review and updates were undertaken at intervals of about 3–5 years, which is rewarded in the accreditation process. The IEM gathered that consultations with industry to review curricula are conducted in different ways by the project institutions. Some invite industry representatives to curriculum review workshops,[21] while others send questionnaires to industry to collect their views. The project also supported study visits by benchmarking teams, comprising 72 persons in seven engineering study programs (i.e., civil, architecture, mechanical, electrical, electronics, chemical, and industrial). The visits focused on observing and examining the best teaching and learning practices of leading universities in Europe, Japan, North America, and Singapore. The findings of the teams were disseminated through workshops participated in by about 1,980 academic staff of various engineering faculties in public and private institutions.

31. Based on the IEM survey, 85.5% of sampled alumni from project institutions and 77.9% from nonproject institutions considered what they had studied at the university and/or polytechnic as relevant to their current jobs. Of the sampled alumni from project institutions, 67.5% indicated that their specific degree was very relevant or relevant to their job, while 76.8% of nonproject institutions indicated such. Of the sampled alumni, 79.1% in project institutions and 94.9% of sampled alumni in nonproject institutions considered the skills they had acquired in the institution as relevant for their job. Also, 56.7% and 23.6% of sampled alumni from project institutions experienced less than 3 months or less than 6 months, respectively, of waiting time for their first job, while 79.0% and 9.9% of sampled alumni from nonproject institutions experienced the same. The survey also indicated that the bulk of alumni from project institutions in the engineering field were with management and the management training and services departments, while the bulk of alumni from the nonproject institutions in this particular sample

[18] UGM and Politeknik Negeri Banjarmasin received motorcycle service sets from a Japanese company. Another Japanese company gave the University of Riau (UNRI) a motorcycle assembly laboratory.

[19] An international oil company and a national paper company for UNRI, and a private paper company and a government-owned plantation company for UNAND.

[20] For example, Politeknik Negeri Kupang and Politeknik Negeri Manado have agreements with Perusahaan Listrik Negara (PLN [state-owned power utility]) to provide training to PLN employees. Some universities offered training and/or seminars to employees of a company within the region such as the seminar on oleo-petrochemical technology in UNRI and training on production and inventory for Padang Cement and PLN Power Plant by UNAND.

[21] Industry representatives are invited to curriculum review workshops in UNRI, University of Lampung, UNAND, UGM, the Polytechnic in Banjarmasin, and the private nonproject university Atma Jaya.

were in management, education, and training. Also, around 84.0% of the sampled alumni from both project and nonproject institutions had technical job responsibilities, while 17.4% indicated clerical and 5.8% managerial job responsibilities. The higher percentage in nonproject institutions can be attributed to the fact that the sampled nonproject institutions are known or high-ranking institutions in engineering education.[22]

32. **Strengthening Private Engineering Programs.** The project assisted 164 personnel of private universities in completing their graduate studies: 32 completed overseas master's and doctorate degrees, while 132 completed in-country master's degree programs. At the bachelor's level, 95 individuals with scholarships completed their degrees, while 580 individuals participated in the teaching improvement workshop. Interviews with former CPIU staff indicated that almost 100% of those who completed master's and doctoral degrees overseas and in-country returned to their respective private universities and departments.

33. **Strengthening University Engineering Program.** The project strengthened selected undergraduate level (S1) and D3 engineering programs of seven universities.[23] Project inputs included staff development and training aid packages; provision of equipment, instructional materials, and books; and civil works.

34. **Staff Development.** Significant assistance for staff development in the project institutions was a key achievement of the project. Appendix 7 provides a breakdown of the SDP for the training and in-country and overseas fellowships for bachelor's, master's, and doctorate programs. In most cases, the actual number of staff sent on fellowships exceeded the planned targets. The major problem experienced in implementing this program was the lack of foreign language proficiency of those being sent abroad, as well as their academic background. As a result, some participants, especially for the overseas doctorate program, stayed beyond the required duration of the program.

35. The project also assisted nondegree training programs. Teaching improvement workshops were attended by 542 persons from state higher education institutions, as well as 580 persons from private higher education institutions that conduct engineering education. The teaching improvement workshops provided knowledge and insight in the field of engineering education curriculum development and its learning processes. Laboratory technician training programs were attended by 349 laboratory officials of target universities.

36. During the IEM, focus group discussions with administrators, alumni, and lecturers showed that nearly all of the teaching staff who finished their studies returned to their respective institutions and received special or specific duties in their respective fields, including improvement of practicum modules, strengthening of the learning process of subjects in their fields of study, development of new subjects and/or classes, research, and junior lecturer guidance. The IEM observed that some of the fellowship recipients are now heads or deans of their departments.

37. **Laboratory and Associated Equipment.** The laboratory and associated equipment items necessary to strengthen engineering programs were identified and installed in the project

[22] The nonproject institutions were chosen based on their accessibility and the possibility of being able to gain more information and perspective about known private and public institutions in the engineering education industry. Technology Bandung and Politeknik Bandung were chosen, since these institutions were known for engineering education in Indonesia, and some of the persons who were involved with the project could be located. Private institutions, Atma Jaya and Akademi Tehnik Mesin Industri, were chosen based on accessibility, since these institutions were located in the same region where project institutions were to be visited.

[23] UNUD, University of Mataram, UNRI, UGM, UNAND, UNTAD, and University of Lampung.

institutions. The project formed an expert team, and staff from the Politeknik Bandung and Institut Teknologi Bandung were assigned to assist each university and polytechnic determine the types of equipment needed. Equipment was provided by the CPIU using international competitive bidding. Procurement of laboratory equipment was implemented through five phases starting in 1997 and ending in 2002. A total of 58 packages of equipment were given to the project institutions. One problem experienced during implementation was delay in opening letters of credit at the time of the financial crisis, when suppliers from abroad were doubtful about the use of letters of credit from BNI. The letters of credit had to be directly issued by ADB, which entailed more time. Hence, delays in some deliveries occurred.

38. The equipment was placed in laboratories at each university and polytechnic, most of which have been used for teaching and learning purposes. The equipment was also very helpful in improving the quality of the learning process. Availability of necessary laboratory equipment served as an important supporting factor in conducting a high-quality teaching and learning process. Focus group discussions with laboratory supervisors of project universities and polytechnics revealed that the new equipment aided practicum activities. Many practicum activities that were previously conducted outside of the university or at places other than the laboratory came to be conducted in the project institutions' laboratories. In certain polytechnics and universities, the use of laboratory equipment as an alternative means of earning funding began to take place. However, problems due to lack of funding for the operation and maintenance of certain equipment began to arise in several institutions. IEM visits observed that some equipment needed calibration and repair. In a few cases, associated software or manuals were not available and thus were never used. In some cases, parts of equipment were difficult to acquire when repairs were needed, which affected optimal usage of the equipment.

39. Based on the survey, 76.5% of the sampled lecturers of the project institutions indicated that the laboratory equipment was highly used, while 23.5% indicated that it was moderately utilized. The survey indicated that 11.3% of current students were highly satisfied and 42.1% moderately satisfied with the equipment. Also, 55.6% of the sampled current students felt that the laboratory activities were sufficient; 38.1%, insufficient; and 6.3% did not know if the laboratory activities in the institutions were sufficient.

40. **Instructional Materials and Books.** Instructional materials and library books were provided by the project. The provision of library and reference books contributed to the strengthening of educational quality. Book titles to be provided were also identified by an expert team formed early in project implementation. Eight book packages were provided consisting of 3,881 titles. Delay in the shipment of books due to problems concerning letters of credit was experienced as well (para. 37). In some cases, these procedural and administrative delays affected the acquisition of books, as a number of books became unavailable or out of print with time. The search for replacements for some of these book titles was sometimes unsuccessful, and thus they were never replaced. The books that were provided were placed in the project institutions' faculty areas and libraries and were being used for the learning and teaching process. A total of 30 types of teaching aids were distributed to each university and polytechnic.

41. Based on the survey of sampled lecturers of project institutions, 63.4% indicated that the library was being used highly; 29.3%, moderately; and 7.3%, partly. Of the sampled lecturers for nonproject institutions, 60.0% indicated that the teaching and instructional materials provided were highly used; 31.4%, moderately; and 8.6%, partly used. Of the sampled current students, 1.9% of them perceived that many books were almost obsolete, while 24.7% perceived that the current useful books were not enough. Around 50.6% indicated that there were too few books in the library, while 22.8% did not bother to answer at all. This result indicates that a review of library and book use may be needed. With the current internet availability, the approach in

learning resources might have changed the attitudes of students toward books or sources and learning materials.

42. **Civil Works.** The project supported civil works, e.g., site development, construction of buildings and facilities, and rehabilitation of buildings and facilities, to support, strengthen, and/or upgrade engineering programs in the different project institutions (Appendix 8). The administrators found the structures useful. Aside from having additional enrollees and better quality engineering education, the heads of the universities and polytechnics indicated that the construction and rehabilitation of buildings added prestige to their institutions. It added visibility and a better image of the project institutions in the region. Planning and design of the projects were generally good, except in a few locations affected by earthquakes. Visits to the project institutions showed lack of maintenance in some of the buildings, as demonstrated by gaps, holes, and missing ceilings. Water leakage was observed in the University of Riau (UNRI), University of Andalas (UNAND), and University of Lampung (UNLAM). Wall cracks in project-supported structures were evident in UNAND as a result of frequent earthquakes, causing safety concerns among students.[24]

43. As indicated in para. 22, second-phase construction was conducted in some project institutions, which included the refurnishing and renovation of older buildings possessing insufficient utilities, as well as adjusting them to be able to support the new laboratory equipment.

44. **Upgrading Engineering Education in Polytechnics.** D2 programs of the following polytechnics were upgraded to D3 programs: Politeknik Negeri Pattimura, Politeknik Negeri Kupang, Politeknik Negeri Pontianak, Politeknik Negeri Banjarmasin, Politeknik Negeri Samarinda, Politeknik Negeri Manado, and Politeknik Negeri Bali. This was done through the provision of civil works, equipment and furniture, in-country and overseas training and fellowships, instructional materials, studies, and special programs, and financing of recurrent costs to complete the upgrading efforts of DGHE.

45. The project-supported staff development S1 program, 4-year diploma course, and D3 programs were conducted to upgrade teaching staff at polytechnics. S1 scholarships were provided to 279 persons who were sent to state universities, while 48 persons were sent to private universities. D3 scholarships were given to 48 teaching personnel from state polytechnics throughout the country, and 159 teaching staff from state polytechnics throughout the country also received special S1 scholarships. The learning improvement workshop was provided by the project wherein 400 teaching staff participated from state polytechnics throughout Indonesia. It provided new insights into the development of competency-based learning for engineering higher education in polytechnics. In addition, an "S1 plus" training program was provided by the project for 458 polytechnic teaching staff throughout Indonesia.

46. All of the buildings are being fully utilized. Appendix 8 shows the project-supported civil works done in each university and polytechnic institution. Multipurpose buildings are useful, as seen during project visits; they were a source of income for some polytechnics where the building was being rented out when not in use. This led to additional income, which financed renovation and additional materials such as sound systems, airconditioners, and additional furniture. Polytechnics were also beneficiaries in the provision of books and instruction materials. Each polytechnic on the average received three packages of books totaling 669 titles.

[24] The IEM had a first-hand experience of an earthquake during its visit. Students ran out of the building and were vulnerable to take a risk of being hit by objects falling from the buildings or cabinets.

2. Enhancing Capacity Access and Participation

47. **Establishing New Engineering Programs.** The project established 10 new engineering programs—six S1 and four D3—in five universities. Through the project, the University of Mataram and UNLAM now have S1 programs in electrical engineering and mechanical engineering. At UNRI, a new bachelor-level program in chemical engineering and two new D3 programs in electrical and mechanical engineering were established. At the University of Tadulako, two new D3 programs in electrical and mechanical engineering were established, while one new bachelor-level program in electrical engineering was established at UNAND. Through these 10 new engineering study programs, the project assisted in the creation of more than 2,500 bachelor-level and more than 500 D3 student slots to study engineering in the project universities. Also, an additional 4,000 student slots were created in 3-year polytechnic diploma programs. At the same time, some of the existing programs that received new training equipment were able to increase their student intake, while other recipient institutions also created extension or nonregular programs to serve those who cannot be served through the regular study programs.

48. This project has resulted in meaningful and significant changes in terms of capacity and conditions for the project institutions. During the IEM visits, it was observed that the improvement of facilities and other learning means had resulted in the possibility of conducting afternoon class sessions. This had taken place in some universities and in Banjarmasin State Polytechnic and Pontianak State Polytechnic. It was also observed that efforts to reach out for the underprivileged and women are being undertaken by the project universities and polytechnic institutions. Awarding of scholarships to deserving students has been maintained even after project completion.[25] Steps to improve expansion of coverage of the scholarship scheme by allocating a quota to far-flung areas while maintaining high standards and the achievement of a 50:50 female and male ratio in scholarship coverage are being considered.

49. **Student Financial Assistance Scheme.** The student loan scheme could not be implemented due to the 1997 AFC and was instead converted to a student grant program with the support of the government and the endorsement of ADB (para. 19). The grants benefited a total of 27,489 students. A means test was administered to participants, who also needed to satisfy appropriate academic criteria. Other criteria included a demonstrated aptitude for and interest in engineering. BNI coordinated the distribution of these student grants. The selection of the students who would receive grants was conducted by each higher education institution. A total of 6,637 students were aided in the first batch, and 16,110 and 4,742 students were aided in the second and third batches, respectively. The grants given amounted to Rp60,000/month for 1 year to each student selected. The funds for each grantee were paid directly into the grantee's account. This method of distribution was chosen to increase the security of funds transferred, but on the other hand it made it difficult for the institution to monitor the grants. One difficulty encountered during its implementation was that BNI was relatively late in transferring the funds to the grantees due to frequent changes of grantee account numbers caused by a BNI regulation on an automatic deduction of a monthly administration fee from all accounts, causing BNI to close accounts after automatic deduction when the remaining balance was below its standard daily balance cutoff for active accounts. Thus, the affected grantees needed to change their account numbers for their next disbursement, which resulted in difficulty for BNI to process the funds transfer on time.

[25] Scholarship funds is a part of the total budget of the project institution with additional sources from some private companies which came about as a result of the improved industry and institution linkage during project implementation.

3. Strengthening Institutional Capacity

50. **Management of Engineering Education.** Academic consulting services were provided to DGHE for implementing the project. The consultants helped DGHE improve and develop academic programs in the national engineering education system in selected fields of study both in the professional engineering and technical education programs. Special programs were also provided to selected staff of DGHE for training in resource management in higher education, participated in by 20 persons from DGHE and individuals from BAN[26], Institut Technology Bandung (ITB), UGM, and University of Indonesia who were assisting DGHE in project implementation. DGHE also organized faculty of engineering management training participated in by deans, assistant deans in the field of academics, assistant supervisors in the field of academics, and polytechnic study program heads. In addition, training for decision making in higher education was attended by the rectors of universities and polytechnic directors of target institutions provided by DGHE and aimed at increasing the capacity of target higher education institutions to guarantee the sustainability of project investments. High regard for DGHE was seen in all visited project and nonproject institutions.

51. DGHE's institutional capacity was strengthened, helping it cope up with the new developments in higher education. With the decentralization and autonomy of public universities and polytechnics, a big challenge faces DGHE. The role of the central government, represented by the DGHE, has been shifting and evolving from regulation toward being an enabling and facilitating government agency. Although it can still intervene through resource allocations and other means within the context of the national higher education system, responsibilities and accountabilities are gradually being shifted to the institutions. Providing autonomy and demanding accountability, however, needs a comprehensive and consistent policy. Full implementation of autonomy and accountability would require an improved institutional framework (i.e., including the legal status and responsibilities of DGHE, BAN, as well as the universities and polytechnics) and legal infrastructure (i.e., higher education laws/procedures, necessary government regulations, ministerial decrees, etc.).

52. **Project Management Support and Other Special Programs.** The project provided consulting services, equipment, studies, and special programs for the CPIU and LPIUs and financing of recurrent costs. The project management services consultants of PT Kogas Driyap (seven consultants for 324 person-months) were hired to assist the CPIU in managing the project on a daily basis.

53. Other special programs and initiatives were implemented with the consultants' assistance. The Fakultas Teknik–UGM was awarded the contract for the study of a cost recovery program. The implementation of the tracer study for engineering graduates was carried out in FY1998/99 by Lembaga Teknologi Fakultas Teknik Universitas Indonesia (Lemtek–Fakultas Teknik–University of Indonesia). The project benefit monitoring and evaluation (PBME) study was carried out in FY1998/99 by Laboratorium Komputasi Matematika Fakultas Matematika dan limu Pengetahuan Alam Universitas Indonesia. PBME should have been prepared by the project for each location that would be continuously updated by each project institution to provide it with distinct and realistic conditions and explanations of the benefits of the project at each location. Although this was implemented, it was only for FY1998/99 and not for all project institutions.

[26]. It is the only accreditation body in the Indonesian higher education system based on the National Education Act and Government Regulation on Higher Education.

54. The IEM noted that an effective routine, formal monitoring and evaluation of equipment and building facilities are needed. A database system for PBME existed only for 1998/99, with many data gaps. There appears to be a need for closer coordination in terms of data collection and monitoring and evaluation of impacts. This was evident when the IEM requested data from project institutions, which could not be produced quickly.

G. Consultants

55. Consultants were recruited following ADB's *Guidelines on the Use of Consultants*[27] in two categories: academic consultants and project management support. Eleven international academic consultants provided 138 person-months of consulting services, while 12 national academic consultants provided 300 person-months to complement the international consultants. Seven project management consultants provided 324 person-months to help the project run smoothly. Interviews during the IEM with former CPIU staff (who are currently employed in UGM, Politeknik Bandung, and ITB) and LPIU staff (who are still employed in their respective project universities and polytechnic institutions) indicated that the performance of the consultants was satisfactory. This was further confirmed through samples of published outputs of consultants. DGHE published the consultant's reports and widely disseminated them among engineering institutions.

H. Loan Covenants

56. All of the loan covenants except three (which were not or only partly met) were complied with by the Government of Indonesia as stated in the Loan Agreement. Of the three, EQAC, which was supposed to be created, was not formed because its function was being fulfilled and executed by BAN, whose growing acknowledgement by and independence from other organizations provided further reason for it to be the main organization conducting higher education quality evaluation. Second, the Local Consultative Fora, which was planned to be a permanent and independent organization, was not fully established formally at each target higher education institution. Instead, formation of functional local consultative forums in various forms specific to each institutional requirement were set up. Lastly, routine budgetary allocations for maintenance and repair of at least 5% of the book value of the equipment from the second year onward did not meet the 5% mark.

I. Policy Framework

57. The experience gained by DGHE, BAN, and project universities and polytechnics in implementing the project helped them to adapt in the evolving and changing higher education environment in Indonesia. Aside from the decentralization and autonomy of public universities and polytechnics mentioned in para. 51, other changes are occurring. One of these is in the internal and external accreditation systems in the higher education sector. Internal accreditation was introduced at some of the larger high-ranking universities in the late 1990s for the purpose of continuously improving the quality of higher education service. External accreditation is conducted by BAN for higher education, which was established in 1994 to assess and accredit programs in public and private higher education institutions (HEIs). BAN introduced institutional accreditation in 2008. It is the only accreditation body in the Indonesian higher education system based on the National Education Act and Government Regulation on Higher Education. The accreditation process by the board was mandatory for all programs in HEIs by 2001, but it is currently a voluntary activity based on the study program request. Through the accreditation process, undergraduate and diploma programs are categorized into four types from A

[27] ADB. 1995. *Guidelines on the Use of Consultants by the Asian Development Bank and Its Borrowers*. Manila.

(satisfactory) to D (unsatisfactory), while postgraduate programs are categorized in three levels: U (excellent), B (good), and T (fair) (Appendix 6).

58. Another aspect of change can be seen in the Higher Education Long-Term Strategy (HELTS) 2003–2010. In 2003, the government introduced HELTS as an important comprehensive package of reforms covering macroeconomic management, financial sector reform, and policies to increase investment and reduce poverty. The main objective of HELTS is to improve the quality of higher education to help reduce shortages of higher level skills that are slowing down investment in the economy and absorption of new technologies. HELTS particularly focuses on decentralizing public HEIs and making the autonomous institutions change public expenditure for higher education into a combination of block grants, competitive grants, and performance-based grants. These resource transfers will focus on improving not only education quality, but also governance, efficiency, and equity. With its emphasis on reforming governance in the sector and developing innovative public financing tools, HELTS can be viewed as a significant initiative in improving the management and governance of public sector organizations.

59. Recent legislation has also attempted to secure a greater slice of the country's revenue pie for education. The new education act stipulates that 20% of the central budget excluding cost and 20% of the provincial budget excluding salary cost should be allocated to education.

III. PERFORMANCE ASSESSMENT

60. **Overall Assessment.** The project is rated *successful*. It was (i) highly relevant at the time of appraisal and at evaluation to the government's and ADB's objectives and strategies; (ii) effective in achieving its objectives, with project outputs and outcomes, sometimes exceeding targets despite the financial crisis it experienced during project implementation; (iii) efficient in terms of resource utilization; and (iv) likely sustainable, in terms of tangible and intangible benefits (see the table).

Overall Assessment of the Project

Criterion	Weight (%)	Assessment	Rating Value	Weighted Rating
Relevance	20	Highly relevant	3	0.6
Effectiveness	30	Effective	2	0.6
Efficiency	30	Efficient	2	0.6
Sustainability	20	Likely	2	0.4
Overall Rating		**Successful**		**2.2**

Note: Highly successful $\geq$ 2.7; successful 2.7>S$\geq$1.6; partly successful 1.6>PS$\geq$0.8; unsuccessful <0.8. .
Source: Independent Evaluation Mission.

61. **Relevance.** Information and data gathered by the IEM indicate the project to be *highly relevant*. As noted in paras. 9–12, the project was formulated in response to the government's REPELITA VI. The project was designed within the framework of ADB's operational strategy to meet the government's development objectives at the time of appraisal. The project design was appropriate to meet its main objectives despite the financial crisis that occurred during project implementation. The IEM observed that upgrading the education of lecturers was highly relevant to the needs of their study programs. Staff development also remains relevant in the face of the government goal of all lecturers in higher institutions possessing a minimum of S2 qualification by 2014. Improving the relevance and quality of engineering programs has helped address the

human resource requirements of industries and other employers. The resources and assets provided to project institutions, including modern equipment, books, and instructional materials, were relevant to their needs.

62. **Effectiveness.** The project is rated *effective*. It achieved its purpose of improving the quality, relevance, and capacity of engineering education in the project institutions visited by the IEM despite the financial crisis during project implementation. It contributed to balanced regional development by expanding the capacity of engineering programs through the provision of new and updated facilities and staff training in 14 project institutions throughout the country (paras. 26–48). Upgraded staff, improved curricula, modern training equipment, and latest learning materials contributed to improving the quality and relevance of the programs, including the academic experience of the students. These are being reinforced by the quality assurance systems in place, to which the project provided some support. New buildings and laboratories in these programs were also created, and new programs are being created. The IEM received expressions of appreciation from lecturers who benefited from staff development, from alumni who used the project-provided facilities and equipment, and from the students currently using the facilities and equipment.

63. **Efficiency.** The project met most of its appraisal targets under the three components (Appendix 5) and exceeded some (specifically for the targets in staff development) (Appendix 7), even if the final total project cost was lower than the budgeted cost which was due to the budgetary constraints during the AFC. The project's economic viability could not be reasonably established due to the absence of tracer studies and data constraints. Neither the RRP nor the PCR included a calculation of the EIRR, nor did they present a least-cost or cost effective analysis. The IEM planned to estimate the EIRR prior to and after implementation of the project but found it difficult to get complete data and information. While most targets were met, the IEM observed that the use of some of the most expensive equipment was suboptimal. Some of the computer numerical controlled machines and tri-axial equipment were nonfunctional and thus could not be used in training students, while one institution received three more wood profiling machines than needed. In one instance, an institution received two machines when in fact only one was required or requested, so the extra machine was not used at all. Some expensive machines also do not have the manuals and/or the relevant accessories, while some of those controlled by computers have outdated software. Given these observations, the IEM surmises that the outcomes could have been achieved at even lower total project cost. Given the efficient use of resources under the main components for improving quality and relevance and enhancing capacity access and participation (e.g., staff development and training, civil works, curriculum development, instructional materials and books) and the suboptimal utilization under the subcomponent for provision of equipment, the overall efficiency is assessed as *efficient*.

64. **Sustainability.** All the sampled universities and polytechnics are operating in varying degrees (Appendix 10). All the three components of the project have been established sufficiently for each project institution and are functioning as expected. The IEM observed that in the project universities and polytechnics, quality assurance systems have been set-up and accreditation is being taken seriously. Outcomes associated with quality assurance and curriculum development are also most likely to be sustainable, as these are rewarded within the program accreditation framework. Outcomes associated with relevance of the engineering programs in relation to link between institutions and industries still exists and is being maintained. Some partnerships were forged between project institutions and industries within its region. The IEM observed that some companies provided internship places for students ranging from 1 month to 3 months. For other universities and polytechnic institutions, other companies provided training equipment, while others funded research studies. Some recipient institutions contracted agreements with organizations to provide training to their employees.

65. As for outcomes associated with capacity access and participation, this project has resulted in meaningful and significant changes in terms of capacity and conditions for the project institutions. During the IEM visits, it was observed that the improvement of facilities and other learning means had resulted in the possibility of conducting afternoon class sessions. Aside from the engineering program that were planned to be established, some of the universities have now the capacity to start and offer new engineering programs not covered by the project. The outcomes associated with staff development inputs are most likely to be sustainable, as the large majority of project assistance recipients have returned to the project institutions and are teaching in the areas of their education.

66. In terms of the outcomes associated with civil work and equipment, civil works in three universities (para. 42) and training equipment of visited project institutions seem to require improved maintenance and repair management systems and greater budget allocation. As mentioned above, some physical facilities need repair and repainting, while some expensive training equipment, specifically those with electronic controls, are nonfunctional or need calibration. Thus, more budget allocation would be necessary to render them functional again. This would require increased budget commitment from the institution and/or the government to serve the repair and maintenance requirements. A loan covenant had already indicated that at least 5% of the book value of the laboratory and workshop equipment should be allocated for maintenance and repair. However, current budget allocations of some project institutions reserve proportions for various line items, e.g., salaries, research and development, and assign a proportion for maintenance and repair lower than the specified percentage in the project's loan covenant. Percentage allocated for the maintenance and repair does not actually depend on the book value of the laboratory and workshop equipment but on the total budget of the university or the project institution which usually ranges from 2%-5% of the total budget of the university or the project institution for the year. Some project institutions have forged training partnerships with government agencies and enterprises and are providing consulting services in exchange for payments. Some of these revenues are being directed toward repair and maintenance of their training equipment. Some project institutions are also eligible to compete for grants from the government, and some have been successful with their proposals. However, D3 programs in universities are not eligible to apply for such grants, which constrain their potential sources of revenue.

67. To address these gaps in maintenance and repair of equipment and physical facilities, project institutions need to increase the corresponding allocations, preferably in compliance with the loan covenant. Project departments may thus need to be more entrepreneurial and seek other sources of revenue while at the same time obtaining the commitment of their institution to increase their maintenance and repair allocation. The latter is feasible in view of the government's publicly expressed commitment to increase the budget share of education to 20%.

68. As for the outcome associated with strengthening institutional capacity, DGHE and BAN were strengthened and the experience and lessons gained by DGHE, BAN, and project universities and polytechnics in implementing the project help in coping up with the new developments in higher education. With the decentralization and autonomy of public universities and polytechnics, a big challenge faces DGHE. The role of the central government, represented by the DGHE, has been shifting and evolving from regulation toward being an enabling and facilitating government agency. From the recently completed TPSDSP, DGHE has implemented the project successfully.

69. Taking into consideration the sustainability of all the components of the project described above and the expected commitment of the government to education in the budget, the IEM, at this time, considers the project's sustainability to be *likely* rather than most likely.

IV. OTHER ASSESSMENTS

A. Impact on Institutions and Policy

70. Overall, the project on the whole helped in the institutionalization of quality assurance in higher education and in strengthening DGHE and BAN. DGHE's institutional capacity was strengthened, which has helped it to cope up with the new developments in the higher education environment mentioned in paras. 50–51 and 57–58. Also, implementing the project made DGHE staff better prepared for the implementation of the TPSDP. In addition, the experience gained by DGHE in implementing the project is also helping DGHE to fully implement HELTS. The government introduced HELTS in 2003, which particularly focuses on decentralizing public HEIs and making the autonomous institutions modify public expenditure for higher education into a combination of block grants, competitive grants, and performance-based grants.

B. Socioeconomic Impact

71. Through the student grant program scheme, the project has benefited students coming from lower income families. Students in project institutions come not only from the largest cities and urban areas, but also from the poorer and rural regions of the country. Increasing the capacity of civil engineering programs, which enroll the most women in engineering, has increased the number of places for women. Upgraded educational qualifications and improved facilities and equipment have contributed to empowering staff to play a larger role in their immediate and professional communities. Indirectly, it may have partly helped improve the human development index in the different regions, as shown in Appendix 9 table, and gross state domestic product in general for the different regions, as shown in Appendix 9 figure.

C. Environmental Impact

72. The project did not have any adverse environmental impact within the project campuses, and wastes generated by project institutions are reused, recycled, or disposed of in government-designated waste collection areas. This was observed during the field visits to the project institutions.

D. Asian Development Bank Performance

73. Since appraisal, ADB conducted 14 missions, including the Project Completion Review Mission. ADB was able to give timely advice to the government. Project administration was delegated to IRM effective 1 July 2001, with 1 year and 3 months left before project completion. Project implementation was consistently rated satisfactory from the start until completion. The midterm review was very responsive to the needs of the project, as it resulted in the introduction of steps that helped remedy the problems encountered during implementation. Overall, ADB performance was *satisfactory*.

E. Borrower and Executing Agency Performance

74. The government was highly committed to the project, as shown by the high priority that it placed on the development of the seven state universities and seven polytechnics. DGHE was committed to the success of the project, as demonstrated by the recommendations that it

forwarded to the ADB Midterm Review Mission. Coordination and cooperation among a number of LPIUs was a challenge but was done relatively well, as indicated during the interviews with administrators. Despite the AFC, where Indonesia was one of the Asian countries severely affected, the country has produced its counterpart funds, although at a lower scale than estimated at appraisal. Overall, the performance of the borrower was *satisfactory*.

V. ISSUES, LESSONS, AND FOLLOW-UP ACTIONS AND RECOMMENDATIONS

A. Issues

75. To improve the efficiency and sustainability of the project's impact, outcomes, and inputs, and the evaluation of a project, the following issues need to be addressed in the near future:

(i) Maintenance and management of project-supported facilities and equipment needs to be improved and properly funded, particularly those needing repairs to ensure long-term sustainability. This would require project institutions to develop other sources of revenue and/or improve cost recovery.

(ii) Setting up and proper accessibility of baseline data on output and outcome indicators for each university and polytechnic should be done prior to a project, and implementation should be regularly maintained even after project completion.

(iii) Coordination and consultation between the archive section of the Office of Administrative Services, resident mission, and its regional department and the Independent Evaluation Department (IED) should be encouraged, as records storage needed could span several years for different kinds of IED studies. In this particular case, LPIU progress reports submitted to IRM were believed to have been disposed of, since no LPIU report was found in the archive section, and the IEM had to resort to the availability of LPIU reports in the project institutions visited.

B. Lessons Identified

76. Reviewing and analyzing the information gathered, the IEM identified the following lessons for future projects in higher technical education and in Indonesia:

(i) The monitoring and evaluation system should not be done only once or twice, but should be integrated and implemented within the regular activities of the project institutions and should also be linked to DGHE's management information system. Baseline data for specific outcome indicators like enrollment rate (in this case for engineering in the project institution), pass rate or graduation rate of students, job search period, etc., should be established and continuously updated in an easily accessible database for each project institution.

(ii) Partnering with other educational institutions, organizations, and enterprises can improve the utilization of facilities and be a source of revenue to increase cost recovery.

(iii) Integrated management of equipment for each university and polytechnic institution, involving an informative inventory system, operation and maintenance manuals, and staff training and accountabilities, should be instituted to permit easy monitoring of its status to promote its optimal use.

(iv) Entrepreneurship capability development would be useful as one of the future project programs due to limits in government funding for higher education institutions to be capable of developing or acquiring alternative means of funding.

(v) Real-time assessments or postevaluation studies on quality of engineering education and academic standards would always need time-series trends of key education indicators. A baseline and time series data of key outcome indicators from a reliable database system that is easily accessible from each university and

polytechnic institution is one of the main keys to truly reflect the status of a university or a polytechnic institution. These data may include the annual numbers of students and graduates by program and faculty; staff by faculty and education level; students receiving scholarships; students considered as poor; employed graduates; and graduates assisted by the student advisory centers for job counseling and placement, together with their job search periods and the type of jobs they found. These indicators would help each university or polytechnic institution identify needed improvements for curriculum development, industry-institution linkage, staff development and access to engineering education.

(vi) An effective screening method used in enhancing college access to the underprivileged and women could be institutionalized for each project universities and polytechnic institution. Expansion of coverage of the scholarship scheme to far-flung areas should be encouraged including the achievement of 50:50 female and male ratio goal. In line with this, mechanics of disbursement of scholarship may be properly designed to avoid delays in disbursement described in para. 49.

C. Follow-Up Actions and Recommendations

77. **Sustainability.** The IEM identified follow-up actions and recommendations for future projects in higher technical education in Indonesia to improve sustainability. There should be an increase in the allocation for maintenance and repair to address gaps in maintenance and repair of equipment and physical facilities at each project institution is needed. Maintenance and management of project-supported facilities and equipment needs to be improved and properly funded, particularly those needing repairs to ensure long-term sustainability. This would require project institutions to develop other sources of revenue and/or improve cost recovery. For earthquake prone areas, design of civil works should take into account human safety concerns and emergency funds should be allocated. In addition, a development plan for improving the quality of its program curricula, staff as well as for improving the networking with other private universities and private enterprises needs to be established.

78. **Monitoring and Evaluation.** A post completion monitoring and evaluation system should be set-up and maintained regularly to obtain meaningful impact assessment and identify needed improvements to sustain the project (paras. 54 and 76[v]).

EDUCATIONAL SYSTEM AND ORGANIZATIONAL STRUCTURE[a]

		Islamic Academic Education under MORA	General Academic Education under MONE	Professional Education under MONE			
	Higher Education	Islamic Doctorate Program (S3)	Doctorate Program (S3)	Professional Program			
		Islamic Master Program (S2)	Master Program (S2)	Professional Program			
22		Islamic Under-graduate Program (S1)	Under graduate Degree Program (S1)	Diploma 4 Program	Diploma 3 Program	Diploma 2 Program	Diploma 1 Program
21							
20							
19	Senior Secondary Education	Islamic Senior Secondary School (Madrasah Aliyah)	General Senior Secondary School (Sekolah Menengah Umum)		Vocational Senior Secondary School (Sekolah Menengah Kejuruan)		
18							
17							
16	Junior Secondary Education	Islamic Junior Secondary School (Madrasah Tsanawiyah)	General Junior Secondary School (Sekolah Lanjutan Tingkat Pertama)				
15							
14							
13	Primary Education	Islamic Primary School (Madrasah Ibtidaiyah)	General Primary School (Sekolah Dasar)				
12							
11							
10							
9							
8							
7	Pre-School	Islamic Kindergarten (Raudhatul Athfal)	Kindergarten (Taman Kanak-Kanak)				
6							
5							

MONE = Ministry of National Education, MORA = Ministry of Religious Affairs.
Note: Shading shows the program focus of the project.
[a] Based on Education Law Number 20 of 2003.
Source: MONE.

COMPLETED HIGHER EDUCATION LOANS TO INDONESIA

Loan Number	Title	Approved Amount ($ million)	Approval Date	PCR Rating
244	Surabaya Institute of Technology Project	14.50	2-Dec-75	GS
402	University of Hasanuddin Project	25.00	7-Jun-79	GS
525	University of North Sumatra Project	26.00	24-Sep-81	NR
737	University of Sriwijaya Project	37.90	21-May-85	S
894/895 (SF)	Marine Sciences Education Project	73.35	14-Jul-88	S
1013	Six Universities Development and Rehabilitation Project	114.00	8-Mar-90	PS
1253	Higher Education Project	140.00	21-Sep-93	S
1432	Engineering Education Development Project	102.00	6-Feb-96	HS
1792	Technological and Professional Skills Development Sector Project	180.00	29-Nov-00	S
	Total	**712.75**		

GS = generally successful, HS = highly successful, NR = not rated, PCR = project completion report, PS = partly successful, S = successful, SF = special funds.
Source: Independent Evaluation Department database.

COST BREAKDOWN BY PROJECT COMPONENTS

Component	Appraisal Estimate ($ million)			Actual ($ million)			% (Underrun)/Overrun		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
A. Base Cost									
1 Staff Development									
a. In-Country	0.00	15.40	15.40	0.00	4.79	4.79	–	(68.87)	(68.87)
b. Overseas	14.80	0.00	14.80	14.49	0.00	14.49	(2.11)	–	(2.11)
Subtotal	**14.80**	**15.40**	**30.20**	**14.49**	**4.79**	**19.28**	**(2.11)**	**(68.87)**	**(36.16)**
2 Specialist Services									
a. International	2.10	0.00	2.10	2.42	0.00	2.42	15.24	–	15.24
b. Domestic	0.00	4.30	4.30	0.00	0.93	0.93	–	(78.44)	(78.44)
Subtotal	**2.10**	**4.30**	**6.40**	**2.42**	**0.93**	**3.35**	**15.24**	**(78.44)**	**(47.70)**
3 Facilities Development									
a. Site Development	0.20	1.90	2.10	0.11	2.83	2.94	**(45.00)**	49.00	40.05
b. Construction	6.00	23.80	29.80	2.02	28.65	30.66	**(66.40)**	20.36	2.89
c. Design and Supervision	0.00	1.80	1.80	0.00	2.30	2.30	–	27.78	27.78
d. Furniture	0.50	4.20	4.70	0.56	1.28	1.84	**11.40**	(69.55)	(60.94)
Subtotal	**6.70**	**31.70**	**38.40**	**2.68**	**35.06**	**37.74**	**(59.96)**	**10.59**	**(1.72)**
4 Equipment and Materials									
a. Equipment	30.60	7.60	38.20	30.87	1.00	31.87	**0.89**	(86.88)	(16.57)
b. Instructional Materials	2.10	1.40	3.50	1.90	0.15	2.05	(9.38)	(89.43)	(41.40)
Subtotal	**32.70**	**9.00**	**41.70**	**32.78**	**1.15**	**33.92**	**0.23**	**(87.28)**	**(18.66)**
5 Research Studies	0.00	0.50	0.50	0.00	0.26	0.26	–	(48.20)	(48.20)
6 Special Program	0.00	6.00	6.00	0.00	2.02	2.02	–	(66.42)	(66.42)
7 Incremental Recurrent Cost	0.00	11.40	11.40	0.00	2.66	2.66	–	(76.65)	(76.65)
8 Taxes and Duties	0.00	7.60	7.60	0.00	9.92	9.92	–	30.55	30.55
Subtotal	0.00	25.50	25.50	0.00	14.86	14.86	–	(41.73)	(41.73)
Subtotal A	**56.30**	**85.90**	**142.20**	**52.37**	**56.78**	**109.15**	**(6.99)**	**(33.90)**	**(23.25)**
B. Contingencies									
1 Physical Contingencies	2.80	4.30	7.10	0.00	0.00	0.00	–	(100.00)	(100.00)
2 Price Escalation	4.30	6.20	10.50	0.00	0.00	0.00	–	(100.00)	(100.00)
Subtotal B	**7.10**	**10.50**	**17.60**	**0.00**	**0.00**	**0.00**	**–**	**(100.00)**	**(100.00)**
C. Interest and Other Charges	**16.30**	**0.00**	**16.20**	**10.96**	**0.00**	**10.85**	**(32.75)**	–	**(33.02)**
Total (A+B+C)	**79.70**	**96.40**	**176.00**	**63.33**	**56.78**	**120.00**	**(20.54)**	**(41.10)**	**(31.82)**

Sources Independent Evaluation Mission and Asian Development Bank. 2004. *Project Completion Report on the Engineering Education Development Project in Indonesia*. Manila.

PROJECT UNIVERSITIES AND POLYTECHNICS AND THE SAMPLE SURVEYS

Table A4.1: Project and Nonproject Institutions

Name of the Institutions at Appraisal (RRP)[a]	Name of the Institutions at Present
A. Universities	
1. University of Udayana	University of Udayana
2. University of Andalas	University of Andalas
3. University of Mataram	University of Mataram
4. University of Lampung	University of Lampung
5. University of Tadulako	University of Tadulako
6. University of Gadjah Mada	University of Gadjah Mada
7. University of Riau	University of Riau
B. Polytechnics	
1. University of Pattimura	Politeknik Negeri Pattimura
2. University of Nusa Cendana	Politeknik Negeri Kupang
3. University of Tanjung Pura	Politeknik Negeri Pontianak
4. University of Lambung Mangkurat	Politeknik Negeri Banjarmasin
5. University of Mulawarman	Politeknik Negeri Samarinda
6. University of Sam Ratulangi	Politeknik Negeri Manado
7. University of Udayana	Politeknik Negeri Bali
C. Nonproject Institutions	
1. Atma Jaya University	
2. Akademi Tehnik Mesin Industri	
3. Politeknik Bandung	
4. Institut Technology Bandung	

RRP = report and recommendation of the President.
[a] While the RRP used the old names of the polytechnics under the universities, the polytechnics became independent institutions during implementation.
Source: Independent Evaluation Mission.

Table A4.2: Survey Sample Size of Different Categories of Respondents

Category of Respondents	Number of Sample Respondents				
	Project Institutions		Nonproject Institutions		
	University	Polytechnic	University	Polytechnic	Total
Administrators	18	17	4	5	44
Lecturers	70	51	18	16	155
Students	98	62	38	31	229
Alumni	197	127	41	46	411
Total	**383**	**257**	**101**	**98**	**839**
	640		**199**		

Source: Independent Evaluation Mission survey.

Table A4.3: Sample Size of Respondents

Institution	No. of Administrators	No. of Lecturers	No. of Students	No. of Alumni
University of Andalas	1	12	15	32
Atma Jaya University	1	5	16	25
Akademi Tehnik Mesin Industri	1	6	16	30
Politeknik Negeri Banjarmasin	3	11	15	36
Institut Technology Bandung	3	13	22	16
PlitekniKupang	4	12	15	34
Lampung	2	12	19	36
Manado	6	16	17	21
Mataram	3	12	15	36
Poltek Bandung	4	10	15	16
Pontianak	4	12	15	36
Riau	5	12	16	35
Udayana	2	10	17	36
University of Gadjah Mada	5	12	16	22
Total	**44**	**155**	**229**	**411**

Source: Independent Evaluation Mission survey.

PROJECT'S KEY COMPONENTS, OUTPUTS, AND ACHIEVEMENTS

Design Summary	Targets	Achievements at PCR	Achievements at IEM
1. Sector and Area Goals To improve the quality, relevance, and capacity of engineering education, and to enhance the access to such education by economically disadvantaged but qualified students who want to study engineering	Build adequate resource capacity and technical knowledge for continuing improvement in the quality and supply of engineering education.	Ministry of National Education established the National Accreditation Board (Badan Akreditasi Nasional or BAN). Several rules and regulations on curriculum, learning process evaluation, and monitoring related to quality improvement were also established. Resource capacity and technical knowledge have been improved in the quality and supply of engineering education.	The Ministry of National Education has strengthened the accreditation process and quality assurance system for engineering project institutions through BAN; and the guidelines and rules on curriculum, learning process evaluation, and monitoring related to quality improvement are continuously being improved. Resource capacity and technical knowledge have improved the quality and supply of engineering education in the project regions. New engineering courses were offered even after project implementation to keep up with the needs of the region.
2. Proposed Objectives 2.1. To improve the quality, relevance, and capacity of engineering education	Improve the academic standards of engineering education and its relevance to the requirements of industry.	The academic standards of engineering education and its relevance to the requirements of industry have been improved.	Universities and polytechnic institutions have taken quality assurance and accreditation seriously and set up incentive schemes for lecturers and academic departments.
2.2. To increase access to engineering studies by qualified students	Increase the capacity of engineering education programs at the university and polytechnic level, and provide more opportunities to study in higher quality programs.	Increased 25,632-student capacity of engineering education programs at the university and polytechnic levels and provide more opportunities to study in higher quality programs.	The new programs and upgraded programs of the universities and polytechnic institutions implemented during the project implementation still exist. Additional new programs have been offered by most project institutions after project completion.
	Ensure engineering graduates have mastered necessary skills, knowledge, and work attitudes.	Improved curriculum and education facilities ensured engineering graduates have mastered necessary skills, knowledge, and work attitudes.	Graduates had 1–6 months waiting time to find jobs within their region. Necessary skills, knowledge, and work attitudes were provided in the improved curriculum and education facilities.

Design Summary	Targets	Achievements at PCR	Achievements at IEM
	Strengthen the institutional and technical capacity of the Directorate General of Higher Education (DGHE) to plan and manage engineering education in the context of new engineering demands.	Institutional and technical capacity of DGHE to plan and manage engineering education in the context of new engineering demands has been strengthened. This was confirmed in the implementation of the TPSDP.	DGHE's institutional capacity was strengthened and has helped DGHE to cope up with the new developments in the current higher education environment, which requires further strengthening. The role of the central government represented by DGHE has been shifting and evolving from regulating into a more empowering, enabling, and facilitating government agency. Responsibility and accountability are gradually being shifted to institutions, although this is still in transition.
3. Project Components and Outputs 3.1. Improving Quality and Relevance - Quality assurance mechanism operational	Engineering Quality Assessment Committee (EQAC) established to support links with industry	EQAC established, supported by 24 person-months of international consulting services and 96 person-months of domestic consulting services by quality assurance specialist to match links with industry. Quality assurance handbook was developed.	EQAC did not actually materialize. Quality assurance responsibilities were taken on by BAN and contributed to stimulating higher education institutions, develop internal quality assurance systems, and develop and improve the accreditation of programs and institutions.
- Industry-institutions link improved	Engineering Program Relevancy Fund (PRF) established to support links with industry	Under the PRF, 341 research topics were completed.	Under the PRF, 341 research topics were completed. Individual universities and polytechnic institutions continue to establish links not only with companies but also with other universities and polytechnic institutions. Some companies provided internship places for students, provided training equipment or funded research, or contracted agreements with universities and polytechnic institutions to provide training to their employees.
- Engineering course and curricula reviewed and updated	Course and curriculum development program designed to generate specific areas of expertise and training in curriculum	Course and curriculum development, supported by 48 person-months of international consulting services and 96 person-months of domestic consulting services by curriculum specialists. It	The new programs and upgraded programs of the universities and polytechnic institutions implemented during project implementation still exist. Courses and curricula are reviewed every 3–5 years and revised as necessary.

Design Summary	Targets	Achievements at PCR	Achievements at IEM
	development	included a program designed to generate specific areas of expertise and training in curriculum development.	Additional new programs have been offered by most project institutions after project completion.
- Staff of selected private institutions trained	Quality of teaching staff raised through overseas and in-country fellowships and training	254 fellows completed overseas master's and doctorate programs, while 531 fellows completed domestic master's degree program: 458, 519, and 63 fellows completed S1 Plus, S1 Special, and D4, respectively.	This has been confirmed; about 97% of trained individuals returned to their respective institutions and are now either heads or active staff in their respective institutions.
- University engineering programs upgraded	Strengthen seven bachelor-level engineering programs in six universities.	Seven bachelor-level (5 in civil engineering [CE], 1 in mechanical engineering [ME], and 1 in electrical engineering [EE]) and five diploma (2 CE, 1 ME, 1 chemical engineering [ChE], and 1 EE) engineering programs in six universities were strengthened.	The new programs and upgraded programs of the universities implemented during the project still exist. Additional new programs have been offered by most project institutions after project completion.
- Engineering programs in polytechnics upgraded	Upgrade 22 diploma engineering programs in seven polytechnics.	Diploma engineering programs (7 CE, 7 ME, and EE and 1 ChE) in seven polytechnics were upgraded. The upgraded programs were supported by 138 person-months of international and 228 person-months of domestic academic consultants. It also included the upgrading of civil works, 41 packages of laboratory equipment, 3 packages of teaching aids, and 2,079 titles of engineering books.	Confirmed. The upgraded programs of polytechnic institutions implemented during project implementation still exist. Additional new programs have been offered by most project institutions after project completion
Private institutions supported	Award overseas and in-country fellowships programs, reference books, and student grants for private institutions.	20, 12, and 131 fellows completed overseas masters, overseas doctorate, and domestic master's degree programs, respectively. Engineering books for reference and student grants also were provided to private institutions.	Completed. All recipients of overseas scholarships returned to their respective universities/institutions. New engineering books are being acquired, and scholarships are being offered to qualified students.

Design Summary	Targets	Achievements at PCR	Achievements at IEM
3.2. Enhancing Capacity, Access, and Participation	Create additional 4,000 student slots in 3-year polytechnic diploma programs.	Additional 4,000 student slots were created in 3-year polytechnic diploma programs.	Aside from the previously created slots, additional new programs have been offered by most project institutions after project completion
- Capacity of university and polytechnic programs increased	Create additional 3,000 student slots in university engineering programs.	Additional 3,000 student places were established in university engineering programs.	
	Establish six bachelor-level (3 EE, 2 ME, and 1 ChE) and 4 3-year diploma (2 ME and 2 EE) engineering programs in five universities.	Six bachelor-level (3 EE, 2 ME, and 1 ChE) and 4 3-year diploma (2 ME and 2 EE) engineering programs in five universities were established.	
- Student financial assistance scheme for engineering study operational	Improve opportunities for 1,300 women and economically disadvantaged students to study engineering through student loan scheme.	Student loan scheme could not be implemented due to financial crisis, but the project provided 27,497 student grants to disadvantaged engineering students. More than 1,300 women benefited from the grant scheme.	Confirmed. Universities and polytechnic still offers yearly scholarships and assistance to students in various forms and amount.
3.3. Strengthening Institutional Capacity - Improved capacity to plan, undertake research, and manage project	Improve systems and procedures for DGHE.	The systems and procedures for DGHE were improved by a series of workshops and benchmarked to reputable higher education institutions overseas.	Confirmed. DGHE's institutional capacity was strengthened, helping it to meet the new developments in the current higher education environment, which requires further strengthening. The DGHE website now posts publications and information about the different universities and institutions.
	Undertake tracer studies of graduates and study in private engineering institutions undertaken	Tracer studies of graduates and study in private engineering institutions were undertaken.	Tracer studies are being undertaken from time to time by the project institutions on an ad hoc basis, some of which have set up an alumni database. In some cases, former students initiated the formation of an alumni association

Design Summary	Targets	Achievements at PCR	Achievements at IEM
	Timely and successful implementation of the project	Project implementation was extended for 1 year to ensure the sustainability of the project investment.	Project completion was actually extended for 1.5 years and financial closing was done 3 months after physical completion.
	Strengthen management of higher education institutions.	72 staff from DGHE, technical team, and project institutions benefited from course development in US, Australia, Canada, UK, Singapore, Malaysia, etc.	Confirmed. DGHE's institutional capacity was strengthened, helping it to cope with new developments in the current higher education environment, which requires continuous strengthening.
		68 high officials from project institutions benefited from benchmarking to overseas engineering institutions in Canada, Europe, and Australia.	Confirmed. The experience gained by these officials was echoed to other officials, CPIU, and LPIUs through workshops.
	Strengthen management information system and project benefit monitoring system (BME).	Information and communication technology facilities were provided to 13 project institutions to support the BME system.	BME was done only for 1998/99, was not updated regularly, and had gaps. From 2002 onward, DGHE set up a web-based database that is updated by each institution and is accessible by anyone with internet access. It includes different education indicators at http://www.evaluasi.or.id/profile.php?specProf=0.

BAN = Badan Akreditasi Nasional, CPIU = central project implementation unit, DGHE = Directorate General of Higher Education, EE = electrical engineering, EQAC = engineering quality assurance committee, IEM = Independent Evaluation Mission, PCR = project completion report, PRF = Poverty Reduction Fund, TPSDP = Technological and Professional Skills Development Project, UK = United Kingdom, US = United States.

Sources: Independent Evaluation Mission and Asian Development Bank. 2004. *Project Completion Report on the Engineering Education Development Project in Indonesia*. Manila.

NATIONAL ACCREDITATION BOARD FOR HIGHER EDUCATION: ACCREDITATION OF COURSES AND INSTITUTIONS

1. Badan Akreditasi Nasional (BAN or the National Accreditation Board for Higher Education) was established by the Ministry of National Education in 1994 to introduce an accreditation and quality assurance system for all tertiary institutions in Indonesia. BAN is an independent body in terms of its structure and funding, and the Secretariat office is based in Jakarta. The Board is managed by the chair and assisted by the secretary and has a number of committee members made up of education experts and representatives from both state and private tertiary institutions.

2. Broadly, the functions of BAN are to (i) establish and implement the new accreditation system, (ii) increase the efficiency of tertiary institutions, and (iii) increase the self-assessment capability of tertiary institutions in Indonesia.

3. The accreditation procedures generally adopt a quantitative and qualitative approach to evaluation. Information supplied by the institutions was gathered via detailed questionnaires and institutional visits. The three elements of evaluation are quality, relevance, and efficiency, and the sub-elements include indicators such as student, lecture, facilities, and curriculum quality; teaching process; institutional and course management; and the output quality of students.

4. The accreditation instrument is developed based on two-group standards: the first group reflects components of leadership and institutional development, and the second group reflects components of quality, efficiency, and effectiveness of the program. The following lists are the standards used for accreditation. Standards reflecting components of leadership and institution development are (i) integrity; (ii) vision; and (iii) governance, human resources, facilities and infrastructure, funding, information system, and sustainability. Standards reflecting components of quality, efficiency, and effectiveness are (i) students, (ii) curriculum, (iii) methods of leaning, (iv) quality assurance mechanism, (v) management, and (vi) academic atmosphere. The standards are reviewed based on nine aspects: (i) appropriateness, (ii) adequacy, (iii) relevance, (iv) academic atmosphere, (v) efficiency, (vi) sustainability, (vii) selectivity, (viii) productivity, and (ix) effectiveness. The assessment uses a quantitative approach by scoring and weighting the standards.

5. BAN accredits all courses offered by academies, polytechnics, tertiary schools (*sekolah tinggi*), institutes, and universities in Indonesia. The accreditation process for *Sarjana* and *Magister* courses commenced in 1997. Accreditation for doctorate degrees commenced in 2001. The accreditation procedures for diploma courses are still being formulated.

A. Assessing *Sarjana* Qualifications

6. Sarjana or S1 courses are rated as either accredited (*Terakreditasi*) or unaccredited (*Tidak Terakreditasi*). For accredited courses, there is a further classification shown in Table A6.1.

Table A6.1: S1 Accreditation Rating and Review Requirements

Rating	Grade	Score	Review Requirements
Accredited	A = very good	60–700	Every 5 years
	B = good	501–600	Every 5 years
	C = satisfactory	400–500	Every 3 years
Not accredited	D	>400	Allowed 5 years to improve rating

Sources: Available: http://www.aei.gov.au/AEI/GovernmentActivities/QAAustralianEducationAndTrainingSystem/CSU_App_2_3.pdf and http://siteresources.worldbank.org/EDUCATION/Resources/indonesia_ban-pt.pdf

7. Institutions that obtain A-rated courses are allowed to determine their own student enrollment numbers, lecture activities, examination materials, and certificates, while institutions that obtain B- and C-rated courses need to continue to improve their quality.

8. For non-accredited courses, the institution concerned is required to seek guidance from a tertiary institution where the same course has been graded A. For a course that is classified D (unaccredited) in the first accreditation process, the institution may seek a second accreditation process within the next 5 years. If it falls for the second time, the institution is given between 3 and 5 years to improve, and if the result has not improved in the third accreditation round, the Ministry of National Education is authorized to discontinue the course.

B. Assessing Magister or S2 Qualifications

9. The Magister or S2 programs (equivalent to master's degree) are rated as accredited or not accredited. The grades awarded are shown in Table A6.2.

Table A6.2: S2 Accreditation Rating and Review Requirements

Rating	Grade	Review Requirements
Accredited	U (ungal: excellent)	Every 5 years
	B (belajar: learning)	Every 3 years
Unaccredited	T (teritnggal: lagging behind)	Every 5 years to improve rating

Sources: Available: http://www.aei.gov.au/AEI/GovernmentActivities/QAAustralianEducationAndTrainingSystem/CSU_App_2_3.pdf and http://siteresources.worldbank.org/EDUCATION/Resources/indonesia_ban-pt.pdf

SUMMARY OF STAFF DEVELOPMENT PROGRAM

Activity	Appraisal Length of Course (months)	No. of Person	Actual Length of Course (months)	No. of Persons
A. In-Country Staff Development				
1. Strengthening Professional Engineering Education				
a. Master's level	30	250	30	399
b. Bachelor's level	36	100	36	279
c. Staff development				
(i) Teaching improvement	1	450	1	542
(ii) Technician training	2	100	2	349
(iii) Fellowship preparation	6	150	6	0
2. Upgrading Selected Polytechnics				
a. Bachelor level	36	400	36	519
b. Diploma level	12	40	12	48
c. Staff development				
(i) Teaching improvement	1	500	1	458
(ii) Learning improvement	0	0	1	400
3. Strengthening Private Institutions				
a. Master level	30	100	30	132
b. Bachelor level	36	100	36	95
c. Staff development				
(i) Teaching improvement	1	400	1	580
(ii) Fellowship preparation	6	100	6	0
Subtotal (A)		**2,690**		**3,801**
B. Overseas Fellowships				
1. Strengthening Institutional Capacity (study visits)				
a. DGHE MIS and planning	3	2	3	0
b. Quality framework	3	5	3	0
c. Course development	1	100	1	72
d. Relevance	1	5	1	0
e. Sustainability program	0	0	0	68
2. Strengthening Professional Engineering Education				
a. PhD Eng.	54	40	54	85
b. M Eng/MS	30	100	30	137
c. Fellowship preparation	6	60	6	212
3. Assisting Private Institutions				
a. PhD Eng.	54	10	54	12
b. M Eng/MS	30	20	30	20
c. Fellowship preparation	6	20	6	0
Subtotal (B)		**362**		**606**
Total		**3,052**		**4,407**

DGHE = Directorate General of Higher Education, M Eng = master's in engineering, MIS = management information system, MS = master's of science, PhD Eng = doctor in engineering.

Sources: Independent Evaluation Mission and Asian Development Bank. 2004. *Project Completion Report on the Engineering Education Development Project in Indonesia*. Manila.

SUMMARY OF CIVIL WORKS COVERED BY THE EEDP

University/Polytechnic Institution	Project/Activity
Andalas University, Padang, West Sumatra	Procurement of furniture Site development of engineering faculty
Tadulako University, Palu, Central Sulawesi	Perfecting building of D3 program Site development for polytechnic building
Gadjah Mada University, DI Yogyakarta	Procurement of furniture Construction of building (lecture) Perfecting building of D3 program
Mataram University, Lombok	Procurement of furniture Perfecting building for engineering faculty Site development for engineering faculty
Lampung University, Bandar Lampung	Perfecting building of engineering faculty Site development for engineering faculty
Riau University	Site development for engineering faculty
Politeknik Negeri Pontianak, West Kalimantan	Construction of polytechnic auditorium Perfecting new buildings Site development of auditorium and polytechnic
Politeknik Negeri Pontianak Samarinda, East Kalimantan	Construction of polytechnic common building Perfecting polytechnic building Site development for polytechnic building
Politeknik Negeri Pattimura, Ambon Moluccas	Construction of polytechnic common building Perfecting polytechnic building Site development for polytechnic building
Politeknik Negeri Bali, Denpasar, Bali	Construction of polytechnic common building Perfecting EEDP engineering faculty buildings Site development engineering faculty Perfecting polytechnic building Site development for polytechnic building
Politeknik Negeri Kupang, Kupang, East Nusa Tenggara	Construction of polytechnic common building Perfecting polytechnic building Site development for polytechnic building
Politeknik Negeri Banjarmasin, Banjarmasin, South Kalimantan	Construction of polytechnic common building Construction of mechanical laboratory building Perfecting polytechnic building Site engineering for polytechnic building Site development for polytechnic building
Politeknik Negeri Manado, Manado, North Sulawesi	Construction of polytechnic common building Perfecting polytechnic building Site development for polytechnic building

D3 = 3-year diploma, EEDP = Engineering Education Development Project.
Sources: Independent Evaluation Mission and EEDP back-to-office reports.

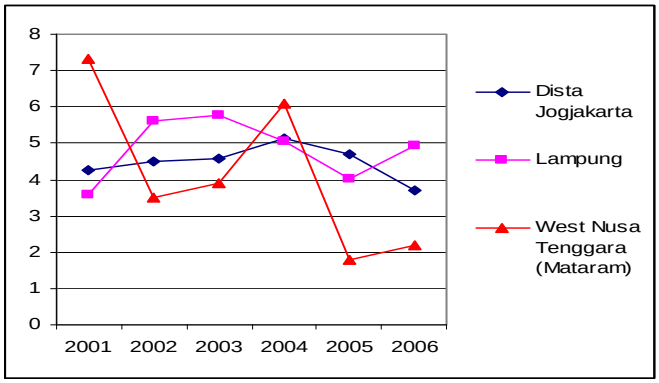
TRENDS BY REGION FOR HUMAN DEVELOPMENT INDEX AND GROSS STATE DOMESTIC PRODUCT

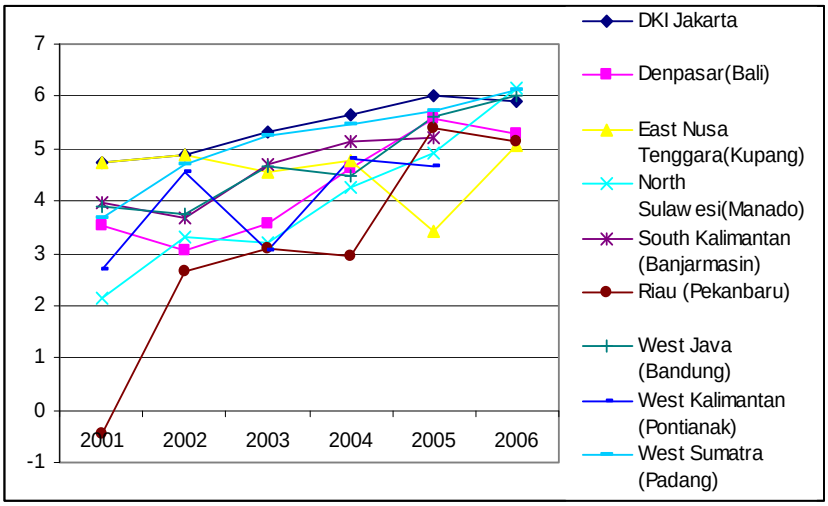
Trends in Human Development Index by Region (1999–2006)

Province	1999	2002	2004	2005	2006
Denpasar(Bali)	65.7	67.5	69.1	69.8	70.1
Dista Jogjakarta	68.7	70.8	72.9	73.5	73.7
DKI Jakarta	72.5	75.6	75.8	76.1	76.3
East Nusa Tenggara(Kupang)	60.4	60.3	62.7	63.6	64.8
Lampung	63.0	65.8	68.4	68.8	69.4
North Sulawesi(Manado)	67.1	71.3	73.4	74.2	74.4
Riau (Pekanbaru)	67.3	69.1	72.2	73.6	73.8
South Kalimantan (Banjarmasin)	62.2	64.3	66.7	67.4	67.7
West Java (Bandung)	64.6	65.8	69.1	69.9	70.3
West Kalimantan (Pontianak)	60.6	62.9	65.4	66.2	67.1
West Nusa Tenggara (Mataram)	54.2	57.8	60.6	62.4	63.0
West Sumatra (Padang)	65.8	67.5	70.5	71.6	71.6

Source: United Nations Development Programme. *Indonesia: Human Development Reports 1999–2007*. Jakarta.

Trends in Gross State Domestic Product by Region (1999–2006)





PROJECT AND NONPROJECT INSTITUTIONS VISITED

A. Introduction

1. The Independent Evaluation Mission (IEM) visited 10 projects (out of the 14 projects in the Engineering Education Development Project). It observed the current status of the universities and the polytechnic institutions; the usefulness of the equipment and facilities provided by the project; the state of staff development; quality assurance; industry-university linkages; and, if any, operation and maintenance of the project facilities and income-generating activities. The IEM met with rectors, lecturers, laboratory instructors, students, and alumni.

B. University of Riau

2. The University of Riau (UNRI) is located in Pekanbaru region in the fast-developing growth triangle known as SIJORI (Singapore, Johor, and Riau), where petroleum and chemical-based industries have already developed. With the growth of manufacturing-based industries, the situation produced an unmet market need for different types of engineers prior to project implementation.

The administration building of UNRI constructed under the project.

3. The establishment of new 3-year diploma (D3) programs in electrical and mechanical engineering and strengthening of bachelor's degree (S1) for chemical and civil engineering helped in meeting the demands of the region for different types and levels of engineers. The IEM observed that the curriculum in UNRI is updated every 5 years through consultation with different companies and experts from other universities. For the D3 program, it was planned to have 52% practical lessons, but actual implementation indicated only 40% practical lessons due to lack of budget. Of the total budget of UNRI, 70% went to salary of staff, 15% for staff development, 5% for scholarships, 3% for research, and 7% for other activities. As of 2008, UNRI had 1,572 engineering students and 152 lecturers. The ratio of teachers to students was 1:10. Of all the lecturers, 4% were doctoral degree (S3) graduates, 67% were master's degree (S2) graduates, and 29% S1 graduates. It was also observed that the building design was based on the whim of one of the leaders of the university, using the "CFT" abbreviation, which means campus, faculty, and technique. Thus, some laboratories were designed like lecture rooms, and not practical for laboratories. Discussions with lecturers and administers indicated that the dropout rate was 2%–5% per year. During the whole course of the program 10%–15% of students either changed program or moved to another university or work.

The equipment used by chemical engineering students of UNRI.

4. There were 1,137 alumni and a focus group discussion with alumni indicated that they benefited from the equipment provided by the project and were satisfied with how their lecturers handled the courses. Discussions with students indicated that the books had not been updated after project implementation, and there was a need to add new ones. Discussion with the administrator informed the IEM that S1 for mechanical engineering and electrical engineering were to be fully established by 2008. Future plans are for creation of S2 programs in civil engineering and chemical engineering, and enhancement of collaboration and linkages with other known universities or polytechnic institutions and industries within the country. Problems facing UNRI were that the D3 program had no grants, lack of budget, and insufficient budget for

equipment and building maintenance. Student tuition fees went approximately 50% for faculty salary and 50% for the university. Another possible source of income generated by the faculty was consultancies handled by an agency. Profit sharing was 2% for the faculty, 2% for the university, and 4% for the agency. A notable observation in this university was the irregular electricity, which affects the use of equipment purchased by the project.

C. Andalas University

5. The University of Andalas (UNAND) is the oldest university in Indonesia outside Java, located at Western Sumatra, a fast-developing region for tourism and industry Strengthening the mechanical and civil engineering programs and establishment of a new program in electrical engineering helped satisfy existing and future needs for the continued development of the region.

The engineering department building of UNAND constructed under the project.

6. The IEM observed that quality assurance program is being implemented at the university and faculty levels. Students are given questionnaires at the end of each semester. Student questionnaire results showed that the satisfaction score increased substantially after 5 years of its program implementation. Certificates and tokens such as external hard drives are given after evaluation for the three best faculty members. Incentives for members of the faculty were in the form of recognition and announcements at every anniversary ceremony. Of the 150 faculty members, 20 are S1 graduates (11%), 100 are S2 graduates (67%), and 30 are S3 graduates (22%).

7. As of 2008, the mechanical engineering program was given an accreditation rating of A, while civil engineering and electrical engineering had a rating of B. Updates in curriculum occur every 5 years. The last update was in 2003, which was approved by the faculty senate, and the next update was scheduled for 2008. UNAND uses a competency-based curriculum, with 70% on theory and 30% on practical applications.

8. UNAND administrators said that the funds they received such as those from the Japan International Cooperation Agency were used when they were in an "emergency situation," while the funds from the Asian Development Bank (ADB) were used to accelerate improvements, and the funds from the Directorate General of Higher Education (DGHE) were used for the big "take-off" of the engineering program. It was also perceived that good equipment was provided by the project but was not enough, specifically for the mechanical engineering program, which needed more tools, and electrical engineering, which had no programmable logic controller. The administration planned to enlarge the faculty. Through focus group discussion, the administrators informed the IEM of the need for S3 grants and for electrical engineering lecturers.

Electronic machines used by electrical engineering students in UNAND.

9. All the lecturers who were sent abroad returned to the university. During focus group discussion, lecturers emphasized that their training abroad helped them gain more confidence

to apply for short courses abroad and to build a worldwide network. The IEM observed that 80% of the lecturers were less than 40 years old. In 2008, UNAND gave full scholarship to 340 students, and that program was planned to be expanded. Other students also got partial scholarships. The main reason of students for choosing UNAND was the reasonable tuition fee with good education quality. The ratio of teachers to students was approximately 1: 20.

10. UNAND has a close relationship with a cement company in Padang in the field of production and inventory. It also cooperates with another cement factory and has a joint project with the local government concerning the impact of earthquakes. A training program for an electric company's power plant is also being given. The building and equipment from ADB accelerated the linkages.

These are the cracks on the walls of UNAND in Padang caused by frequent earthquakes.

11. Problems encountered concern the maintenance of the building and equipment, the limited budget, the policy that new buildings are built for new departments, and the safety issue for students and staff due to frequent earthquakes within the area. Materials for the building structures were also downgraded, e.g., wood was used for windows instead of the planned aluminum due to insufficient budget. Of the total income of the university, 15% is from student tuition fees, 70% from the government, and 15% from generating funds and other aid agencies. The tuition fee is approximately Rp750,000/semester, of which Rp400,000/semester is for laboratory activities. Of the total budget, 15% is for maintenance, 65% is for salaries, and 20% is for research and development.

12. UNAND provides Liquid Crystal Display in every classroom. It received grants from DGHE for S2 civil engineering, S2 mechanical engineering, and S3. The university also established a new department for new engineering programs such as S1 programs for environmental engineering and industrial engineering and soon S1 for informatics.

D. Lampung University

The engineering books acquired under the project for UNLAM.

13. The University of Lampung (UNLAM) is located in Lampung, a province close to West Java and Jakarta, where the demand for qualified engineering graduates is high. Lampung absorbs the spillover from both regions. In providing support for UNLAM, the project met some of the market need for high-quality engineering graduates in mechanical and electrical engineering. UNLAM has played a significant role in educating and producing its graduates to meet the labor needs in both private and public institutions, particularly in Lampung Province. Among public institutions, UNLAM has become a key partner of local governments (province and regencies/cities) in planning and evaluating development through research and public services.

14. Curriculum updates happen every 5 years in coordination with the West Sumatra Universities Cooperation Board. Linkages with other universities are being improved through regular annual meetings, annual seminars, sharing of resources, and cooperation with well-known universities of Indonesia.

15. Through focus group discussions with lecturers, administrators, alumni, and students, the lecturers voiced out that they lacked equipment, specifically for high voltage laboratories. UNLAM experienced some problems with computer numerical controlled and some other equipment, since the software was not in synchronization or did not match with the machines delivered. Almost all lecturers were S2 holders; very few were S3 graduates. The average tuition fee is around Rp850,000/semester. About 20% of the tuition fees go to the university's income, while approximately 75% goes to the department. In terms of total expenses, 40% goes to salaries of staff, 30% is for development, and the remaining 30% is for other activities. There is no career guidance program given to students. UNLAM has set up an alumni mailing list, and a formal alumni association has been established. Books are limited. Students often borrow books and equipment from the University of Indonesia in Jakarta and/or Institut Teknologi Surabaya.

16. UNLAM has also set up a research institute, which coordinates cross-disciplinary research activities in different departments. Faculties and departments make a mono-disciplinary research master plan that contained and describes the UNLAM scientific core research or describes the special quality or superiority of its faculties and departments. The UNLAM research activities are funded from the UNLAM supplementary budget, the government's competitive grant, research collaboration with overseas organizations, and research cooperation with government and private institutions. Currently, UNLAM offers 66 programs: 22 diploma courses, 39 undergraduate courses (S1), and 5 master's programs. UNLAM also offers nondegree/special licenses; UNLAM offers teacher training and environmental assessment.

E. University of Gadjah Mada

17. The University of Gadjah Mada (UGM) is a good example of effective and efficient engineering education, with both vertical and lateral linkages between professional and technician engineering programs. The project helped strengthen the 3-year diploma programs in civil, electrical, and mechanical engineering to answer the increased demand for good-quality technician engineers in Dl Yogyakarta.

The mechanical engineering Laboratory contracted under the project.

18. UGM has taken on a new status as a state-owned legal entity since 26 December 2000. Founded on 9 December 1949, it is one of the oldest and largest university in Indonesia. It currently has 18 faculties, 71 undergraduate study programs, 28 diploma study programs, and a graduate program of 62 study programs. It has about 55,000 students including 350 foreign students, 2,301 employees, and 2,266 lecturers. As of October 2003, UGM had graduated 134,219 students consisting of 17,358 diploma holders, 94,923 first degree holders, 21,406 masters, and 532 PhD holders.

19. Based on the interviews and focus group discussions, UGM emphasizes the philosophy of continuous improvement, where analysis of problems and opportunities looks into baseline information, resources, human resources, setting targets, deciding where to go, setting action to anticipate problems or resistance to change, and being open to collaboration in order to learn more and have a broader network, the benefits of which are improvement and acceleration.

20. Curriculum for the civil, electrical, and mechanical engineering diploma programs ranges from 50% to 60% practical and 40% to 50% theoretical. Strategy for curriculum development is improved through science vision and market signals from alumni, employers, and other stakeholders. Curriculum is evaluated every 3–5 years. The curriculum update was in 2007. Alumni usually give feedback through e-mail. The capacity of mechanical engineering increased from 120 students in 1996 to 240 in 2008. The students come from all over that part of the country. Usually, the rector sends professors to high schools to find the best students in the region. New students are usually categorized in seven tracks, wherein 1,000 students from low-income families are in a track. Around 2,000 students ranked 1–2 in their schools are required to take the entrance exam for this track. The budget for scholarships is Rp15 billion, spread over the seven tracks. Around 10% of students under the program fail or change programs every year.

21. UGM is one of the best in quality assurance implementation according to the Asian University Network. UGM has a quality assurance network with the National University of Singapore, Chulalongkorn University in Bangkok (Engineering Education Network), and cooperation with the South East Asia Engineering Development Network. It has both internal and external assessment bodies. An external public accountant looks into the accountability for and use of resources; the last review indicated a status of "normal, without exception." UGM has undertaken cooperation not only for quality assurance but also with different companies within the region. As an example, Suzuki donated the extension building and provides motorcycles and cars plus service and maintenance sets for practical learning. UGM also helps students obtain jobs through soft skills training. The Engineering Career Center was established in cooperation with industries.

22. The project provided UGM with laboratory equipment, furniture, and buildings. The IEM observed that the buildings and furniture are still in good condition. Some equipment, however, now needs repair as well as spare parts that can be bought only abroad. Focus group discussion with students indicated that some students are dissatisfied with the equipment, the curriculum is too general, there are few lecturers who are overseas graduates, there is a need for more equipment such as a crane, there is need for maintenance of damaged equipment, and there has been no revision of the practical lesson guide. D3 students feel some discrimination in term of supply and access to information as compared to S1 students. Electrical engineering students feel they have less equipment than mechanical and chemical engineering students. Discussion with mechanical engineering alumni indicated that most UGM mechanical graduates are already booked or expecting to work right after graduation. UGM's tracer study, however, shows that in general students need to wait 6 months before getting their first job.

The electrical engineering laboratory in UGM.

23. Since some of those interviewed actually implemented the project, insights about different aspects of the project components were suggested and given: fellowship should always be combined with English proficiency training; equipment procurement should be a package program, including training, modules for practical lessons, accessories, software, computers, and drivers; equipment should be ordered based on equipment-to-student ratios; manual equipment has greater durability than electronic; electronic equipment is easily outdated, and spare parts are usually expensive and not available in Indonesia; the lecturers

and technicians are not capable to operate the electronic controlled devices (in general); it is better to buy stand-alone equipment such as press-tester and strain tester than having interdependent electronic equipment, since if one does not function, all other remaining interdependent equipment will not work.

The civil engineering laboratory at Atma Jaya University.

F. Atma Jaya University, Yogyakarta

24. Atma Jaya is one of the nonproject private universities visited that offers S1 chemical engineering. The new curriculum has 100 credit units (of 144) for basic competencies in chemical engineering. Usually, the university invites alumni and general contractors to give feedback in developing a new curriculum, which happens every 4 years.

25. Based on the interviews, of the total tuition fees of students, 65% is allocated to staff salaries while the remaining 35% is allocated to other routine activities of the university. Of the total entrance fees collected per student, 50% goes to the university while 50% goes to the foundation. Atma Jaya University has 300 engineering lecturers, 11% of which are S3 graduates, 7% are S1 graduates, and 82% are S2 graduates. Atma Jaya is an active member of a network of local and international Catholic universities (i.e., Indonesian Catholic Association of Institutions of Higher Learning Asia-Pacific and International Federation of Catholic Universities).

26. The university has a unit that promotes and manages consultancy activities and scholarships from private universities, companies, and Catholic communities. Thirty students receive scholarships every semester in every faculty.

27. Atma Jaya has around 11,000 students. Less than 15% drop out or change programs every year. The ratio of teachers to students is on the average 1:25. Enrollment has decreased in recent years. For those who get jobs in less than 6 months, usually it is not the right position or field, and the salary is low. There are 128 universities in Jogjakarta which makes it very competitive in Jogjakarta to find employment.

28. One of the plans of the university is promote itself to the Papua province, where the majority of Catholics live. The university is considering forging links with the Papua government to provide scholarships for Papua students.

G. Akademi Tehnik Mesin Industri (ATMI)

29. ATMI is known as a production-based technical institution. It responded to the absence of technical experts in Indonesia at that time it was built (1968). The workshop was equipped with conventional manufacturing machines through the help of the Swiss government and social organizations from Switzerland and Germany. From the first year, students of ATMI have been actively involved in producing high-quality products to meet the demands of industries. In addition, students of ATMI are also learning a sense of quality and high discipline so that their products can be sold on the market.

30. ATMI has consistently carried on a spirit of innovation to be always on track with the development of industries and technology. ATMI now has modern equipment such as computer aided design and computer aided manufacturing machines, wire electrical discharge machine,

and computer numerical controlled machine. Moreover, the items produced at ATMI are becoming more varied in terms of kind, type, design, and use, such as office and school furniture, hospital equipment, and workshop equipment.

The engineering laboratories in ATMI.

31. ATMI offers D3 mechanical engineering. Its curriculum has 67% practical lessons and 33% theoretical lessons. Its emphasis is on a sense of quality in the first year, a sense of efficiency in the second year, and a sense of flexibility and innovation in the third year.

32. ATMI has 35 lecturers, 156 students, and 90 industry staff. Lecturers are sometimes trained in Germany. Of 250 applicants, usually around 75 are accepted. The dropout rate is around 5% drop in the first year. Usually, there are no dropouts among second and third year students. Placements usually happen 8 months before graduation, and 90% of the students sign a contract of employment before graduation. The biggest problem or risk in this kind of institution is the high uncertainty of financial resources, which depends on the business climate. As much as possible, ATMI tries to find fixed customers.

33. Students of ATMI have intense interaction with industries. The previous capacity of the institution was 108 for first year, but it now accepts only 75 new students. The remainder is allocated for short-term and modular training for industries.

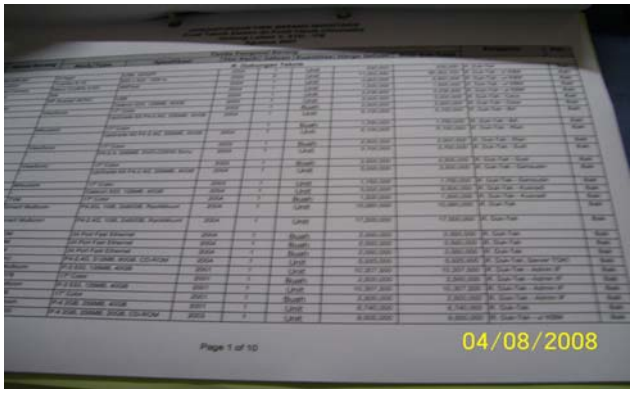
H. Bandung Institute of Technology

34. Institut Teknologi Bandung (ITB) is a state university located in Bandung. Established in 1920, it is the oldest technology-oriented university in Indonesia. It is one of the nonproject universities that offers S1 mechanical, electrical, chemical, and civil engineering. ITB was chosen to gain more insights into the current trends in engineering, since it is one of the best in the country. In addition, a number of former members of the central project implementation unit and local project implementation unit residing in this region were good sources of information about the project.

35. The quality assurance unit was established in 2006 and embedded in ITB management. The unit sets target for all ITB units, both academic and nonacademic. The quality assurance unit covers the performance of students, lecturers, departments, faculties, and research groups.

36. The Academic Senate produced guidelines for curriculum development. The curriculum is revised every 5 years. It takes 1 year to design a curriculum. Usually, alumni, industry, and university networks are invited through a workshop.

37. Among all the institutions visited by the IEM, ITB has the best system of maintenance. It is also the only one that has an inventory document readily available per laboratory. Some equipment was already damaged, but students and staff could fix it. Out-off-date and heavily damaged equipment is not repaired.



The organized inventory system of equipment in ITB.

38. Currently, there was no budget to develop new buildings or to purchase new equipment. New buildings and equipment are dependent on grants. Of the total budget of ITB, 33% comes from the ITB community, 23% comes from the government, and 44% from tuition fees of students. The main expenditures are allocated for salary (60%), research and research group (20%–30%), and maintenance (10%–20%). It was noticeable that mechanical engineering department had old equipment in its laboratories.

39. As of 2008, no new lecturers were recruited. ITB must now finance itself. Income collected from students ranges from Rp2.5 million–Rp3 million/semester, and entrance fees range from Rp0 to Rp45 million. On the average 5,000 of 12,000 students receive full or partial scholarships, the main sources of which are the government and industry. On the average, the intake of new students is around 3,000 per year.

40. ITB has an organized alumni association, coordinated by the vice rector for student and alumni affairs, which holds regular meetings. The ITB administrator perceived that the education system cannot match the needs of industry, and DGHE should sit together with other ministers (trading and industry) to meet the needs of the industries, and produce and use technology to improve the region and the country.