カンボジア共和国
カンボジア工科大学
教育能力向上プロジェクト
中間レビュー調査報告書

平成 26 年２月
（2014年）

独立行政法人国際協力機構
人間開発部

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序　　文

カンボジア王国は、2010年後半から製造業などの日系企業の進出が加速しており、これら外国投資も活用しながら、製造業等の拡大によって産業を多角化することで経済の持続的な成長をめざしています。しかし、外資系企業からは、カンボジア王国の高等教育機関の輩出する高度人材には、生産ラインなどの設計・管理や不具合の原因究明を行うことができる実践的なスキルを持ったエンジニアレベルの工学系人材が不足していることが指摘されています。

カンボジア王国のエンジニアを育成する高等教育機関としては、カンボジア工科大学が国内最高峰の機関として位置づけられていますが、同大学は実験・実習のための施設・機材の不足等により座学中心の教育が行われており、実践的なスキルを持った人材を必要とする産業界のニーズに応えることが十分にできていない現状です。

このような背景からカンボジア王国政府から日本政府に対して、カンボジア工科大学の電気・エネルギー工学、産業機械工学、地球資源・地質工学の3学科の強化を目的とした「カンボジア工科大学教育能力向上プロジェクト」の実施に係る技術協力の要請がありました。これを受けてJICAは2011年10月から4年間の予定で協力を実施しています。

今回実施する中間レビュー調査は、プロジェクトの中間地点として、プロジェクト目標や成果等の達成状況や実施プロセスを確認するとともに、プロジェクトの残り期間の課題及び今後の方向性について確認することを通じて、プロジェクト改善に役立てることを目的としています。

本報告書は、同調査結果を取りまとめたものであり、今後のプロジェクトの展開に、更には類似の他プロジェクトに活用されることを期待しております。

最後に、本調査にご協力を頂いた内外関係者の方々に深い謝意を表するとともに、引き続き一層のご支援をお願い致します。

平成26年2月

独立行政法人国際協力機構

人間開発部長　萱島信子

目　　次

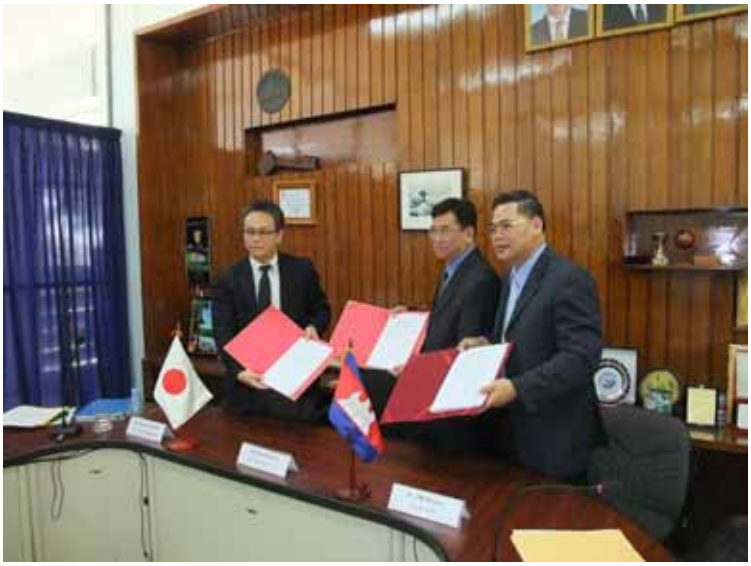
地　　図

出所：グーグルマップより調査団作成

写　　真

カンボジア側と日本側との間で、合同評価報告書案が協議された。

JCC においてカンボジア工科大学の３学科からこれまでの活動について報告がなされた。



JCC においてミニッツが署名された。

略　語　表

略語	正式名称（英語/仏語）	日本語
AUN/SEED-NET	ASEAN University Network/Southeast Asia Engineering Education Development Network	アセアン工学系高等教育ネットワーク
C/P	Counterpart	カウンターパート
FD	Faculty Development	ファカルティ・デベロップメント
EEE GEE	Department of Electrical and Energy Engineering Département de Génie Electrique et Energétique	電気・エネルギー工学科
GGE GGG	Department of Geo-resources and Geotechnical Engineering Département de Génie Géo-Ressources et Géotechnique	地球資源・地質工学科
IME GIM	Department of Industrial and Mechanical Engineering Département de Génie Industriel et Mécanique	産業機械工学科
ITC	Institute of Technology of Cambodia	カンボジア工科大学
JETRO	Japan External Trade Organization	日本貿易振興機構
JICA	Japan International Cooperation Agency	国際協力機構
JCC	Joint Coordinating Committee	合同調整委員会
M&E	Monitoring & Evaluation	モニタリング・評価
M/M	Minutes of Meetings	協議議事録
MoEYS	Ministry of Education, Youth and Sport	教育青年スポーツ省
MLVT	Ministry of Labour and Vocational Training	労働・職業訓練省
MM	Man-Month	人/月
MTR	Mid Term Review	中間レビュー
ODA	Official Development Assistance	政府開発援助
O&M	Operation and Maintenance	維持管理
PD	Project Director	プロジェクト・ディレクター
PDM	Project Design Matrix	プロジェクト・デザイン・マトリックス
PM	Project Manager	プロジェクト・マネジャー
PO	Plan of Operation	活動計画
R/D	Record of Discussion	討議議事録
RGC	Royal Government of Cambodia	カンボジア王国
USD	US dollar	米ドル

評価調査結果要約表

Ⅰ．案件の概要

国名：カンボジア王国		案件名：カンボジア工科大学教育能力向上プロジェクト
分野：高等教育		援助形態：技術協力プロジェクト
所轄部署：高等・技術教育課		協力金額（2013年11月末時点）：2.01億円
協力期間	2011 年 10 月 ～ 2015年10月（予定）	先方関係機関：教育青年スポーツ省、カンボジア工科大学（ITC）
		日本側協力機関：東京工業大学、九州大学、北海道大学、早稲田大学、同志社大学、京都大学
		他の関連協力：

１－１　協力の背景と概要

カンボジア王国（以下、「カンボジア」と記す）への外国直接投資純流入額は、2009年から2011年までの3年間で約1.7倍に拡大しており、さらに2010年後半からは製造業を含む日系企業の進出が加速している。カンボジアは、これら外国投資も活用しながら、製造業などの拡大によって産業を多角化することで、経済の持続的な成長をめざしている。しかし、生産ラインなどの設計・管理や不具合の原因究明を行うことのできる実践的なスキルを持ったエンジニアレベルの工学系人材が不足している点が指摘されている。そのため外資系企業は、中国やタイなどからそうした人材を雇用して対応している。

こういったエンジニアを育成する高等教育機関としては、カンボジア工科大学（Institute of Technology of Cambodia：ITC）が国内最高峰の機関として位置づけられる。しかしITCでは、実験・実習のための施設・機材の不足等により座学中心の教育が行われており、実践的なスキルを持った人材を必要とする産業界のニーズに応えることが十分にできていない。

また、カンボジアでは近年、探鉱技術の向上及び地中の危険物の除去の進展などによって、鉱物資源の新たな開発が進められ、フン・セン首相の指示により、ITCにおいて過去に廃止された地球資源・地質工学科を2011年10月より再開設することが決まった。しかし、当該分野にかかるITCの知見・経験は乏しく、当該学科においても、実験・実習を取り入れたカリキュラムの実践に対する支援が必要となっている。

このような背景からカンボジア政府から日本政府に対して、ITCの電気・エネルギー工学、産業機械工学、地球資源・地質工学の3学科の強化を目的とした「カンボジア工科大学教育能力向上プロジェクト」（以下、「本プロジェクト」）の実施に係る技術協力の要請があった。

これを受けてJICAは2011年10月から4年間の予定で協力を実施している。本プロジェクトは，ITC及び教育青年スポーツ省をカウンターパート（Counterpart：C/P）とし、JICAはチーフアドバイザーを短期出張ベースで年間4回程度、業務調整員1名を長期専門家として派遣している。

今回実施する中間レビュー調査では、カンボジア側と合同でプロジェクト目標や成果等の達成状況や実施プロセスを確認するとともに、プロジェクトの残り期間の課題及び今後の方向性について確認することを通じて、プロジェクト改善に役立てることを目的とする。

１－２　協力内容

（1）上位目標：ITCの対象3学科（電気・エネルギー学科、産業機械学科、地球資源・地質工学科）から、より高い実践的なスキルを身につけた高度人材が輩出される。

（2）プロジェクト目標：ITCの対象3学科において、より実験・実習に重点を置くことを通じて学部教育の質が改善する。

（3）成果

1）成果1：コースワークのためのシラバスがより実験・実習に重点を置いたものへと改善される。

2）成果2：教員の教授法が実践を重視したものへと向上する。

3）成果3：実験用機材が、実験・実習において適切に活用される。

（4）投入実績（2011年10月～2013年11月）

日本側

専門家派遣：1）チーフアドバイザー（短期専門家）、2）業務調整員（長期専門家）、3）産業機械工学（短期専門家7名）、4）地球資源・地質工学（短期専門家6名、インドネシア人専門家1名含む）、5）電気・エネルギー工学（短期専門家4名、タイ人専門家1名含む）で、短期専門家の従事期間は延べ4.2カ月

本邦研修：24名（電気・エネルギー学科9名、産業機械学科9名、地球資源・地質工学科6名）

業務費負担：64,817.23 USドル（機材付属品、消耗品等）

機材供与：電気・エネルギー学科と産業機械学科への供与（総額1,611,462USドル相当）。なお地球資源・地質工学科対する機材供与は文化無償資金による。

相手国側

カウンターパート配置：　マネジメントレベル3名＋技術カウンターパート56名（電気・エネルギー学科22名、産業機械学科21名、地球資源・地質工学科13名）

事業費負担：860,740 USドル相当（施設整備費、新規職員雇用など）

その他：専門家執務スペース（ITC内）

２．評価調査団の概要

調査者

日本側

担当分野	氏名	所属
団長/総括	田中　努	JICA人間開発部　高等・技術教育課　課長
工学教育	高田　潤一	東京工業大学大学院　理工学研究科国際開発工学専攻　教授
協力計画	谷口　敬一郎	JICA人間開発部　高等・技術教育課　特別嘱託
評価分析	井田　光泰	合同会社適材適所 シニアコンサルタント

カンボジア側

H. E. Lav Chiv Eav	教育青年スポーツ省次官
Dr. Romny OM	ITC学長

調査期間	2013年11月24日～12月7日	評価種類：中間レビュー

３．評価結果の概要

３－１　プロジェクトの主な実績

指標に沿った主な進捗と実績は、以下のとおりである。

期待される主要成果	概要
成果１	
1-1 カリキュラムにおける実習・実験の比率が高まる	機材供与された科目について、実習・実験の導入が進み、3学科の合計実習・実験時間はプロジェクト前の528時間から896時間へと増加した。

1-2 機材1台当りの学生数が減少する	機材や実験の種類によって異なるが、産業機械学科と電気・エネルギー学科では学生5～6名で1台の機材が活用され、地球資源・地質工学科では、フィールド調査用の機器は各学生に1つずつの必要器具が提供されている。また顕微鏡も1台当り2名の学生の割合で配置されている。
1-3 改定されたシラバスの数	一部のシラバスで実験・実習時間を明記し、使用する機器名を記載するといった変更を行っている。
1-4 作成された学生実験手引書の数	電気･エネルギー学科と産業機械学科併わせて、これまでに77%の学主実験手引書が作成されている（95/115)。地球資源・地質工学科は今後、中心的な課題として本邦研修などで取り組む予定である。また作成された手引書についても短期専門家の助言を受けて改定を図る予定である。
成果２	
2-1 学科長が教員による実習中心教育の能力が高まったと認識する	学科長・副学科長によれば、供与機材を活用した実験の増加などを通して授業が改善しているという。更新機材（老朽化した機材の買い替え）や操作が比較的簡易な実験・実習用機材については、十分な活用が図られている。一部の新規導入機材については一層の習熟が求められる。
2-2 「FD活動」[1]が定期的に実施される	各学科では月2回学科ごとにスタッフミーティングを開催している。ただし、この会議は教育・学生指導に特化した会議ではなく、短期専門家による指導や本邦研修の成果を他の教員と共有する場とはなっていない。
成果３	
3-1 実験用機材活用に係る内規が作成される	各学科には簡単な内部規約が作成され、機材管理の責任者と学生の実習・実験をサポートするアシスタントが任命されるなど体制はあるが、機材の保守・点検などのシステムなどは整備されていない。
3-2 タスクフォースにより定期的なレビューが行われる	機材の故障でトラブルが発生した際に学長・副学長に報告されるようになっているが、組織的なモニタリングの体制や仕組みはまだ導入されていない。
プロジェクト目標	
プロジェクトのために設立される評価委員会が、より実験・実習に重点を置くことを通じて学部教育の質が改善したと評価する	ITCに対してフランスや日本など海外17大学が参加する国際コンソーシアムが教育支援を行っており、ITCもこの国際コンソーシアムが求める教育水準に沿うことを重視している。年1回、加盟大学の代表者が集まりITCの教育内容をレビューし、ITCに対する改善提言を行っている。現在、加盟大学では、ITCで取得した単位の認定、ITC5年生を修士課程1年として認定、毎年約60名のITCの学生への奨学金提供といった措置を取っており、ITCの教育レベルの高さを示すものといえる。PDMで明記したプロジェクトのための「評価委員会」は設置されておらず、プロジェクトが支援する3学科の教育の質を客観的に示す指標はない。

[1] FD（Faculty Development）活動とは、教員が授業内容・方法を改善し向上させるための組織的な取り組みを指し、具体的には教員相互の授業参観の実施、授業方法についての研究会の開催、優れた教育実践例の共有などの活動を含む。「カンボジア王国カンボジア工科大学教育能力向上プロジェクト詳細計画策定調査報告書」

	今回の中間レビューでは、学生に対するグループインタビューを行ったが、面談した学生たちによれば、機材活用や学生実験指示書の導入等により、教育の質が上がったとの声が多かった。他方、教員が機材活用についてもっと習熟するべきとの要望もあった。
上位目標	
ICTの卒業生の雇用主の70%が、プロジェクト開始以前よりプロジェクト開始後の卒業生のほうがより実践的なスキルを身につけていると評価する。	現在ITCでは、企業向けに卒業生のパフォーマンスについてのアンケート調査などは実施されておらず、ITCとして定期的な調査が必要である。 2012/2013の2学科（地球資源・地質工学科はまだ卒業生を輩出していない）82名の卒業生の進路を見ると、就職67%、大学院進学17%、就職活動中15%、その他1%となっており、ITCの卒業生は既に企業から評価されており、就職状況も良好である。就職活動中の学生も就職口がないのではなく、希望する収入が得られる企業を探しているという状況である。

実施プロセス

- 技術移転は主に短期専門家派遣と本邦研修により行われている。機材導入についてはC/Pと業務調整員により行われた。本邦大学の現職教員を短期専門家として適切なタイミングに派遣することは、専門家の所属大学での通常業務との兼ね合いがつき難いことや専門家個人に対する事業協力へのインセンティブの低さなどから難しかった。他方、本邦研修は1カ月程度実施され適切であったと判断される。特に、研修員となるC/Pと日本の受入れ大学において研修目的や内容が明確であった場合、より高い研修効果が得られている。
- プロジェクトの初期段階においては、チーフアドバイザーが短期型のシャトル派遣であり、どうしても活動の制約が避けられなかったこと、日本人専門家との間でコミュニケーションが十分ではなくプロジェクト事務所の機能に制約があったこと、プロジェクトに関するC/Pとの定期会合が行われていなかったこと、日本における国内支援委員会も最低限の頻度でしか開かれていなかったことなどから、プロジェクトの進展が限られていた。2年目、3年目については、より多くの短期専門家が派遣され、C/Pが機材の導入や活動に費やす時間が増えたことにより、プロジェクトが進展した。
- PDMの改定について、2012年12月に合同調整委員会（Joint Coordinating Committee：JCC）が開催されたものの、プロジェクト実施レベルにおいては、意思決定に関する体制が明確になっていない。
- 短期専門家とC/Pとのコミュニケーションはよいが、個々のコミュニケーションのやり取りという性格が強く、全体の情報が把握できるような情報共有が求められる。また、導入されたTV会議システムはそれほど活用されていないことから、プロジェクトの後半ではより多くの活用が期待される。
- プロジェクトの活動は、学生実験手引書作成や教授法の改善であり、C/PであるITC教員にとって通常業務であることから、オーナーシップは高い。

３－２　5項目評価の概要

（1）妥当性：プロジェクトの妥当性は高い。

「教育セクター国家開発戦略（2009～2013）」では、高等教育・研究の発展が重要な戦略として挙げられ、「次期教育開発戦略計画（2014～2018）」でも、工学分野でアセアン諸国の基準に見合うような大学教員の能力向上と実験等、施設の整備を促進することが重点課

題として掲げられている。産業界による人材ニーズでは、質の高いエンジニアへのニーズがあり、本プロジェクトの主旨と一致する。教育省傘下の10大学のうち、理系の学科を有する大学は3校しかなく、工学系ではほぼITCのみという状況であることから、カンボジアの工学教育を支援するうえで、ITCを支援することは極めて妥当といえる。

(2) 有効性：プロジェクトの有効性は中程度である。

本プロジェクトではコースワークの改善、教育方法の改善、適切な機材活用が3つの成果目標として挙げられている。いずれの成果目標も実習・実験を重視した教育の質を改善するうえで不可欠な要素である。これまで、コースワークの改善については、学生実験手引書が導入され、実習・実験時間が大幅に増加するなど、目に見える具体的な成果が生まれている。他方、教育方法の改善や適切な機材活用はまだ十分な成果が見えていない。これまでの取り組みから、今後、短期専門家による適切な指導を十分受けることができ、ITC教員が機材の活用法や教授方法について一層努力すれば、プロジェクト目標を達成することは十分可能である。

(3) 効率性：プロジェクトの効率性については一部課題がある。

プロジェクトの進捗について1年目は投入が少なく、2～3年目にある程度投入が確保でき、活動が進むようになってきている。成果１について当初予定より遅れはあるが、ある程度実績が上がっているが、成果２と３については一層の努力が必要である。短期専門家とC/Pとのコミュニケーションは徐々に円滑化し始め、本邦研修も成果品作成のうえで効果的である。他方、定期的なプロジェクト会議がないなど組織的な取り組みにおいてプロジェクト運営の弱さがある。また、短期専門家派遣の難しさは依然懸念材料であるとともに、プロジェクトに参加する教員の多数にとってJICAの技術協力プロジェクトは初めての経験であり、PDMなどプロジェクトの目標、枠組み、範囲などあまり明確に理解していないため、今後、プロジェクトの進め方など含めて十分な支援が必要である。

(4) インパクト：インパクトの見込みは高い。

ITC卒業生の就職状況や商工団体へのヒアリングによれば、ITC卒業生は企業などから既に非常に高い評価を得ている様子がうかがえた。また、ITCもカンボジアの主要企業と対話する機会をもち、企業ニーズについて理解を高めようとしている。現在の5年生以下の学生は、本プロジェクトによる便益（新規機材と実習・実験の導入、教員指導法の改善など）を受けており、以前の卒業生より実践的な知識・技能を有していることが期待できる。ほかに期待されるインパクトとして、日本の大学研究者の支援によるITCでの研究活動の開始、日本の大学とITC間の連携協定の展開などが挙げられる。

(5) 持続性：プロジェクトの持続性については一部課題がある。

工学系の技術者育成は「次期教育開発戦略計画（2014～2018）」の重点政策に掲げられており、政策面の持続性は高い。プロジェクト成果の持続性について、実習・実験はコースワークのなかに位置づけられているが、教育方法の改善や機材の適切な維持管理については、FDのためのミーティングや機材の維持管理システムなど制度や体制づくりが進んでおらず、リスク要因である。ITCでは機材更新や修理のための予算が少ないため、定期的な保守・点検の徹底化を図ることで、故障などのトラブル回避に努力する必要がある。消耗品については、企業研修サービスなどの収益活動を行うなどして、各学科が独自に自立性を確保することが可能である。技術面については、国際コンソーシアムが今後も技術支援の役割を果たすことが期待できる。また、本プロジェクトで構築・強化されたITC教員と日本の大学教官との結びつきによる技術支援が期待できる。

３－３　促進要因

本プロジェクトの促進要因としては、対象3学科の教員の52%がアセアン工学系高等教育ネットワーク（AUN/SEED-NET）プロジェクトを通して、日本をはじめ海外で修士・博士の学位を取得しており、教員の能力が強化されていたことと、日本など受入れ側の指導教員とITCの教員の間にネットワークが形成されていたことを挙げることができる。また、国際コンソーシアムを通して多くの教員がフランス等で学位を取得しており、ITCの教育水準の向上という点で貢献している。

３－４　阻害要因

幾つかの供与機材について専門家派遣前に仕様などが決まっていたが、不可欠な付属品やスペアが機材リストから漏れていたために活用できず、プロジェクトで対応する必要が生じた。また、地球資源・地質工学科に対しては文化無償資金協力で機材供与が行われたが、不可欠な機材のリスト漏れ、取扱説明書の不備といった問題が多く、プロジェクトで対応に追われ、機材活用が遅れた。

３－５　結論

評価項目	評価結果
1. 妥当性	産業人材育成を支える政策支援は一貫しており、プロジェクトが対象となる産業ニーズに対応していることから、妥当性は高い。
2. 有効性	有効性は中程度である。今後、プロジェクトの効率性が高まればプロジェクト目標の達成も可能である。
3. 効率性	効率性には一部課題がある。特にプロジェクトマネジメントは、適切な分野や時期に専門家を派遣することやカウンターパートが活動により深くかかわることを通じて、強化される必要がある。
4. インパクト	ITCの卒業生は産業界やITCの学術的な発展の影響から評価されており、インパクト（予測）は高い。
5. 持続性	持続性についても一部課題が予想される。機材の維持管理には、特に注意が必要である。

３－６　提言

評価結果に基づく合同評価チームのプロジェクトに対する提言は以下のとおり。

（1）ITCマネジメントに対する提言

1）産業連携オフィスを含め、ITCとして、卒業生に対する企業の評価や産業界のニーズを把握するための定期的な調査を制度化すること。

2）計画機材の適切な使用や維持管理を行うための計画策定を行うこと。

（2）プロジェクト事務所と対象3学科に対する提言

1）プロジェクトの進捗に関してTV会議を通じて定期的に短期専門家とコミュニケーションをとること。

2）プロジェクト管理の強化、教育手法の開発や適切な機材管理のための仕組み（機材リスト、消耗品・付属品等の在庫リスト、代理店との連絡経路の確立、消耗品の補充に必要なコストの把握、定期保守・点検の方法等）を作るために定期会合をもつこと。

3）必要な機材の付属品や部品をプロジェクト期間終了までに調達すると同時に、機材管理の計画と同時に企業への研修提供といった収益活動のプランを策定し、活動計画に位

置づけること。

4）最終的にプロジェクト目標を期間内に達成するために、2014年1月末までに個々の活動の実施者とスケジュールを記載した後半の活動の詳細な計画を策定すること。

5）効果的な本邦研修を実施するため、日本人専門家と対象の学科長及びITC教員と綿密な協議を行い、研修目的や内容を明確にしたうえで研修を実施すること。

（3）JICAへの提言

1）専門家の方の多くが現役の大学教員であり頻繁にITCを訪問できないことから、大学の退官教員などを長期専門家として派遣することを検討すること。

2）現在、別途、無償資金協力事業が進んでいる。JICAは文化無償資金協力と本プロジェクトの経験から学んだ教訓に基づき、機材の効果的な設置に留意すること。

3）日本人専門家間のコミュニケーション・連携（特に学科を越えたコミュニケーション・連携）は十分に円滑とはいえないことから、JICAは定期的に関係大学が集まる会合を開催するなどを通じて、より密接なコミュニケーションを図ること。また各種資料の共有も、各学科の代表者のみに共有するのではなく、関係者全員に行き渡るように努めること。

The Summary of Mid Term Review Evaluation

<table>
<tr><td colspan="3">1. Outline of the Project</td></tr>
<tr><td colspan="2">Country: Kingdom of Cambodia</td><td>Project Title: The Project for Educational Capacity Development of the Institute of Technology of Cambodia</td></tr>
<tr><td colspan="2">Issue/Sector: Higher Education</td><td>Cooperation Scheme: Technical Cooperation</td></tr>
<tr><td colspan="2">Division in Charge:</td><td>Total Cost (at the time of Mid-term Review): 2.0million yen</td></tr>
<tr><td rowspan="2">Period of Cooperation</td><td rowspan="2">October 2011 – October 2015
(Scheduled for four years)</td><td>Partner Country's Implementation Organization: Ministry of Education, Youth and Sports (MoEYS) and Institute of Technology of Cambodia (ITC)</td></tr>
<tr><td>Supporting Organization in Japan: Tokyo Institute of Technology, Kyushu University, Hokkaido University, Waseda University and Doshisha University, Kyoto University</td></tr>
<tr><td colspan="3">1-1 Background of the Project
The share of industrial sector in GDP in Cambodia is limited to 23.5%, and major industries are garment and construction industries. The diversification of industries and expansion of mineral industry are regarded as necessary steps for further economic growth of Cambodia.
The Royal Government of Cambodia, with its National Development Strategy named "Rectangular Strategy", is making efforts for the promotion of trade and investment, development of small & medium sized companies, and development of human resources with skills matching the needs of the labor market. However, business community including foreign investors is facing the shortage of engineers and technicians who can manage or design the production lines of factories. On the other hand, development of mineral resources is progressing in recent years in Cambodia because of the improvement of technology and the progress of removal of landmines.
Under these circumstances, RGC requested the Government of Japan for assistance to improve educational capacity of Institute of Technology of Cambodia (ITC), focusing on the Department of Electrical and Energy Engineering (EEE), the Department of) Industrial and Mechanical Engineering (IME) and the Department of Geo-resources and Geotechnical Engineering (GGE).
The Mid-term Review Team for the project, organized by the representatives of Cambodian side and JICA, evaluated the achievements and implementation process of the project by using the evaluation five criteria and derive reform measures for achieving the expected outputs and the project purpose.</td></tr>
<tr><td colspan="3">1-2 Project Overview
(1) Overall Goal
Graduates with stronger practical skills are developed by the target departments of ITC.

(2) Project Purpose
The quality of education is improved with more emphasis on practice and experiments at the target departments of ITC as a leading university.

(3) Outputs
1. Syllabus for course works is improved with more practice and experiments.
2. Teaching method of academic staff is enhanced to conduct practice-oriented education.
Equipment for experiments is properly utilized for practice and experiment.</td></tr>
</table>

(4) Inputs

【Japanese side】

Experts: 1) Chief advisor (short-term), 2) Project Coordinator (long-term), 3) 7 short-term experts for IME, 6 for GGE including one expert from Indonesia and 4 for EEE including one expert from Thailand

Training in Japan: 24 counterparts (IME: 9, EEE: 9, GGE: 6)

Operation cost: 64,817.23 US dollars for consumables and accessories for equipment, etc.

【Cambodian side】

Counterpart:	3 counterparts at the managerial level and 56 technical counterparts
Facility& expenses:	860,740 US dollars for the installation of facilities and the salaries of new staff assigned for the project Provision of office space for Japanese experts in ITC

2. Mid-term Review Team

Members of Mid-term Review Team	Japanese side: 1) Team Leader: Mr. Tsutomu TANAKA, Director, Technical and Higher Education Division, Human Development Department, JICA 2) Engineering Education: Dr. Jun-ichi TAKADA, Professor, Tokyo Institute of Technology 3) Cooperation Planning: Mr. Keiichiro TANIGUCHI, Special Advisor, Technical and Higher Education Division, Human Development Department, JICA 4) Evaluation Analysis: Mr. Kaneyasu IDA, Senior Consultant, Tekizaitekisho Organization Cambodian side: 1) H. E. Lav Chiv Eav, Secretary of State, MoEYS, Project Director 2) Dr. Romny OM, Director of ITC, Project Manager	
Period	From November 24 to December 7, 2013	Type of Evaluation: Mid-term Review

3. Results of Evaluation

3-1 Progress of the Project

The Project's achievements in accordance with the PDM are shown in the table below.

Indicators	Progress and achievements
Output1	
Ratio of practice and experiments in curriculum increases.	The hours spent for practices and experiments by the three departments increased from 528 before the commencement of the project to 896 in November 2013.
Number of students per equipment decreases.	In EEE and IME departments, one class is usually divided into five to six groups and one set of equipment is available for each group. GGE department is very new and the number of practical work (experiments and field work) has been drastically increased. Now fieldwork has been made possible for five subjects and necessary tools are available for each student. A pair of students uses one microscope.

Number of revised syllabi	Basically the project revises the existing syllabi related to practices and experiments.
Number of revised instruction for practices and experiments	In EEE and IME departments, 77 % of the necessary student laboratory manuals (61 out of 79 for EEE) and (34 out of 36 for IME) have been drafted. GGE department plans to draft the manuals before training in Japan. All the manuals developed by the lecturers will be further improved, incorporating feedback from the Japanese experts.
Output 2	
All heads of the departments consider capacity of academic staff is enhanced to conduct practice-oriented education.	The heads of departments recognized the improvements due to the facts that utilizing the lab equipment, the lecturers are conducting course works and more mini-projects are being conducted. The lecturers can utilize the equipment that has been procured to replace the old ones and also the equipment that is easy-to-use. Yet, the lecturers still need to be specialized in the use of equipment that has been newly introduced to ITC.
Faculty Development activity is regularly conducted.	Each department organizes the staff meeting twice a month. But the objective of the meeting is not limited to faculty development. The staff meeting needs to be further improved for sharing of experience from model lectures by experts and training in Japan.
Output 3	
Regulation for utilization of equipment is developed.	Each department has a concise set of rules for laboratory management and one staff member supervises the operation and maintenance of equipment and one assistant support students in the use of equipment. Yet, a more systematic laboratory management needs to be introduced for sustainable use and maintenance of the newly introduced equipment.
Periodical review is conducted by the taskforce.	Monitoring is mostly done by the assigned staff member by reporting problems to the head of the department. But, monitoring system has not yet instituted in an organizational manner.
Project Purpose	
Evaluation committee to be established for the Project assesses the quality of education is improved with more emphasis on practice and experiments.	The existing system for the evaluation of quality of education includes the approval of the curricula of ITC by the International consortium of 17 overseas universities, based on the annual report of ITC on its academic performance. Under this framework, Credits obtained at ITC can be recognized at the recipient universities and the Fifth year student at ITC is recognized as the 1st year M.Sc. student by some of the member universities. Every year, approximately 60 students study abroad at or through arrangements with member universities. This manifests the academic levels of ITC to some extent. No evaluation committee has been established for the project. According to the interview to a group of ITC students in the 5th grade, the quality of education at ITC improved by the use of new equipment and the introduction of increasing numbers of experiments and practices. At the same time, they feel the lecturers should be more specialized in the use of equipment.

Overall Goal	
70% of employers of ITC graduates consider graduates after the Project have stronger practical skills than those before the Project.	ITC has not conducted survey to the industry about the performance of its graduates. Therefore, it is difficult to quantitatively measure to what extent the recent graduates have more practical skills than those who graduated earlier times before the project. One indication of good evaluation of ITC graduates is that they are very competitive in the job market for engineers. According to the follow-up survey on the graduates conducted by ITC, 67% of the graduates got jobs, 17% continued education and 15% seeking better paid or more qualified positions.

Implementation Process

- Progress is facilitated mainly through guidance given by short-term experts in Cambodia and counterpart training in Japan while the preparations and installation of equipment was done by the counterparts and the project coordinator. Training in Japan for one month was very appropriate, especially when the purposes of the training courses were discussed and well specified.
- It was difficult to dispatch experts in a timely manner and for a sufficient duration in Cambodia because short-term experts had to participate in project activities from their busy teaching and research schedule.
- At an earlier stage of the project duration, project progress was slow because a short-term expert was assigned as the chief advisor and it was difficult to manage the project and communicate with stakeholders in such a implementation setting. Also, the project's support committee meeting was not organized only a few times. Project progress was more facilitated in the second and the third years, more short-term experts visited ITC and the counterparts increasingly spent time setting up and utilizing equipment.
- JCC meeting was held in December 2012 to discuss the revision of PDM. At the operational level, decision-making was not so effective because of the above-mentioned factors.
- With the counterparts, communication is mostly person-to-person and no formal project meetings were organized. Therefore, dissemination and sharing of project information was limited. Also, TV conference was not often used by both sides.
- All the project activities such as the development of teaching materials and the improvement of teaching methods are part of their regular activities. Therefore, the ownership of the project activities was strongly felt by the counterparts.

3-2 Summary of Evaluation Results

(1) Relevance: The relevance of the project is considered to be high.

The National Strategic Development Plan (2009 – 2013) emphasizes the human resource development for industry as a prioritized agenda. The next Plan (2014 – 2018) will also prioritize the capacity development of teachers and upgrading of laboratories at the universities in the field of engineering to meet ASEAN standards. The job prospect for graduates of IME and EEE to get a job is very high while the demand is being generated for prospective GGE graduates. In the labour market, the immediate need is the development of skilled labour, yet the need for quality engineers is also recognized. Out of 10 public universities under MoEYS, only 3 of them have engineering related departments. MoFYS recognizes ITC as the leading university in the field of engineering. Therefore, targeting ITC as the implementing organization is also appropriate.

(2) Effectiveness: The effectiveness of the project is considered to be moderate.

The three expected outputs of improved coursework, teaching methods and proper utilization of equipment are all necessary to improve the quality of education with emphasis on practice and experiments. Tangible outputs are being produced for the Improvement of teaching methodology for coursework, but further efforts are necessary for the improvement of teaching methods and the proper utilization of equipment. It is quite possible to improve the quality of education to a satisfactory level if the lecturers work harder to utilize the equipment for experiments and they are able to have more opportunities to learn from the short-term experts.

(3) Efficiency: the efficiency of the project has some issues.

Project progress was slow in the first year and more activities were seen in the second and third years. Many of the expected outputs have been produced for Output 1 although the schedule is a little behind. On the other hands, more activities should be implemented to achieve Output 2 and 3 in the 2nd half of the project. Weak project management at the operational level and difficulties to send short-term experts remain critical issues for an effective implementation of project activities. The lecturers do not know much about the framework of the project. Also, they are not so familiar with the modality of JICA's technical cooperation. Therefore, they need more guidance on how to proceed with project activities.

(4) Impact: the prospect of impact is high.

ITC graduates are already well accepted by the industry. ITC also tries to understand the needs of the industries through meetings and feedback from the companies that accepted interns. Because the students from the fifth grades onward will be trained with more practice and experiments, companies should rate them more favorably than the previous graduates. Other expected impacts include the strengthening of partnership between ITC and Japanese universities and the increasing number of research projects by utilizing newly installed equipment.

(5) Sustainability: the sustainability of the project has some issues.

The Government policy for human resource development for the industry will be consistent and ensured by the national strategic plan. As for the sustainability of the project outputs, practices and experiments will be continuously performed because these activities are incorporated into the course work. It is unclear how much output 2 and 3 can be secured because activities to improve teaching methods and the proper utilization of equipment have not yet been institutionalized. The budget available for equipment is very small in ITC, the lecturers need to fully understand the methods of regular and preventive maintenance to prevent major troubles. ITC may be able to procure consumables with its own budget by generating revenue from training services to companies. For the technical aspect, the international consortium would be one platform to support ITC. Partnership with Japanese universities would also help ITC lecturers further develop learning opportunities.

3-3 Factors Promoting Sustainability and Impact

52% of the ITC lecturers received degrees through JICA-assisted AUN/SEED-Net Project and they improved their academic capabilities prior to the project implementation. International consortium of 17 universities was also beneficial to the academic development of ITC.

3-4 Factors Inhibiting Sustainability and Impact

The list and the specifications of the equipment were decided prior to the arrival of the project coordinator and project activities. Some equipment had problems such as lack of spare parts and it took some time to utilize them for teaching. The equipment procured by cultural grant aid for GGE had more problems (e.g., lack of essential equipment in the equipment list, insufficient guidance and poor quality operation manuals).

3-5 Conclusions

Criteria	Evaluation Results
Relevance	Relevance is high as the policy support for human resource development for industry is consistent and the project responds to the needs of target industries.
Effectiveness	Effectiveness is moderate. It is possible to achieve the project purpose if the project's efficiency is increased.
Efficiency	Efficiency has some issues. Particularly project management needs to be strengthened to facilitate the dispatch of experts and involve the counterparts in project activities more extensively.
Impact	The prospect of impacts is high as ITC graduates are highly accepted by the industry and other impacts on academic development to ITC.
Sustainability	Sustainability would probably have some issues; the maintenance of the equipment needs special attention.

3-6 Recommendations

To ITC:

- To institute periodical survey to evaluate graduates' performance
- To develop a plan for the proper use and maintenance of the equipment

To the project office and the three departments:

- To communicate with the short-term experts to inform necessary information and progress made by ITC on a regular basis via TV conference
- To have the bi-monthly or monthly meeting to strengthen the managerial aspects of the project and develop necessary systems for the development of teaching methods and the proper use and maintenance of the equipment
- To make sure that all necessary accessories and spare parts be procured before the end of the project duration. In this connection, the three departments should make proposal for the O&M and revenue generation to submit to ITC.
- To develop detailed plan of operation in order to successfully implement the activities and to eventually achieve the project purpose within a limited timeframe.
- To specify the purpose and contents of training program through discussions with Japanese experts before dispatching the participants to Japan

To JICA:

- To promote the dispatch of Japanese short-term experts to ITC by organizing the support committee meetings in Japan and taking measures to facilitate their increased participation.
- To consider the dispatch of experts who are able to stay and work in ITC for weeks and months to oversee the revision of coursework and model teaching activities.
- To ensure the effective installation of equipment by the forthcoming grant aid assistance based on the lessons learned from the experiences of cultural grant aid and this project

第１章　中間レビュー調査の概要

１－１　プロジェクトの概要

（1）背景

カンボジア王国（以下、「カンボジア」と記す）の産業構造は、農林水産業のGDPシェアが36.7％と高い一方で工業のGDPシェアは23.5％と低い。他方、カンボジアへの外国直接投資純流入額は、2009年から2011年までの3年間で1.7倍に拡大しており、2010年後半からは製造業を含む日系企業の進出が加速している。カンボジアは、これら外国投資も活用しながら、製造業等の拡大を通じて産業を多角化することにより、経済の持続的な成長をめざしている。

しかしながら、カンボジアに進出する日系企業などの外資系企業からは、高等教育機関の輩出する高度人材には、会計やマーケティングといったビジネス人材が多い一方で、生産ラインなどの設計・管理や不具合の原因究明を行うことができる実践的なスキルを持ったエンジニアレベルの工学系人材が不足している点が指摘されている。そのため外資系企業は、中国やタイなどからそうした人材を雇用して対応している。

カンボジアにおけるエンジニアを育成する高等教育機関としては、カンボジア工科大学（Institute of Technology of Cambodia：ITC）が国内最高峰の教育機関として位置づけられる。わが国は2003年からJICAの技術協力、アセアン工学系高等教育ネットワーク（ASEAN University Network/Southeast Asia Engineering Education Development Network：AUN/SEED-NET）プロジェクト（第１フェーズ：2003～2008、第２フェーズ：2008～2013年）を実施中で、メンバー大学教員を対象とする留学事業（修士・博士レベルの域内・本邦留学による高位学位取得支援)、共同研究活動、ネットワーク形成活動等を行っている。ITCは、AUN/ SEED-NETプロジェクトを通じて、これまでに約100名の教員が留学事業に参加して高位学位を取得するなど、教員の研究・教育能力の向上に取り組んでいる。しかしながらITCでは、実験・実習のための施設・機材の不足などにより講義中心の教育が行われており、実践的なスキルを持った人材を必要とする産業界のニーズに応えることが十分にできていない。

また、カンボジアでは近年、探鉱技術の向上及び地中の危険物の除去の進展などによって、鉱物資源の新たな開発が進められようとしている。産業としての鉱業の発展も期待されており、既に外資系企業を含め100社近い企業が鉱床を探査している。このような動きを受け、フン・セン首相の指示により、ITCにおいて過去に廃止された地球資源・地質工学科を2011年10月より再開設することが決まり、準備が進められている。しかしながら、当該分野にかかるITCの知見・経験は乏しく、当該学科においても、実験・実習を取り入れたコースワークの実践に対する支援が必要となっている。

このような背景からカンボジア政府から日本政府に対して、ITCの電気・エネルギー工学、産業機械工学、地球資源・地質工学の3学科の強化を目的とした「カンボジア工科大学教育能力向上プロジェクト」（以下、「本プロジェクト」）の実施に係る技術協力の要請があった。これを受けてJICAは2011年10月から4年間の予定で協力を実施している。本プロジェクトはITC及びその上位機関である教育青年スポーツ省（Ministry of Education, Youth and Sport：MoEYS）をカウンターパート（Counterpart：C/P）とし、JICAはチーフアドバイザーを短期出張ベースで年間4回程度、業務調整員1名を長期専門家として派遣している。

今回実施する中間レビュー調査では、プロジェクト目標や成果等の達成状況や実施プロセ

スをカンボジア側と合同で確認するとともに、プロジェクトの残り期間の課題及び今後の方向性について確認することを通じて、プロジェクト改善に役立てることを目的としている。

(2) プロジェクトの概要

プロジェクトは、現行（オリジナル）プロジェクト・デザイン・マトリックス（Project Design Matrix：PDM）に基づき以下のように要約される。

プロジェクトの要約

上位目標	カンボジア工科大学の対象3学科から、より高い実践的なスキルを身につけた高度人材が輩出される。
プロジェクト目標	カンボジア工科大学の対象3学科において、より実験・実習に重点を置くことを通じて学部教育の質が改善する。
成果 1	コースワークのためのシラバスが、より実験・実習に重点を置いたものへと改善される。
成果 2	教員の教授法が実践を重視したものへと向上する。
成果 3	実験用機材が、実験・実習おいて適切に活用される。

出所：現行（オリジナル）PDM

詳細については、付属資料3（ミニッツのAnnex-1）参照。

１－２　中間レビュー調査の目的

中間レビュー調査の主な目的は以下のとおり。

1）プロジェクトの実績を計画と比較して検証する。

2）プロジェクトの実施プロセスを検証し、貢献・阻害要因を把握する。

3）5項目評価（妥当性、有効性、効率性、インパクト、持続性）に沿ってプロジェクトを分析・評価する。

4）PDMや活動計画（Plan of Operation：PO）の変更も含めプロジェクト後半で取るべきアクションについて提言を行う。

１－３　合同評価チームメンバー

カンボジア側

氏　名	所　属
H.E. Lav Chiv Eav	Under Secretary of State, Ministry of Education, Youth and Sport（MoEYS）
Dr. Romny OM	Director of Institute of Technology of Cambodia（ITC）, Project Manager

日本側

担　当	氏　名	所　属
団長/総括	田中　努	JICA人間開発部　高等・技術教育課　課長
工学教育/チーフアドバイザー	高田　潤一	東京工業大学大学院　理工学研究科国際開発工学専攻 教授
協力計画	谷口　敬一郎	JICA人間開発部　高等・技術教育課　特別嘱託
評価分析	井田　光泰	合同会社適材適所　シニアコンサルタント

１－４　調査日程・主要面談者

（1）調査日程

本中間レビューの現地調査は、2013年11月24日（日）から12月7日（金）にわたり以下の日程で実施された。

日付	日　　程	メンバー
24-Nov	Arrive in Phnom Penh, Cambodia	Ida
25-Nov	Courtesy Call to Institute of Technology of Cambodia（ITC） Interview with Director and Deputy Director	Ida
	Interview with Japanese experts	Ida
26-Nov	Interview with lecturers from GEE	Ida
	Interview with lecturers from GIM	Ida
27-Nov	Interview with Japanese experts	Ida
	Interview with lecturers from GGE	Ida
28-Nov	Document review and documentation	Ida
	Interview with students at GEE	Ida
29-Nov	Interview with H.E. Laov Him, Director General of TVET, MLVT	Ida
	Interview at Department of Higher Education, MoEYS,（Mr. You Vireak, Deputy Director of Department of Higher Education）	Ida
	Interview with JETRO（Mr. Doho, Chief Representative）	Ida
	Interview with Cambodian Chamber of Commerce （Mr. Yun Sovanna, Project Manager and Mr. Hong Setha, lead consultant, Support to G-PSF project）	Ida
30-Nov	Report writing	Ida
1-Dec	Arrive in Phnom Penh, Cambodia Internal Meeting	Taniguchi Ida
2-Dec	Courtesy Call to JICA Cambodia Office Courtesy Call to H.E. Dr. Yuok Ngoy, Secretary of State of MoEYS	Taniguchi, Ida
	Interview with and visit to GEE, GIM and GGE Meeting with experts	Takada, Taniguchi, Ida
3-Dec	Internal Meeting（Finalizing M/M draft）/ Sending M/M draft to stakeholders Mr. Tanaka will arrive in Phnom Penh, Cambodia	Taniguchi, Takada, Ida Tanaka
4-Dec	Discussion on Joint Mid-term Evaluation Report and M/M with MoEYS, ITC and other concerned parties Finalizing the draft of MM	Tanaka, Taniguchi, Takada, Ida
5-Dec	JCC Meeting to get approval on Joint Mid-term Evaluation Report & Signing of M/M with ITC and Ministry of Education, Youth, and Sports（MoEYS） Report to JICA Office, Phnom Penh	Tanaka, Taniguchi, Takada, Ida
6-Dec	Report to EOJ, Phnom Penh Leaving for Japan	Tanaka Taniguchi, Ida
7-Dec	Arrive in Japan	

（2）主要面談者

1）カンボジア国教育青年スポーツ省（MoEYS）

H.E. Dr. Yuok Ngoy	Secretary of State
H.E. Lav Chiv Eav	Under Secretary of State

2）カンボジア国労働・職業訓練省（MLVT）

H.E. Laov Him	Director General of TVET

3）カンボジア工科大学（ITC）

H.E.Dr. OM Romny	Director of ITC
Mr. PHOL Norith	Deputy Director of ITC
Mr. Pan Sovanna	Head of GIM Department
Dr. Nguon Kollika	Coordinator of JICA project in GIM
Dr. Seang Chansopheak	GIM
Mr. Meng Chamnan	GIM
Dr. Rey Sopheak	GIM
Mr. CHY Cheapok	Head of EEE Department
Dr. Sreng Sokchenda	EEE
Dr. PO Kimtho	EEE
Dr. Bun Long	Vice head of EEE
Mr. Thourn Kosorl	EEE
Ms Sreymean Sio	GGE
Mr. Vamoeurn Nimol	GGE
Dr. Bun Kim Ngun	GGE
Mr. Pich Bunchoeun	GGE
Mr. Chea Samneang	GGE

4）在カンボジア日本国大使館

玉光　慎一	一等書記官
和田　孝行	二等書記官

5）JETROプノンペン事務所

道法　清隆	所長

6）JICAカンボジア事務所

井﨑　宏	所長
竹内　博史	次長
井口　邦洋	所員

１－５　評価の方法

（1）評価の枠組み

中間レビュー調査チーム（以下「チーム」）は、PDMに基づきプロジェクト開始当初から現在までのプロジェクトの実績と実施プロセスを把握したうえで、評価5項目の観点から評価を行った。

1）プロジェクトの実績

プロジェクトの実績について、投入（インプット）、成果（アウトプット）、プロジェクト目標、上位目標について計画並びに現行PDM指標に沿って検証した。

2）実施プロセス

実施プロセスについて、計画に沿って実施されてきたのか、プロジェクトマネジメントは適切であったかなどを確認し、プロジェクトの実施プロセスに影響を与えた貢献・阻害要因を把握した。

3）5項目評価

プロジェクトは、以下に説明する5項目の評価基準に基づいて分析・評価した。

5 項目評価

1．妥当性（Relevance）	妥当性は、プロジェクトの正当性や必要性を問う視点である。プロジェクトの期待される効果（プロジェクト目標や上位目標等）はターゲットグループのニーズに合致しているか、プロジェクトは問題の解決方法として適切か、プロジェクトは政策との整合性があるか、プロジェクトの戦略やアプローチは妥当か、プロジェクトはODA予算を使って実施することが適切かなどを評価する。
2．有効性（Effectiveness）	有効性は、想定された対象者・社会に対してプロジェクトの実施により便益がもたらされるかを問う視点である。
3．効率性（Efficiency）	効率性はリソース・投入が成果に転換されているかを問う視点で、主としてプロジェクト・コストと効果の関係に焦点をあてる。
4．インパクト（Impact）	インパクトはプロジェクトの実施によって生じる、長期的な視点の効果を問う視点で、直接的・間接的、正・負、想定された・想定されなかった効果を含む。
5．持続性（Sustainability）	持続性は、プロジェクトによる効果が協力終了後も持続され得るかを問う視点である。

出所：「JICA事業評価ガイドライン（改訂版）」（2004年）より作成

4）情報源

既存の文献・各種報告書（事業進捗報告書、合同調整委員会議事録、専門家報告書、活動実績資料等）に加え、本中間レビュー調査において、関係者への質問票調査、インタビュー調査を実施し必要な情報・データの追加収集を行った。対象は、MoEYS、ITC（学長/副学長等のマネジメント層、各学科の教員、学生)、MLVT、日本人専門家、カンボジア商工会、JETROプノンペン事務所である（１－４　調査日程・主要面談者参照)。また、質問票・インタビュー項目の詳細は付属資料4〔質問票（短期専門家対象/ITC教員対象)〕参照。

調査結果については、2013年12月5日（木）に開催された合同調整委員会（JCC）において報告のうえ、協議議事録（Minutes of Meetings：M/M）及び合同評価報告書として取りまとめ署名を行った。詳細は付属資料3協議議事録（M/M）（合同評価報告書を含む）参照。

（2）プロジェクト・デザイン・マトリックス（PDM）の改訂

評価の枠組みとなるPDMについては、プロジェクト開始当初にカンボジア・日本国側双方で合意されたPDM（付属資料1現行PDM）に基づき、プロジェクトの開始当初から現在までのプロジェクトの実績と実施プロセスを把握し、また評価5項目の観点から評価を行った。他方、PDMの改訂については、2012年12月の第1回JCCにおいてもPDMの改訂が議論されていることを踏まえ、調査期間中に双方協議を行い、新たにPDMの改訂が合意された（付属資料2改訂PDM)。

主な改訂内容と理由は以下のとおり。

現行PDMと改訂PDM比較一覧

	現行PDM	改訂PDM	理由
成果 1	Syllabus for course works is improved with more practice and experiments.	Coursework in the target departments is improved with more practices and experiments.	「syllabus」が指す内容が曖昧なため「coursework」として講義内容全般を指すこととした。
活動 0	-	Conduct periodical survey of satisfaction of companies received ITC interns, of satisfaction of the 5th year students, and of satisfaction on the quality of education in the target departments	プロジェクト目標と上位目標における達成度合いを測るための定期的な調査が必要であるため。
活動 1-1	Set up a taskforce for syllabus revision.	Set up a taskforce in each department for the revision of coursework.	タスクフォースが各学科において設立されることを明確にするため。
活動 1-2	Review and revise syllabus and instruction for practices and experiments.	Review and revise coursework and student laboratory manuals for practices and experiments.	「syllabus」及び「instruction」が指す内容が曖昧なため、活動による成果物を具体的に記載。

活動 1-3	Conduct a periodical review on the implementation of the revised syllabus and instruction for practices and experiments.	Conduct a periodical review on the implementation of the revised coursework and student laboratory manuals for practices and experiments by the taskforce in each department and Japanese experts.	「syllabus」及び「instruction」が指す内容が曖昧なため、活動による具体的な成果物、活動の実施者を明確にするため。
活動 2-2	Train academic staff by joint research activities with Japanese and/or ASEAN country experts.	Train academic staff by guidance on research methodology by Japanese and/or ASEAN country experts	成果２は、研究活動を行うことがプロジェクトの主眼ではなく、教育活動としての研究方法の指導を行うことが主眼となるため。
活動 2-3	Conduct Faculty Development activities to share good practices in teaching among academic staff	Conduct sharing activities of model teaching and lessons learnt of the training in Japan and discuss how to apply to their teaching among academic staff	ファカルティ・ディベロップメントとしてどのような活動を行うのかを明確にするため。
活動 3-1	Set up a taskforce for utilization of equipment.	Organize a taskforce in each department for utilization of equipment.	各学科にある既存グループやタスクフォース等も活用して取り組むことを明確にするため。
活動 3-3	Conduct a periodical review on utilization of equipment by the taskforce.	Conduct surveys on the conditions and the utilization of equipment, consumable supplies and materials in each semester by the taskforce and Japanese experts.	機材の有効活用や維持管理を行うための調査内容を明確にするため。
日本側の投入	Long-term Experts：Chief Advisor	Long-term or Short-term Experts：Chief Advisor	現状にあわせて修正。
指標		改訂PDM参照	定義の明確化並びに達成状況の量的把握を目的として改訂。
入手手段		改訂PDM参照	指標の変更に即して改訂。

第２章　実績と実施プロセス

２－１　投入

中間レビュー時点における日本・カンボジア国側双方の投入は以下のとおり。

（1）日本側

1）日本・アセアン諸国からの専門家

1）チーフアドバイザー（短期専門家1名）、2）業務調整員（長期専門家1名）、3）産業機械工学（短期専門家7名）、4）地球資源・地質工学〔短期専門家6名（インドネシア人専門家1名含む）〕、5）電気・エネルギー工学〔短期専門家4名（タイ人専門家1名含む）〕で、従事期間は延べ4.2カ月〔付属資料3協議議事録（M/M）のAnnex-3参照〕

2）本邦研修

24名（電気・エネルギー学科9名、産業機械学科9名、地球資源・地質工学科6名）が本邦研修を受けた〔付属資料3協議議事録（M/M）のAnnex-4参照〕

3）機材

産業機械学科と電気・エネルギー学科への供与（総額1,611,462USドル相当）（付属資料3協議議事録のAnnex-5-1、5-2、5-3参照）地球資源・地質工学科へは機材供与は文化無償資金協力による。

4）プロジェクト経費

2013年11月までのプロジェクト経費支援総額は64,817.23 USドル〔付属資料3 協議議事録（M/M）のAnnex-7参照〕

（2）カンボジア側

1）カウンターパートの配置

3名の主要C/Pを配置し〔付属資料3 協議議事録（M/M）のAnnex-8-1、8-2、8-3、8-4参照〕、教育青年スポーツ省高等教育局総局長がプロジェクト・ディレクター、ITC学長がプロジェクト・マネジャー、3学科の職員（電気・エネルギー学科22名、産業機械学科21名、地球資源・地質工学科13名）が技術カウンターパートとて任命された。

2）執務スペース

プロジェクト事務所が提供された。

3）プロジェクト経費

付属資料にあるとおり、860,740 USドルが投入された〔付属資料3 協議議事録（M/M）のAnnex-9参照〕。

２－２　プロジェクトの実績

（1）アウトプット

PDMの指標に沿ったプロジェクトの3つの成果目標の達成状況は以下のとおりである。

成果１：コースワークのためのシラバスがより実験・実習に重点を置いたものへと改善される。

1-1　指標①：カリキュラムにおける実習・実験の比率が高まる

機材が供与された教科について、実習・実験の導入が進んでいる。プロジェクト前と2013年11月現在の実習・実験の時間数の推移は以下のとおりである。

学科	実習・実験時間数	
	プロジェクト開始前	2013年11月現在
電気・エネルギー学科	448	560
産業機械学科	80	224
地球資源・地質工学科	0	112

出所：電気・エネルギー学科、産業機械学科、地球資源・地質工学科

1-2　指標②：機材1台当たりの学生数が減少する

電気・エネルギー学科について、ほとんどの供与機材が既に実習・実験に活用されている。1クラスは25～30名の2チームに分け、5～6名が1グループを作り、1つの機材を活用している。産業機械学科では約8割の供与機材が活用され、電気・エネルギー学科同様、1台につき5～6名の学生によって活用されている。地球資源・地質工学科は新設された学科で、機材も整備されていなかったため、本プロジェクトの実施により、実習・実験とフィールドワークが大幅に増加した。現在、5科目でフィールドワークが実施され、各学生に1つずつの必要器具が提供されている。また顕微鏡も1台当たり2名の学生の割合で配置されている。

1-3　指標③：改定されたシラバスの数

当初の実施計画では、シラバスの改定と学生実験手引書の作成は1年目に完了する予定であったが、機材の設置・活用の遅れにより、そうした活動も計画より遅れた。したがって、学生実験手引書の作成過程にあり、定期的なシラバスの改定はまだ実施されていない。

また、カリキュラムを大幅に改定するためには、国際コンソーシアムへ提案し了承を得る必要がある。基本的には本プロジェクトでは、シラバスの授業内容の変更ではなく、実験・実習に関する記載内容の修正等を想定する。現段階では、一部のシラバスで実験・実習時間を明記し、使用する機器名を記載するといった変更を行っている。

1-4　作成された学生実験手引書の数

学科	科目数	これまでにドラフト版を作成した学生実験手引書の数（実験・実習別）	最終的に完成させるべき学生実験手引書の数（実験・実習別）
電気・エネルギー学科	18	61	79
産業機械学科	9	34	36
地球資源・地質工学科	9	検討中	検討中

出所：電気・エネルギー学科、産業機械学科、地球資源・地質工学科

- 学生実験手引書については、電気・エネルギー学科と産業機械学科の2学科で77%の進捗状況にある。
- 電気・エネルギー学科は18科目について学生実験手引書の作成を計画した。各科目は複数の実験・実習で構成されているため、学生実験手引書も実験・実習課題別に作成され

る。機材導入後間もない科目（3科目、18の学生実験手引書を作成予定）を除いて、学生実験手引書のドラフト版が作成されている。一部学生実験手引書については短期専門家によるコメント待ちである。

- 産業機械学科については、ほぼドラフトが作成済みである。「材料強度」「機械的構成」「熱交換」「エンジン理論」の4科目については、短期専門家とITC教員によるチェックを受けて最終化を図る予定である。「エンジン理論」については、学生実験手引書を1冊追加する予定である。
- 地球資源・地質工学科については、これまで機材別の操作マニュアルの作成を図ってきたため、今後、短期専門家と相談して、学生実験手引書の作成について必要な実験やフィールド調査を決定する予定である。2014年2月、3名のC/Pが九州大学と北海道大学で研修を受ける予定のため、それまでに学生実験手引書のドラフトを作成し、日本で短期専門家の助言を受けながら、最終化を図りたい意向である。

成果２：教員の教授法が実践を重視したものへと向上する

2-1 指標①：学科長が教員による実習中心教育の能力が高まったと認識する

学科長・副学科長へのヒアリングによれば、供与機材を活用した学生実験の増加などを通して授業が改善しているという。特に、更新機材（老朽化した機材の買い替え）や操作が比較的簡易な実験・実習用機材については、十分な活用が図られている。一部の新規導入機材については、操作方法など含めて一層の習熟が求められる。

2-2 指標②：「FD活動」[2]が定期的に実施される

各学科でFD活動を行う場はスタッフミーティングである。ただし、スタッフミーティングの議題は多岐にわたり、教授法についての議論は議題の一部にとどまっている。その他、FD活動の機会としては、短期専門家が来訪した際に行われるモデル授業や発表が挙げられる。

電気・エネルギー学科では月2回スタッフミーティングを開催している。プロジェクト開始後、これまでに3回、専門家による発表があり、教員と学生が参加している（40～80名ほど）。毎回、カリキュラム開発、教授法、農業への電気通信技術の応用といったテーマについて依頼し、教員にとって学習の機会となっている。

産業機械学科（教員16名）では月2回スタッフミーティングを開催している。主な議題は、教授法、学生の理解度についての課題などである。

地球資源・地質工学科では月2回スタッフミーティングを開催している。学科開設後間もないため、まだ教授法が十分確立・定着していないため、短期専門家による発表やフィールドワークの指導など重要な支援となっている。特に、短期専門家によって、地質図作成といった科目の実習を導入することが可能となった。教員は徐々に自信をもって取り組めるようになってきた。

上記のように各学科とも、月2回のスタッフミーティングを開催しているものの、この会議は教育・学生指導に特化した会議ではなく、短期専門家による指導や本邦研修の成果を

[2] FD活動とは、教員が授業内容・方法を改善し向上させるための組織的な取り組みを指し、具体的には教員相互の授業参観の実施、授業方法についての研究会の開催、優れた教育実践例の共有などの活動を含む。「カンボジア王国カンボジア工科大学教育能力向上プロジェクト詳細計画策定調査報告書」

他の教員と共有する場とはなっておらず、改善が求められる。

成果３：実験用機材が、実験・実習おいて適切に活用される

3-1 指標①：実験用機材活用に係る内規が作成される

- 各学科には機材に関する簡単な内部規約が作成されている。また、機材管理の責任者として1名の教員が任命されている。また、学生の実習・実験をサポートするアシスタントも1名配置されている。機材に問題が生じた場合、責任者が学科長に報告し、学長に報告することが、ルールとなっている。
- 現在、3学科では、機材の設置と活用が優先課題となっており、機材の管理・メンテナンスまで対応できていない。簡易な機材についてはそれほどのメンテナンスが必要ないこと、また比較的高度な機材についてもまだ導入後間がないため、保守・点検やメンテナンスまで関心が至っていないようである。
- 電気・エネルギー学科では、一部の実習器具の質に難があるが、それを除いて機材はおおむね活用されている。問題のある機材については、業者と解決策を検討中である。機材活用については、特にソフトウエアの活用について一層理解を高める必要がある。また、教員が機材の活用に習熟するとそれだけ活用の幅が広がるため、新たな付属品の必要性が生じるといったケースがある。このため、短期専門家と協議して、プロジェクト終了までに必要な付属品を確保しておくことが望まれる。
- 産業機械学科では、すべての教員が機材を活用した実習・実験ができるということをめざしている。現時点では、まだ適切な活用ができていない機材がある。また、ラボの管理についても、機材の保守・点検、学生の安全や環境配慮など含めたシステム導入の必要性を認識している。
- 地球資源・地質工学科も教員は機材の設置と機材活用を主眼に取り組んできており、機材管理の制度はまだ確立していない。既存の制度としては、フィールドワーク用の器具にID番号を付け台帳管理しているといった取り組みに限定されている。

3-2 指標②：タスクフォースにより定期的なレビューが行われる

3-1で記述したとおり、定期的なレビューは、ラボの管理者による学科長への報告が行われているのみであり、組織的なモニタリングの体制や仕組みはまだ導入されていない。

(2) プロジェクト目標

プロジェクト目標：カンボジア工科大学の対象3学科において、より実験・実習に重点を置くことを通じて学部教育の質が改善する

現在、ITCに対して国際コンソーシアムが教育支援を行っており、ITCもこの国際コンソーシアムが求める教育水準に沿うことを重視している。国際コンソーシアムはフランスを中心として、ベルギー、日本、タイなどから17大学が参加し、年1回、加盟大学の代表者が集まり、ITCが提出した年次報告書に基づき、ITCの教育内容をレビューし、ITCに対する改善提言を行っている。国際コンソーシアムの支援は2018年まで継続する予定である。国際コンソーシアムの支援を受けるメリットとして、ITCで取得した単位の認定、ベルギー、フランスの大学ではITCの最終学年である第5年次学生を修士課程1年として認定、毎年約60名のITCの学生に奨

学金提供といったことが挙げられる。こうしたメリットを得られるということは、ITCの教育レベルの高さを示すものといえる。

これまで、現行PDMで明記したプロジェクトのための「評価委員会」は設置されておらず、プロジェクトが支援する3学科の教育の質を客観的に示す指標がなかった。そのため、本中間レビュー調査中にカンボジア側と合意した改訂PDMでは新たに教育の質を示す指標として、学生によるITCの教育への満足度の向上、日本人専門家によるITCの教育への調査結果の向上、教育機材情報の定期的更新を設定した。プロジェクトの後半では、上記指標についての定期的モニタリングが必要である。

今回の中間レビューでは、学生に対するグループインタビューを行ったが、面談した学生たちによれば、機材活用や学生実験指示書の導入などにより、教育の質が上がったとの声が多かった。他方、教員が機材活用についてもっと習熟するべきとの要望もあった。

ITC在学生の声

今回の調査では、電気・エネルギー学科第5年次学生6名に集まってもらい、ITCの教育について意見・感想を聞いた。
主な内容は次のとおり。
「以前は機材が古いためトラブルが多く、実験結果が出ないということがあった。」
「既に学生実験手引書が導入されている。実験で分からなかったとき解決のヒントになり有効。」
「5〜6名の学生で1台の機材を活用している。以前に比べると大幅によくなったが、2名1組で実験することが多いので、順番待ちで長く待たなければいけないときもある。もう少し機材を増やしてもらえるといい。」
「一部の新規機材については、まだ教員が十分活用方法を理解していない。」
「現在、就職先を見つけることはとても容易だが、（参加した6名は）できれば大学院に進みたいと考えている。」

（3）上位目標

上位目標：カンボジア工科大学（ITC）の対象3学科（電気・エネルギー学科、産業機械学科、地球資源・地質工学科）から、より高い実践的なスキルを身につけた高度人材が輩出される

現行PDMでは「70%の卒業生が以前に比べて実践的な能力があると企業に認識されること」が指標として挙げられている。現在ITCでは、企業向けに卒業生のパーフォーマンスについてのアンケート調査などは実施されておらず、プロジェクト終了後、この指標に沿って上位目標の達成状況を測ることは難しいと思われる。したがって、改訂PDMでは、ITCの最終学年である第5年次学生が企業へのインターンに参加することを活用し、「インターン受入れ企業がITCインターン学生を高く評価する」というように指標を改定した。プロジェクトの後半では、第5年次学生がインターンを終了した際に企業からインターンに対して回答される現行の評価シートを改定することにより、上位目標の達成度を測定すべくモニタリングを実施する予

定である。

現時点で入手できた卒業生についての最新データは、以下のとおりである。ITCの卒業生は既に企業から評価されており、就職率は高い。また、就職活動中の学生も就職口がないのではなく、希望する収入が得られる企業を探しているという状況がある。今回の学生へのインタビューによれば、大学院への進学希望者も多いという。

2012/2013の2学科の卒業生進路実績[3]

学科	卒業生数	就職[4]	大学院	就職活動中	その他	連絡取れず
電気・エネルギー学科						
エネルギーコース	47	22	5	4	0	16
電気通信コース	43	25	8	9	1	0
電気･エネルギー学科合計	90	47	13	13	1	16
産業機械学科						
機械コース	29	20	5	4	0	0
産業コース	19	15	3	1	0	0
産業機械学科合計	48	35	8	5	0	0
地球資源・地質工学科						
地球資源･地質工学コース	0	0	0	0	0	0

（電気・エネルギー学科、産業機械学科、地球資源・地質工学科）

２－３　プロジェクトの実施プロセス

（1）技術移転

技術移転は、主に短期専門家派遣と本邦研修により行われている。機材導入についてはC/Pと業務調整員により行われた。短期専門家派遣は、主に本邦大学の現職教員を派遣するが、専門家の所属大学での通常業務との兼ね合いがつき難いことや専門家個人に対するプロジェクト協力へのインセンティブの低さなどから適切なタイミングに派遣することは難しく、また派遣期間も計画よりも短く技術移転期間としては不足している。一部、日本人専門家の派遣が難しい分野や時期には、インドネシアやタイなどアセアン諸国からの第三国専門家に依頼して指導を受けた。

短期専門家派遣の実績

	派遣専門家数	派遣回数 （延べ日数）	本邦研修 参加者数	研修期間 （カ月）
電気・エネルギー学科	6	7（31日間）	9	9
産業機械学科	10	9（49日間）	9	9
地球資源・地質工学科	8	8（34日間）	6	6

出所：プロジェクト事務所

[3] 卒業3カ月後、ITCの各学科では卒業生に対して電話による進路調査を行っている。地球資源・地質工学コースは次年度から卒業生が出る予定。

[4] 2012/2013年度コース別の主な就職先は次のとおりである（括弧内は人数）。
電気・エネルギー科エネルギーコース：Bouygues Construction (3)、MEP engineering services (3)、Fuji Furukawa (3)、EM (2)、Minebea、電気･エネルギー科電気通信コース：Bouygues Construction (7)、Khmer Semiconductor (4)、Khmer brewery (3)、Minebea (3)、CP (3)
産業機械科機械コース：Boursier ITB (4)、Prime Auto Center (3)、ETS (2)、Comin Khmer (2)、Team Cambodia (2)、産業機械科産業コース：Cambodia Brewery (3)、Khmer beer (3)、KED design (4)、Minebea (2)、Boursier Master (3)、Khmer Beer (2)

他方、本邦研修は1カ月程度実施され適切であったと判断される。本邦研修では指導を受けるだけでなく、学生実験手引書を作成するなど成果品の作成も取り組まれている。特に、研修員となるC/Pと日本の受入れ大学において研修目的や内容が明確であった場合、より高い研修効果が得られている。

(2) プロジェクトの運営

1) マネジメント

プロジェクトの初期段階においては、下記理由により、プロジェクト事務所がプロジェクトを実施する過程で困難であった。

- チーフアドバイザーが短期型のシャトル派遣であり活動の制約が避けられなかった。また、日本人専門家との間でコミュニケーションが十分でなくプロジェクト事務所の機能に制約があった（プロジェクト開始から約１年後以降、チーフアドバイザーと業務調整専門家との間でSkypeによる月例のミーティングが開かれるようになり、改善されつつある)。
- C/Pとのコミュニケーションが、ITC教員1名と本邦大学の専門家1名というように、一対一で行われていた。プロジェクトに関するC/Pとの定期会合が行われていなかった。プロジェクト事務所の主要な業務は各種投入の準備・手配、派遣される専門家を探すことであった。
- 日本における国内支援委員会は、2011年12月に第1回目、2012年5月に2回目というように、年1回程度の頻度しか開かれていなかった。

プロジェクトの2年目、3年目については、より多くの短期専門家が派遣され、C/Pが機材の導入や活動に費やす時間が増えたことにより、プロジェクトは進展したといえる。

2) 意思決定過程

2012年12月、PDMの改定について議論をするためJCCが開催された。プロジェクト実施レベルにおいては、上記「マネジメント」で指摘した理由のため、意思決定過程は効果的とはいえない。

3) コミュニケーション

プロジェクト開始前にITC教員関係者が日本人大学に留学し日本人専門家との関係が既にある場合やプロジェクトの進展とともに日本人専門家との連絡を通じてITC教員との信頼関係が構築された場合は、日本人専門家とITC教員とのコミュニケーションはよい。すべての分野において上記のような信頼関係が出来上がっているとはいえず、今後、日本人専門家とITC教員との密な関係の構築が求められる。

プロジェクト活動の促進や関係者間の情報共有は、ITC教員と日本人専門家など、主に一対一で行われている。日本人専門家がITCでのプロジェクトの進捗を理解するために、更なる情報共有が求められる。

また、プロジェクトで導入されたTV会議システムはそれほど頻繁には活用されていない。しかし、2013年5月と9月に日本人専門家とITC教員との間で実施した産業機械学科の会議で

は、双方ともコミュニケーションを深め、プロジェクトの課題を議論するうえで有効であった。TV会議システムは、プロジェクト後半においては、有効なコミュニケーションツールとなり得る。日本人専門家とITC教員の信頼関係が醸成されれば、今後有効に活用されるであろう。

（3）オーナーシップ

プロジェクトの活動は、学生実験手引書や教授法の改善であり、C/PであるITC教員にとって通常業務であることから、オーナーシップは高いといえる。また、多くの教員が海外で学位を取得しており、国内工学系教育のトップ校としての自覚も強いことから、教育水準を高めなければいけないという意識は強い。

日本人短期専門家へのアンケート調査の主な感想・意見

プロジェクト運営について
- プロジェクト全体、あるいは各学科での進捗状況について現状が把握しづらく、もっと情報・資料を共有してほしい
- プロジェクトの成果目標が曖昧なので、支援の範囲を判断しづらい
- 短期専門家の滞在期間が限定的なので、シニアボランティア、技官、退官した教員などを長期専門家として派遣することを検討した方がよい
- 機材を使いこなすことで、C/Pも自信と意欲を高めることができるので、長期専門家が継続的に支援できるような体制が必要

カウンターパートへの指導について
- 指導したC/Pが離職したため、一部科目については他の教員への指導が必要となった
- 担当したC/Pからはアクションや連絡がなく、意欲が感じられない
- まだ教員の講義能力が足りない
- 講義科目数に対して対応できる教員の専門性が不足している
- 本邦研修でトレーニングしてから、現地で指導すると効果が上がると思われる
- 大学内の研修だけでなく、日本の理解促進のために、企業訪問、工場見学など他の活動も含めてはどうか
- 一度現地でC/Pと会って議論しないと、メールやTV会議だけでは良好な関係を築くのが難しい

本邦研修について
- 若手教員は学習意欲が高く、個別課題を持参して本邦研修を受けた場合、効果が高かったが、先方の要望や日程のツメが甘い場合は効率性に課題があった
- 本邦研修の中間点あたりに、日本の製造業の工場視察などを設定するよう、JICAには企画・協力をしてほしい

機材の活用について
- 設置作業が進んでいない実験装置について、関係者の連携・支援が必要

今後の課題について
- プロジェクト後にITCとの関係が切れてしまう可能性が高いので、JICAに継続的な連携のた

めの環境づくりを検討してほしい
・ 日本人専門家にとってJICAのプロジェクトに参加しても大学内の実績としてほとんど評価されず、また、JICAは大学にお金をはらうが、個人には日当程度しか支払わないシステムになっている．この辺りの事項が改善されないと、積極的にJICAのプロジェクトにかかわろうとする日本人専門家は限られると考えられる
・ 短期専門家の負担が大きいと対応できないので、必要な支援に優先度をつけて効率的な支援を行うことで、プロジェクトの効果も高まると思う

第３章　５項目評価結果

３－１　妥当性

以下の事由で、プロジェクトの妥当性は高いと判断する。

（1）2009～2013年の国家開発戦略計画のなかで成長・雇用・均等・効率を謳った四辺形戦略で、産業人材育成は優先課題の1つとして挙げられている。この国家開発戦略計画に呼応する「教育セクター国家開発戦略（2009～2013）」では、高等教育・研究の発展が重要な戦略として挙げられていた。また、「次期教育開発戦略計画（2014～2018）」では、工学を含む8つの分野[5]でアセアン諸国の基準に見合うような大学教員の能力向上と実験等施設の整備を促進することが掲げられている。したがって、本プロジェクトの目標は次期国家計画とも整合性がとれているといえる。

（2）プロジェクト目標である実践的な工学教育の質の向上は、産業人材に対するニーズにも呼応している。現在、労働市場で大きなニーズがあるのは熟練工・技能工といったレベルの労働者であるが、カンボジア商工会等産業界へのヒアリングによれば、プロジェクトで支援する電気・エネルギー学科と産業機械学科については、質の高いエンジニアに対する強いニーズがある。また、地球資源・地質工学科については、今後鉱物探査から採掘などへのビジネスが展開するに従って、人材ニーズが増加することが見込まれている。以上の点から、質の高いエンジニアを育成するというプロジェクトの目標は産業界や労働市場のニーズに合ったものといえる。

（3）教育省傘下の10大学のうち、理系の学科を有する大学は3校しかなく、工学系ではほぼITCのみという状況であることから、カンボジアの工学教育を支援するうえで、ITCを支援することは極めて妥当といえる。なお、カンボジア全体の2011～2012年の工学系学部卒業生数はわずか1,000名程度で、本プロジェクトで支援するITCの3学科の卒業生はそのうちの20％[6]を占めることから、本プロジェクトの貢献度は大きい[7]。

（4）日本のカンボジアに対するODA政策（2012年4月）では、民間セクターの強化が3つの大方針の1つに掲げられ、民間セクター強化の手段として、製造業など潜在的な産業向けの技術者育成が挙げられている。したがって、本プロジェクトは日本のODA政策とも整合性が保たれている。

３－２　有効性

効率性は中程度と判断する。その理由は、以下のとおり。

（1）現時点では、ITCの教育の質を評価する委員会は設置されておらず、現行PDMの指標どおりに有効性を判断することはできない。現在、入手可能な情報として、国際コンソーシアムに

[5] 工学、建築学、薬学、歯学、看護学、会計、観光、専門サービスの8分野。

[6] 地球資源・地質工学科は2014年度から卒業生が輩出する。20％は同学科の卒業見込みの人数を含めた数字である。

[7] Cambodian higher education：challenges and future direction Mak Ngoy（2012）– カンボジアでは文系が非常に多い。特にビジネス系の大学が多く全体の47％を占める。

よる毎年の報告書や学期末に学生による大学評価などがあるが、いずれも、3学科の教育の質を前後比較することはできない。プロジェクトの後半は、中間レビュー調査において改訂されたPDMの指標に基づいて、学生によるITCの教育への満足度の向上、日本人専門家によるITCの教育への調査結果の向上、教育機材情報の定期的更新がなされたかどうかについて、定期的にモニタリング・評価をしていく必要がある。

(2) 本プロジェクトではコースワークの改善、教育方法の改善、適切な機材活用が3つの成果目標として挙げられている。いずれの成果目標も実習・実験を重視した教育の質を改善するうえで不可欠な要素といえる。これまで、コースワークの改善については、学生実験手引書が導入され、実習・実験時間が大幅に増加するなど、目に見える具体的な成果が生まれている。他方、教育方法の改善や適切な機材活用はまだ十分な成果が見えていない。

(3) これまでの取り組みから、今後、短期専門家による適切な指導を十分受けることができ、ITC教員が機材の活用法や教授方法について一層努力すれば、プロジェクト目標を達成することは十分可能であると判断できる。

３－３　効率性

効率性については一部課題がある。

(1) プロジェクトの進捗について1年目は投入が少なく、2〜3年目にある程度投入が確保でき、活動が進むようになってきている。成果１について当初予定より遅れはあるものの、ある程度実績が上がっているが、成果２と３については一層の努力が必要である。

(2) プロジェクトの運営については以下のプラス・マイナス面がある。

- 本邦研修と短期専門家によるカンボジアでの指導を通して、短期専門家とC/Pとのコミュニケーションは徐々に円滑化し始めている。
- 活動のなかでは、本邦研修は具体的な成果品の作成に取り組むうえで特に効果的であった。
- 定期的なプロジェクト会議がないなど組織的な取り組みにおいてプロジェクト運営の弱さがある。また、適切なタイミングと期間での短期専門家派遣は難しく、依然懸念材料である。プロジェクト後半では、定期的な会議の実施や日本人専門家のほかにAUN/SEED-NETプロジェクト等を通じたアセアン諸国の専門家派遣を活用するなどの改善を行う必要がある。
- プロジェクトに参加する教員の多数にとってJICAの技術協力プロジェクトは初めての経験であり、PDMなどプロジェクトの目標、枠組み、範囲などあまり明確に理解していないため、今後、ITC教員に対するPCM研修の実施など、十分な支援が必要である。

３－４　インパクト

インパクト発現の見込みは高い。

(1) ITC卒業生が以前に比べてより実践的な知識・技能を有しているとして企業に評価されることを本プロジェクトの目標としているが、現時点では、そうした指標データは入手できていない。ITCでは2012年に産業連携事務所を設置し、1名の教員と秘書を配置した。まだ、企業に対す

る学生評価調査などは実施していない。[8] そのため、インターン受入れ企業などにより前後比較が可能な調査を実施してインパクトの測定を行う必要がある。

(2) ITC卒業生の就職状況や商工団体へのヒアリングによれば、ITC卒業生は企業などから既に非常に高い評価を得ている様子がうかがえた。また、ITCもカンボジアの主要企業と対話する機会をもち、企業ニーズについて理解を高めようとしている。現在の第5年次学生以下の学生は、本プロジェクトによる便益（新規機材と実習・実験の導入、教員指導法の改善など）を受けており、以前の卒業生より実践的な知識・技能を有していることが期待できる。

(3) 上位目標以外に期待できるインパクトとして次の点を挙げることができる。
- 2013年度から教育青年スポーツ省高等教育局が研究資金の提供を開始した。こうした資金を活用し、導入した機材を活用して研究活動が行われることが期待できる。
- 本プロジェクトを通して、ITCは日本の大学と連携強化を図っている。現時点で、九州大学と連携合意書が調印され、東京工業大学とも調印に向けた準備が進んでいる。また、東京工業大学はITC支援の国際コンソーシアムに正式に参加した。このように、本プロジェクトを契機として、大学間、研究者間の連携が拡大することが期待できる。

３－５　持続性

持続性については一部課題がある。

(1) 3-1で記述したとおり、工学系の技術者育成は「次期教育開発戦略計画　(2014～2018)」の重点政策に掲げられており、政策面の持続性は高い。

(2) プロジェクト成果の持続性について、実習・実験はコースワークのなかに位置づけられるため、制度的には持続性が高い。他方、教育方法の改善や機材の適切な維持管理については、FD活動のためのミーティングや機材の維持管理システムなど制度や体制づくりが進んでいないため、現段階で持続性を判断することはできない。

(3) これまでITCでは新規機材の据え付けや活用促進を進めてきたが、機材の維持管理は、今後の重点課題となる。特に、ITCでは機材更新や修理のための予算が少ないため、定期的な保守・点検の徹底化を図ることで、故障などのトラブル回避に努力する必要がある。また、国内に代理店がなく、ITCとしても調達のノウハウがない機材の付属品については、プロジェクト終了までに十分な予備を確保しておくような長期的な視点が必要となる。消耗品については、企業研修サービスなどの収益活動を行うなどして、各学科が独自に自立性を確保することが可能である。

(4) 技術面については、国際コンソーシアムが今後も技術支援の役割を果たすことが期待できる。また、本プロジェクトで構築・強化されたITC教員と日本の大学教官との結びつきによる

[8] 現在、ITCが対外的に実施している調査は次の2つである。①インターン受入れ企業による学生評価（評価シートを学生に持たせて企業に回答してもらい、単位認定の1つの指標とする）、②卒業生への進路調査（卒業3カ月後に、各学科の秘書が卒業生に電話で就職先、業務内容と大学での学習内容との一致状況、給与などについてヒアリングする）

技術支援が期待できる。現在、日本で学位取得できるスキームが少なく、留学による教員の能力強化といった機会は限定的であるが、フランス政府が提供する奨学金制度などが活用できるため、今後も留学機会は一定程度確保されると思われる。

３－６　促進要因

(1) 対象3学科の教員の52%がAUN/SEED-NETプロジェクトを通して、日本をはじめタイ、インドネシア、マレーシアなどのアセアン諸国で修士・博士の学位を取得している（電気・エネルギー学科で22名中13名、産業機械学科で21名中7名、地球資源・地質工学科で13名中9名）。AUN/SEED-NETプロジェクトにより教員の能力が強化されていたと同時に、日本など受入れ側の指導教員とITC教員の間にネットワークが形成されていたことも大きな促進要因といえる。

(2) 17大学によるITC支援の枠組みである国際コンソーシアムを通して多くの教員がフランスなどで学位を取得しており、ITCの教育水準の向上という点でも大きな促進要因である。

３－７　阻害要因

長期専門家が派遣される前に供与機材とその仕様が決まっていた。これは機材の納入時期を早めるという意味でプラスの面もあったが、幾つかの機材については、オペレーションに不可欠な付属品やスペアがリストから漏れていたために活用できず、プロジェクトで対応する必要が生じた。また、地球資源・地質工学科に対しては文化無償資金協力で機材供与が行われたが、不可欠な機材のリスト漏れ、取扱説明書の不備・不完といった問題が多く、プロジェクトで対応に追われ、機材活用が遅れた。

第４章　結論と提言

４－１　結論

5 項目評価結果の要約は次のとおりである。

5 項目評価の要約

評価項目	評価結果
1. 妥当性	産業人材育成を支える政策支援は一貫しており、プロジェクトが対象となる産業ニーズに対応していることから、妥当性は高い。
2. 有効性	有効性は中程度である。今後、プロジェクトの効率性が高まればプロジェクト目標の達成も可能である。
3. 効率性	効率性には一部課題がある。特にプロジェクトマネジメントは、適切な分野や時期に専門家を派遣することやカウンターパートが活動により深くかかわることを通じて、強化される必要がある。
4. インパクト	ITCの卒業生は産業界やITCの学術的な発展の影響から評価されており、インパクト（予測）は高い。
5. 持続性	持続性についても一部課題が予想される。機材の維持管理には、特に注意が必要である。

４－２　提言

提言の内容は以下（1）から（3）のとおりである。

（1）ITCマネジメント（学長・副学長）に対する提言

・ 産業連携オフィスを含め、ITCとして、卒業生に対する企業の評価や産業界のニーズを把握するための定期的な調査を制度化すること。

・ 対象3学科から提案された機材計画をもとに機材の適切な使用や維持管理を行うための計画策定を行うこと。

（2）プロジェクト事務所と対象3学科に対する提言

・ プロジェクトの進捗に関してTV会議を通じて定期的に短期専門家とコミュニケーションをとること。

・ プロジェクト管理の強化、教育手法の開発や適切な機材管理のための仕組み（機材リスト、消耗品・付属品等の在庫リスト、代理店との連絡経路の確立、消耗品の補充に必要なコスト把握、定期保守・点検の方法等）を作るために、毎月あるいは隔月ごとに定期会合をもつこと。

・ 必要な機材の付属品や部品をプロジェクト期間終了までに調達すると同時に、機材管理の計画と同時に企業への研修提供といった収益活動のプランを策定し、活動計画に位置づけること。

・ 最終的にプロジェクト目標を期間内に達成するために、2014年1月末までに個々の活動の実施者とスケジュールを記載した後半の活動の詳細な計画を策定すること。

・ 効果的な本邦研修を実施するため、日本人専門家と対象の学科長及びITC教員と綿密な協議

を行い、研修目的や内容を明確にしたうえで研修を実施すること。

（3）JICAに対する提言

- 専門家の多くが現役の大学教員であり頻繁にITCを訪問できないことから、大学の退職教員などを比較的長期の専門家として派遣することも検討すること。
- 現在、別途、無償資金協力事業が進んでいる。JICAは文化無償資金協力と本プロジェクトの経験から学んだ教訓に基づき、機材の効果的設置に留意すること。
- 日本人専門家間のコミュニケーション・連携（特に学科を越えたコミュニケーション・連携）は十分に円滑とはいえないことから、JICAは定期的に関係大学が集まる会合を開催するなどを通じて、より密接なコミュニケーションを図ること。また各種資料の共有も、各学科の代表者のみに共有するのではなく、関係者全員に行き渡るように努めること。

第５章　団員による調査結果・所感

５－１　団長調査結果・所感

JICA人間開発部高等技術教育課　課長　田中努

ITCは本プロジェクトのほかにこれまでAUN/SEED-NETの対象校として長らくJICAの協力対象となってきたが、技術協力プロジェクトの実施拠点として直接的な協力を受けることは初めてであり、日本でPh.D.を取得した留学経験者が多数C/Pに含まれていても、プロジェクト活動が円滑に進まなかった面がある。特にITC関係者によるPDMに対する基本的理解が十分ではなかったことが原因の1つと考えられる。例えば、「成果１」は順調に取り組まれていたが、「成果２」及び「成果３」については取り組みが必ずしも十分ではなく、関係者がPDMを十分に意識しながら活動をしてこなかったケースがあったと考えられる。ついては、今後は前述のプロジェクトが発現すべき成果を十分に意識しながら進められることを期待する。

東京工業大学高田教授（チーフアドバイザー）をはじめとする本邦支援大学の中核的な先生方の献身的な協力には深く感謝する。一方で、本プロジェクト協力への関心が必ずしも高くない支援大学の先生が存在するのも事実であり、本部側でも高田先生をはじめとする先生方とも相談のうえ、そういった先生方の理解促進や協力インセンティブの創出等について改善できればと考える。1つは、プロジェクトに対する十分な理解が得られていない点があり、JICA側からの十分な説明や情報共有に留意していきたい。

５－２　工学教育/チーフアドバイザー調査結果・所感

東京工業大学大学院理工学研究科国際開発工学専攻　教授　高田潤一

これまで約20年にわたっていくつかのJICAの工学系高等教育プロジェクトに専門家としてかかわってきたものの、チーフアドバイザーを務めたのは初めてのことであり、しかも現地に駐在せず短期のシャトル派遣であったことから、現地調整員の岩舘氏の全面的な支援なしにはとてもプロジェクトは回らなかった。PDMの書き方1つとっても、ITCと日本側専門家の間ではある程度共通理解を得ていたものの、その内容はPDMの文言とは必ずしも一致しておらず、当初はJICA本部との理解の相違に当惑した。さらに、今回の中間レビュー調査の結果、これまでのITC側の取り組みのいくつかについては、会議の席で耳にしていた状況と実態とが異なっていることも判明した。このため、中間レビューの機会にPDMを改定して、実状に沿った活動内容と具体的なエビデンスに基づく評価の指針を明確にした。この一連の経験のなかで、実態に沿ったPDM作成の重要性を痛感した。

これまでAUN/SEED-NETプロジェクトにかかわってきた本邦大学関係者はITCの潜在的なレベルの高さをよく認識している。しかしながら、本プロジェクトにおける協力大学の選定にあたっては、3分野のうちの産業機械工学分野では国際協力事業への参加経験者が全くいない体制となったため、プロジェクトに関する理解を得て協力頂くまでに長い時間を必要とした。国立大学には派遣法に基づいて給与補填が行われるものの、教員個人にとっては、通常業務にプロジェクトへの協力が付加されるだけで、当人の使命感・達成感以外には特段の見返りもなく、国際協力事業へのインセンティブがないことは、私がJICA事業への協力を始めた20年前に既に言われていたこ

とで、この点について全く進歩がないことを改めて痛感した。しかしながら、顔の見える関係を通じて協力関係を築く努力が重ねられた結果、ようやく信頼関係が構築されつつある。ITC教員を研修員として本邦大学へ受入れた本人教員からは、ITC教員の熱心さと潜在的能力の高さを評価する声が多く聞かれている。優秀なITC教員が博士課程学生として日本の大学に留学し、立派な研究成果を修めて帰国し、次の世代の人材育成に当たる、というのが、日本側教員のインセンティブとして働くことも期待できる。残り2年間、より効果的な協力体制でプロジェクトを進めて行きたい。

付　属　資　料

１．現行PDM

２．改訂PDM

３．協議議事録（M/M）（合同評価報告書を含む）

４．質問票（短期専門家対象/ITC教員対象）

Project Design Matrix (PDM)

Project Title: The Project for Educational Capacity Development of Institute of Technology of Cambodia (ITC)
Duration: Four years
Target Group : Academic staff of three target Departments of ITC (Electrical and Energy Engineering, Industrial and Mechanical Engineering, and Geo-resources and Geotechnical Engineering)

Narrative Summary	Objectively Verifiable Indicators	Means of verification	Important Assumptions
(Overall Goal) Graduates with stronger practical skills are developed by the target departments of ITC.	1. 70% of employers of ITC graduates consider graduates after the Project have stronger practical skills than those before the Project.	➢ Questionnaire/Interview with employers in public and private sectors	
(Project Purpose) The quality of education is improved with more emphasis on practice and experiments at the target departments of ITC as a leading university.	1. Evaluation committee to be established for the Project assesses the quality of education is improved with more emphasis on practice and experiments.	➢ Result of evaluation by the evaluation committee for the Project	➢ Trained academic staff stay with ITC
(Outputs) 1. Syllabus for course works is improved with more practice and experiments.	1.1. Ratio of practice and experiments in curriculum increases. 1.2. Number of students per equipment decreases. 1.3. Number of revised syllabus 1.4. Number of revised instruction for practices and experiments	➢ Record of each Department of ITC	
2. Teaching method of academic staff is enhanced to conduct practice-oriented education.	2.1. All heads of the departments consider capacity of academic staff is enhanced to conduct practice-oriented education. 2.2. Faculty Development activity is regularly conducted.	➢ Record of each Department of ITC ➢ Questionnaire/Interview to heads of departments ➢ Record of faculty development activity	
3. Equipment for experiments is properly utilized for practice and experiment.	3.1. Regulation for utilization of equipment is developed. 3.2. Periodical review is conducted by the taskforce.	➢ Record of each Department of ITC, Reports from taskforce on periodical review	
(Activities) 1-1. Set up a taskforce for syllabus revision. 1-2. Review and revise syllabus and instruction for practices and experiments. 1-3. Conduct a periodical review on the implementation of the revised syllabus and instruction for practices and experiments. 2-1. Train academic staff by model teaching by Japanese and/or ASEAN country experts. 2-2. Train academic staff by joint research activities with Japanese and/or ASEAN country experts. 2-3. Conduct Faculty Development activities to share good practices in teaching among academic staff 3-1. Set up a taskforce for utilization of equipment. 3-2. Develop a regulation for utilization of equipment. 3-3. Conduct a periodical review on utilization of equipment by the taskforce.	Inputs 1. JICA a) Long-term Experts: Chief Advisor and Project Coordinator b) Short-term Experts: Three to four experts per department per year from Japan and/or ASEAN country c) Provision of equipment d) Short-term training of academic staff in Japan: three to four staff per department per year 2. Cambodia a) Assignment of necessary administrative and academic staff for implementation of the Project b) Provision of office space for experts c) Provision of maintenance costs of facilities and equipment d) Provision of running expenses for the implementation of the Project		Preconditions ➢ Needs for the engineering fields do not change drastically.

Project Design Matrix (PDM)

Project Title: The Project for Educational Capacity Development of Institute of Technology of Cambodia (ITC)
Duration: Four years
Target Group : Academic staff of three target Departments of ITC (Electrical and Energy Engineering, Industrial and Mechanical Engineering, and Geo-resources and Geotechnical Engineering)

Revised on Dec. 5, 2013

Narrative Summary	Objectively Verifiable Indicators	Means of verification	Important Assumptions
(Overall Goal) Graduates with stronger practical skills are developed by the target departments of ITC.	The ITC interns are highly evaluated by the companies which receives them.	Survey results on companies' evaluation on the ITC interns	
(Project Purpose) The quality of education is improved with more emphasis on practices and experiments at the target departments of ITC as a leading university.	1. The rate of satisfaction of the fifth-year students increases. 2. The evaluation on the quality of education given by the Japanese experts improves. 3. The information on equipment is updated in each semester, and necessary consumable supplies and materials are prepared.	1. Survey results on the fifth-year students' performance 2. Evaluation results by the Japanese experts 3. Records of the surveys on equipment and consumable supplies and materials	➢ Trained academic staff stay with ITC
(Outputs) 1. Coursework in the target departments is improved with more practices and experiments.	1.1 The ratio of practices and experiments to lectures in coursework increases. 1.2. The number of students per equipment decreases. 1.3. 100 % of the subjects in which new equipment is installed is improved with more practices and experiments. 1.4. 100 % of the student laboratory manuals for the above improved subjects is drafted.	1.1 Survey results on the ratio of practice and experiments to lectures in each syllabus in the target departments 1.2 Survey results on the number of students per equipment 1.3 List of the subjects with more practices and experiments in the target departments 1.4 List of the revised students laboratory manuals in the target departments	
2. Teaching method of academic staff is enhanced to conduct practice-oriented education.	2.1 Model teaching conducted by the Japanese and/or ASEAN country experts are shared and applied to their teaching among the teaching staff of the target departments. 2.2 The lessons learned from the knowledge and skills of the training participants in Japan are shared with the other members of the target departments.	2.1 Records of the sharing and applying activities of the model teaching given by Japanese and/or ASEAN country experts 2.2 Records of the sharing and applying activities of the lessons learned in the target departments	

3. Equipment for experiments is properly utilized for practice and experiment.	3. The survey on the conditions and utilization of the equipment and consumable supplies and materials is implemented by each department in each semester.	3.1 List of regulations for utilization of equipment in each three department 3.2 Survey results on the conditions of equipment and consumable supplies and materials in each three department.	
(Activities) 0. Conduct periodical survey of satisfaction of companies received ITC interns, of satisfaction of the fifth-year students, and of satisfaction on the quality of education in the target departments. 1-1. Set up a taskforce in each department for the revision of coursework. 1-2. Review and revise coursework and student laboratory manuals for practices and experiments. 1-3. Conduct a periodical review on the implementation of the revised coursework and student laboratory manuals for practices and experiments by the taskforce in each department and Japanese experts. 2-1. Train academic staff by model teaching by Japanese and/or ASEAN country experts. 2-2. Train academic staff by guidance on research methodology by Japanese and/or ASEAN country experts 2-3. Conduct sharing activities of model teaching and lessons learnt of the training in Japan and discuss how to apply to their teaching among academic staff. 3-1. Organize a taskforce in each department for utilization of equipment. 3-2. Develop a regulation for utilization of equipment. 3-3. Conduct surveys on the conditions and the utilization of equipment, consumable supplies and materials in each semester by the taskforce and Japanese experts.	Inputs 1. JICA a) Long-term or short-term Experts: Chief Advisor and Project Coordinator b) Short-term Experts: Three to four experts per department per year from Japan and/or ASEAN country c) Provision of equipment d) Short-term training of academic staff in Japan: three to four staff per department per year 2. Cambodia e) Assignment of necessary administrative and academic staff for implementation of the Project f) Provision of office space for experts g) Provision of maintenance costs of facilities and equipment h) Provision of running expenses for the implementation of the Project		Preconditions ➢ Needs for the engineering fields do not change drastically.

MINUTES OF MEETING
BETWEEN
THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF KINGDOM OF CAMBODIA
ON
THE JAPANESE TECHNICAL COOPERATION FOR THE PROJECT FOR EDUCATIONAL CAPACITY DEVELOPMENT OF INSTITUTE OF TECHNOLOGY OF CAMBODIA

The Mid-term Review Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. Tsutomu Tanaka, conducted an evaluation study from Nov. 24th to Dec. 7th, 2013, for the purpose of the mid-term review on the Project for Educational Capacity Development of Institute of Technology of Cambodia (hereinafter referred to as "the Project").

During its visit to the Kingdom of Cambodia, the Team had collected relevant data and information, and had a series of meetings with the authorities and organizations concerned.

As a result of the discussions, the Japanese side and the Cambodian side agreed upon the Joint Mid-Term Review Report attached as appendixes.

Phnom Penh
December 5, 2013

Mr. Tsutomu Tanaka
Team Leader
Mid-term Review Team
Japan International Cooperation Agency (JICA)
Japan

H.E. Lav Chiv Eav
Under Secretary of State
Ministry of Education, Youth and Sport
Kingdom of Cambodia

Dr. Romny OM
Director
Institute of Technology of Cambodia
Kingdom of Cambodia

JOINT MID-TERM REVIEW REPORT

THE PROJECT FOR EDUCATIONAL CAPACITY DEVELOPMENT OF INSTITUTE OF TECHNOLOGY OF CAMBODIA

(Oct. 2011-Oct.2015)

Joint Mid-term Review Report

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9. Contribution from ITC for the Project
10. Evaluation Grid

List of Abbreviations and acronyms

AUN/SEED-NET project	ASEAN University Network/Southeast Asia Engineering Education Development Network Project
C/P	Counterpart
EEE	(Department of) Electrical and Energy Engineering (or GEE in French)
GGE	(Department of) Geo-resources and Geotechnical Engineering (or GGG in French)
IME	(Department of) Industrial and Mechanical Engineering (or GIM in French)
ITC	Institute of Technology of Cambodia
JICA	Japan International Cooperation Agency
JCC	Joint Coordinating Committee
M&E	Monitoring & Evaluation
M/M	Minutes of Meetings
MoEYS	Ministry of Education, Youth and Sport
MTR	Mid Term Review
ODA	Official Development Assistance
O&M	Operation and Maintenance
PD	Project Director
PDM	Project Design Matrix
PM	Project Manager
PO	Plan of Operation
R/D	Record of Discussion
RGC	Royal Government of Cambodia
USD	US dollar

1. OUTLINE OF THE MID TERM REVIEW

1-1 PROJECT OVERVIEW

1-1-1 Background

The share of industrial sector in GDP in Cambodia is limited to 23.5%, and major industries are garment and construction industries. The diversification of industries and expansion of mineral industry are regarded as necessary steps for further economic growth of Cambodia.

The Royal Government of Cambodia (hereinafter referred to as "RGC"), with its National Development Strategy named "Rectangular Strategy", is making efforts for the promotion of trade and investment, development of small & medium sized companies, and development of human resources with skills matching to the needs of the labor market. However, business community including foreign investors is facing the shortage of engineers and technicians who can manage or design the production lines of factories.

On the other hand, development of mineral resources is progressing in recent years in Cambodia because of the improvement of technology and the progress of removal of landmines.

Under these circumstances, RGC requested the Japanese Government for assistance to improve educational capacity of Institute of Technology of Cambodia (ITC). In Response to this official request, the Project for Educational Capacity Development of Institute of Technology of Cambodia started in October 2011 for the period of four years.

The Mid-term Review Team for the project, organized by the representatives of Cambodian side and JICA, will evaluate the achievements and implementation process of the project by using the evaluation five criteria and derive reform measures for achieving the expected outputs and the project purpose.

1-1-2 Narrative Summary of the Project

The Project is summarized according to the original PDM (13 October 2011) as below:

Overall Goal	Graduates with stronger practical skills are developed by the target departments of ITC.
Project Purpose	The quality of education is improved with more emphasis on practice and experiments at the target departments of ITC as a leading university.
Output 1	Syllabus for course works is improved with more practice and experiments.
Output 2	Teaching method of academic staff is enhanced to conduct practice-oriented education.
Output 3	Equipment for experiments is properly utilized for practice and experiment.

For a complete version, please see the attached original PDM (Annex 1).

1-2 OBJECTIVES OF THE MID TERM REVIEW

The main objectives of the Mid Term Review are as follows:

1) To verify the accomplishments of the Project compared to those planned;
2) To identify obstacles and/or facilitating factors that have affected the implementation process;
3) To analyze the Project in terms of the five evaluation criteria (i.e. Relevance, Efficiency, Effectiveness, Impact and Sustainability); and
4) To make recommendations on the Project regarding the measures to be taken for the 2nd half of the

project, including modification of PDM and PO.

1-3 MEMBERS OF THE JOINT EVALUATION TEAM

Cambodian side

1) H.E. Lav Chiv Eav, Under Secretary of State, MoEYS
2) Dr. Romny OM, Director of ITC, Project Manager

Japanese side

1) Team Leader: Mr. Tsutomu TANAKA, Director, Technical and Higher Education Division, Human Development Department, JICA
2) Engineering Education: Dr. Jun-ichi TAKADA, Professor, Tokyo Institute of Technology
3) Cooperation Planning: Mr. Keiichiro TANIGUCHI, Special Advisor, Technical and Higher Education Division, Human Development Department, JICA
4) Evaluation Analysis: Mr. Kaneyasu IDA, Senior Consultant, Tekizaitekisho LLC

1-4 SCHEDULE OF THE MID TERM REVIEW

The Review was conducted from 24 November to 7 December 2013 as follows.

Date	Activities	Members
24-Nov	Arrive in Phnom Penh, Cambodia	Ida
25-Nov	Courtesy Call to Institute of Technology of Cambodia (ITC) Interview with Director and Deputy Director	Ida
	Interview with Japanese experts	Ida
26-Nov	Interview with lecturers from GEE	Ida
	Interview with lecturers from GIM	Ida
27-Nov	Interview with Japanese experts	Ida
	Interview with lecturers from GGE	Ida
28-Nov	Document review and documentation	Ida
	Interview with students at GEE	Ida
29-Nov	Interview with H.E. Laov Him, Director General of TVET, MLVT	Ida
	Interview at Department of Higher Education, MOEYS, (Mr. You Vireak, Deputy Director of Department of Higher Education)	Ida
	Interview with JETRO (Mr. Doho, Chief Representative)	Ida
	Interview with Cambodian Chamber of Commerce (Mr. Yun Sovanna, Project Manager and Mr. Hong Setha, lead consultant, Support to G-PSF project)	Ida
30-Nov	Report writing	Ida
1-Dec	Arrive in Phnom Penh, Cambodia Internal Meeting	Taniguchi Ida
2-Dec	Courtesy Call to JICA Cambodia Office Courtesy Call to H.E. Yuok Ngoy, Secretary of State of MoEYS	Taniguchi & Ida
	Interview with and visit to GEE, GIM and GGE Meeting with experts	Takada, Taniguchi, Ida
3-Dec	Internal Meeting (Finalizing M/M draft) / Sending M/M draft to stakeholders Mr. Tanaka will arrive in Phnom Penh, Cambodia	Taniguchi, Takada & Ida Tanaka
4-Dec	Discussion on Joint Mid-term Evaluation Report and M/M with MoEYS, ITC and other concerned parties Finalizing the draft of MM	Tanaka, Taniguchi, Takada & Ida
5-Dec	Meeting to get approval on Joint Mid-term Evaluation Report & Signing of M/M with ITC and Ministry of Education, Youth, and Sports (MoEYS)	Tanaka, Taniguchi, Takada & Ida

	Report to JICA Office, Phnom Penh	
6-Dec	Report to EOJ, Phnom Penh Leaving for Japan	Tanaka Taniguchi & Ida
7-Dec	Arrive in Japan	

1-5 METHODOLOGY OF EVALUATION

1-5-1 Evaluation Framework

The Mid-term Review Team (hereinafter referred to as "the Team") reviewed related documents and information collected through questionnaires and interviews with Cambodian counterpart personnel, Japanese experts and relevant stakeholders. The Team analyzed the Project from the viewpoints of 1) achievements of the project, 2) implementation process, and 3) the five evaluation criteria.

(1) Achievements of the Project

Achievements of the Project were measured in terms of Inputs, Outputs, Project Purpose and Overall Goal in comparison with the Objectively Verifiable Indicators of the PDM.

(2) Implementation Process

Implementation process of the evaluated Project was reviewed to see if the activities have been implemented according to the schedule outlined in the PO, and to see if the Project has been managed properly as well as to identify contributing and/or hampering factors that have affected the implementation process.

(3) Evaluation based on the Five Evaluation Criteria

The project is analyzed and based on the 5 Evaluation Criteria as described below:

Five Evaluation Criteria

1. Relevance	A criterion for considering the validity and necessity of a project regarding whether the expected effects of a project (or project purpose and overall goal) meet with the needs of target beneficiaries; whether a project intervention is appropriate as a solution for problems concerned; whether the contents of a project is consistent with policies; whether project strategies and approaches are relevant, and whether a project is justified to be implemented with public funds of ODA.
2. Effectiveness	A criterion for considering whether the implementation of project has benefited (or will benefit) the intended beneficiaries or the target society.
3. Efficiency	A criterion for considering how economic resource/inputs are converted to results. The main focus is on the relationship between project cost and effects.
4. Impact	A criterion for considering the effects of the project with an eye on the longer term effects including direct or indirect, positive or negative, intended or unintended.
5. Sustainability	A criterion for considering whether produced effects continue after the termination of the assistance.

Source: JICA Guideline for Project Evaluation (2004)

1-5-2 Modification of Project Design Matrix (PDM)

For evaluation of a technical cooperation of JICA, Project Design Matrix (PDM) is used as one of the essential documents. During the Review, PDM was modified through discussions among all concerned and revised into PDM_1. The major part of the modification is explained as below, and for a complete one, please see ANNEX-2.

	PDM0	PDM1	Reasons
Output 1	Syllabus for course works is improved with more practice and experiments.	Coursework in the target departments is improved with more practices and experiments.	The project's focus is on the improvements of course work with more practice and experiments
Activity 0	-	Conduct periodical survey of satisfaction of companies received ITC interns, of satisfaction of the 5th year students, and of satisfaction on the quality of education in the target departments	It is necessary to conduct periodical survey to measure the level of achievements at the Project Purpose and Overall Goal.
Activity 1-1	Set up a taskforce for syllabus revision.	Set up a taskforce in each department for the revision of coursework.	The taskforce is required to be established in each department.
Activity 1-2	Review and revise syllabus and instruction for practices and experiments.	Review and revise coursework and student laboratory manuals for practices and experiments.	It is necessary to specify the products as a result of the activity.
Activity 1-3	Conduct a periodical review on the implementation of the revised syllabus and instruction for practices and experiments.	Conduct a periodical review on the implementation of the revised coursework and student laboratory manuals for practices and experiments by the taskforce in each department and Japanese experts.	It is necessary to specify the products as a result of the activity and the actors of this activity.
Activity 2-2	Train academic staff by joint research activities with Japanese and/or ASEAN country experts.	Train academic staff by guidance on research methodology by Japanese and/or ASEAN country experts	The focus on the Output 2 is not the research activities, but educational activities.
Activity 2-3	Conduct Faculty Development activities to share good practices in teaching among academic staff	Conduct sharing activities of model teaching and lessons learnt of the training in Japan and discuss how to apply to their teaching among academic staff	It is necessary to specify what activities are expected to do as Faculty Development activities.
Activity 3-1	Set up a taskforce for utilization of equipment.	Organize a taskforce in each department for utilization of equipment.	The taskforce is required to be established in each department for utilization of equipment.
Activity 3-3	Conduct a periodical review on utilization of equipment by the taskforce.	Conduct surveys on the conditions and the utilization of equipment, consumable supplies and materials in each	It is necessary to specify what surveys should be conducted for effective use and maintenance of equipment.

		semester by the taskforce and Japanese experts.	
Inputs for JICA side	Long-term Experts: Chief Advisor	Long-term or Short-term Experts: Chief Advisor	It is revised because of the actual input.
Objectively Verifiable Indicators			Some of the indicators are modified and clarified with quantitative targets.

Improvements of course work include the increased number of subjects with practices and experiments, the increased hours spent for practices and experiments, the improved ratio of students per equipment, and the introduction of student laboratory manuals.

The objectively verifiable indicators have also been modified with the aim to give clear definition to the indicators with quantitative targets. Means of verification have been modified accordingly. For details, please see attached PDM$_1$ (Annex-2).

2. ACHIEVEMENTS AND IMPLEMENTATION PROCESS

2-1 INPUTS

2-1-1 Japanese Side

1) Japanese Experts and Experts from ASEAN countries: A total of 19 experts has been appointed for 5 positions: 1) Chief Advisor (one short-term), 2) Project Coordinator (one long-term), 3) Industrial and Mechanical Engineering (7 short-term), 4) Geo-resources and Geotechnical Engineering (6 short-term, including one short-term from Indonesia), and 5) Electrical and Energy Engineering (4 short-term, including one short-term from Thailand). Total M/M is 4.2 M/M. (See ANNEX-3)
2) Training in Japan: A total of 24 counterparts (9 from EEE, 9 from IME and 6 from GGE) attended the Counterpart Training in Japan from ITC (See ANNEX-4)
3) Equipment: A total of USD 1,611,462 worth equipment has been provided. (See ANNEX-5-1, 2 &3) Equipment for GGE was provided by cultural grant aid of the Japanese Government.
4) Operational Budget: A total of USD 64,817.23 has been spent up to November 30, 2013 for general operation. (See ANNEX-7)

2-1-2 Cambodian Side

1) C/Ps: A total of 3 personnel has been appointed as the main counterpart of the project. (See ANNEX-8-1) Project Director is assigned from the position of Secretary of State of MoEYS, and Project Manager is assigned from the position of Director of ITC. Faculty members (Technical C/Ps) are assigned in each department in the number of 22 in Industrial and Mechanical Engineering Department, 21 in Electrical and Energy Engineering Department, and 13 in Geo-resources and Geotechnical Engineering. (See ANNEX 8-2 &3)
2) Office: Offices for experts have been provided in good conditions.
3) Operational costs: A total of 860,740 USD from ITC was allocated. For details, please see Annex-8. (See ANNEX-9)

2-2 ACHIEVEMENTS OF THE PROJECT

2-2-1 Outputs

In order to achieve the Project Objective, three (3) outputs are specified in PDM of the Project. The achievement and review of each output based on the revised indicators is summarized as follows:

Output 1: Syllabus for course works is improved with more practice and experiments.

1-1 Ratio of practice and experiments in curriculum increases.

After the equipment is provided, the subjects in which the new equipment is utilized have more practices and experiments. The number of practices and experiments increased as follows:

Department	Hours used for practices and experiments	
	Before the Project	As of November 2013
EEE	448	560
IME	80	224
GGE	0	112

(Sources: EEE, IME and GGE)

1-2 Number of students per equipment decreases.

In EEE department, most of the provided equipment has been utilized for experiments. One class is limited to 30 students and the class is usually divided into five to six groups and one set of equipment is available for five to six students. In IME department, approximately 80% of the new equipment is utilized by a group of 5 - 6 students. GGE department is very new and the number of practical work (experiments and field work) has been drastically increased. Now fieldwork has been made possible for five subjects and necessary tools are available for each student. The equipment such as microscopes has been used recently and started to be used by a group of two students per microscope and one set of tools for each student for the fieldwork.

1-3 Number of revised syllabi

Changes to the existing curricula require the approval of the international consortium. Therefore, basically the project revises the existing syllabi related to practices and experiments.

1-4 Number of revised instruction for practices and experiments

Department	The number of subjects	The number of topics for which manuals have been drafted	The number of topics for which manuals need to be prepared
EEE	18	61	79
IME	9	34	36
GGE	9	Not yet decided.	Not yet decided.

(Sources: EEE, IME and GGE)

EEE works on 18 subjects. Each subject consists of several topics; therefore, a student laboratory manual needs to be developed for each topic or experiment. The manuals have been mostly drafted for the topics that equipment is available for use. The manuals for three subjects or 18 topics have not yet drafted because equipment is still fully operational. Some manuals are waiting for feedback from the Japanese experts. In total, 77 % of the necessary student laboratory manuals (61 topics out of 79) and for GIM (34 topics out of 36) have been drafted. For IME, some topics under "Strength of materials", "Mechanical constructions", "Heat exchangers" and "Theory of engines" need to be checked by the Japanese experts or other ITC

lecturers before finalization. One more topic will be added to "Theory of engines".

GGE has not focused its efforts on the development of student instruction manuals, but worked on the development of the operation manual for each set of equipment. Therefore, the taskforce members need to discuss in consultation with the Japanese experts to decide the number of manuals to be developed. In February 2014, three lecturers are scheduled to have training in Japan (Hokkaido University and Kyushu University). GGE plans to draft the manuals before the training and finalize them in Japan after receiving feedback from the Japanese experts.

According to the original Plan of Operations, the activities of revision of syllabi and student laboratory manuals will be completed by the first year of the project. However, because of the delay of installation of equipment, the revision of syllabi and making student laboratory manuals are also behind the schedule. The periodical reviews on the revision and utilization of syllabi and student laboratory manuals have not been conducted yet.

Output 2: Teaching method of academic staff is enhanced to conduct practice-oriented education.

2-1 All heads of the departments consider capacity of academic staff is enhanced to conduct practice-oriented education.

The heads of departments recognized the improvements due to the facts that by utilizing the lab equipment, the lecturers are improving coursework and more mini-projects are being conducted. The lecturers can utilize the equipment that has been procured to replace the old ones and also the equipment that is easy-to-use. Yet, the lecturers still need to be specialized in the use of equipment that has been newly introduced to ITC.

2-2 Faculty Development activity is regularly conducted.

Each department organizes the staff meeting. This is the occasion when the lecturers discuss on teaching methods, yet the discussion on teaching methods is one of the agendas of the staff meeting. The other opportunity to learn teaching methods is when the Japanese experts visit the department and conduct model lectures and make presentations.

EEE department organizes the staff meeting twice a month. In three occasions, experts came and made presentation. Each time, ITC requests the expert the agenda and contents (e.g., curriculum development, teaching methods, telecommunication use for agriculture) and share experience. At each seminar, all the lecturers and interested students (40 – 80 people) participated.

In IME Academic staff members (16 lecturers) have the staff meeting approximately two times a month. The minutes of the meeting is submitted to the board of director. They usually discuss teaching methods, problems about students and their understanding of topics, etc.

In GGE, the staff meeting is organized twice a month. The department is still very new, and the teaching methods have not been fully established or entrenched. Therefore, guidance given by the Japanese experts in the fielded as well as advice and presentations in the classroom were very helpful. Some subjects such as basic geological mapping could be very difficult to teach without their advice. The lecturers are much more confident than before.

Output 3: Equipment for experiments is properly utilized for practice and experiment.

3-1 Regulation for utilization of equipment is developed.

Each department has some rules for the management of equipment. Such rules include the assignment of one teaching staff member to supervise the equipment in the department and one laboratory assistant to support students, and reporting of problems by the teaching staff to the head of the department.

At present, the priority for the three departments is the installation and utilization of equipment for

teaching. Not much attention has been paid to the management system partly because the equipment does not require much maintenance yet and some pieces do not need much maintenance.

In EEE department, most of the equipment is functional except for some equipment from Indonesia (low quality parts in telecommunication experiment kits and electricity and electronic experiment sets). EEE is negotiating with the agent to solve the problem. The more familiar with the use of equipment, the more the lecturers realize they need more accessories. Therefore, they need to discuss more often among the lecturers and with the Japanese experts and make sure all the necessary accessories should be procured before the end of the project duration. Also, the staff members must be well exposed to the equipment, particularly the operation of software.

In IME department, the immediate goal is for all the lecturers to be able to fully utilize the equipment for teaching. Some equipment is not yet used properly. They feel they should also introduce proper laboratory management system including the maintenance of equipment, safety guidance and environmental management.

In GGE department, a formal system needs to be introduced to manage equipment. The lecturers were busy installing and familiarizing themselves with the equipment. The system that the department started to install is the identification numbers attached to each piece of equipment and a logbook to manage small tools.

3-2 Periodical review is conducted by the taskforce.

As mentioned in 3-1, monitoring is mostly done by the assigned staff members by reporting problems to the head of the department.

2-2-2 Project Purpose

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

1-1 Evaluation committee to be established for the Project assesses the quality of education is improved with more emphasis on practice and experiments.

No evaluation committee has been established exclusively for the project. The existing systems for the evaluation of quality of education include the accreditation made by Accreditation Committee of Cambodia, and the approval of the curricula of ITC by the International consortium of 17 universities from Thailand, France, Japan, and Belgium (2014 – 2018) based on the annual report of ITC on its academic performance. Under this framework, credits obtained at ITC can be recognized at the recipient universities and the Fifth year student at ITC is recognized as the 1st year M.Sc. student by member universities in Belgium, France and Spain. Every year, approximately 60 students study abroad at or through arrangements with member universities. This manifests the academic levels of ITC to some extent.

No objectively verifiable indicator specific to this project is available to measure the improvements of the quality of education at the three target departments. The mid-term review team had the following findings: according to the interviews to selected students, the quality of education has been improved with the utilization of equipment, the introduction of more experiments and student laboratory manuals. Yet, further improvements are necessary, particularly in the specialization of new equipment.

2-2-3 Overall Goal

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

1-1 70% of employers of ITC graduates consider graduates after the Project have stronger practical skills

than those before the Project.

It is difficult to quantitatively measure to what extent the recent graduates have more practical skills than those who graduated earlier times before the project. One indication of good evaluation of ITC graduates is that they are very competitive in the job market for engineers. ITC conducts follow-up of its graduates every year three months after their graduation. The latest results of the study for 2012/2013 graduates are as follows:

Department	No of graduates	Employed	Continued education	Not employed	Others	Unable to contact
EEE						
Energy	47	22	5	4	0	16
Electronic and Telecommunication	43	25	8	9	1	0
Total	90	47	13	13	1	16
IME						
Mechanical	29	20	5	4	0	0
Industrial	19	15	3	1	0	0
Total	48	35	8	5	0	0
GGE						
	0	0	0	0	0	0

(EEE, IME and GGE)

2-3 IMPLEMENTATION PROCESS

(1) Technical Transfer

Progress is facilitated mainly through guidance given by short-term experts in Cambodia and counterpart training in Japan while the preparations and installation of equipment were done by the counterparts and the project coordinator.

	No of experts dispatched	Times dispatched (Total days)	No of Counterparts trained in Japan	Total months trained in Japan
EEE	6	7 (31 days)	9	9
IME	10	9 (49 days)	9	9
GGE	8	8 (34 days)	6	6

(Source: Project office)

The dispatch of short-term experts was central to the facilitation of project activities. Yet, it is difficult to dispatch experts in a timely manner and for a sufficient duration in Cambodia because short-term experts had to participate in project activities from their busy teaching and research schedule. Particularly in the first year of the project, project progress was slow as many of the short-term experts who declared participation in the project were not able to visit ITC.

Short-term experts usually stayed in Cambodia for a few days, which is not enough for the counterparts. Third country experts from Thailand and Indonesia were also dispatched for the fields that Japanese experts were not available or requests were made by the counterparts.

Training in Japan for one month is very appropriate, especially when the purposes of the training courses are discussed and specified between the participants and the universities in Japan. Using the time in Japan, the counterparts can facilitate project activities such as drafting student laboratory manual and incorporating comments by Japanese experts.

(2) Project Management

General management

At the beginning of the project, it was difficult for the project office to facilitate project progress due to the following reasons:

- The chief advisor was changed from long-term to short-term, the roles of the chief advisor were limited, and also the function of the project office is limited due to shortage of communication with experts. (Later, Skype meeting was organized monthly between the coordinator and the chief advisor.)
- With the counterparts, communication is mostly person-to-person. Formal project meetings were not organized by the project office and arrangements for inputs and looking for experts were main tasks for the project office.
- Project support committee meeting in Japan was not held so often and it did not help much for the recruitment of Japanese experts. The first meeting was held in December 2011 and the second meeting in May 2012. (After the second meeting, some activities started to move forward.)

Project progress was more facilitated in the second and the third years, more short-term experts visited ITC and the counterparts increasingly spent time setting up and utilizing equipment.

Decision-making

JCC meeting was held in December 2012 to discuss the revision of PDM. At the operational level, decision-making was not so effective because of the above-mentioned factors.

Communication

Communication was good between short-term experts and counterparts when they had developed rapport either as a result of interactions during the project or based on previous relationships developed through scholarship or exchange programs. Some fields need more interactions between the short-term experts and the counterparts to develop a close working relationship.

Promotion of project activities and sharing of information among the participants of the projects were mostly done at the individual levels. More sharing of information and project progress is necessary for the short-term experts to understand local situations.

TV conference was not often used. Yet, the meeting in May and September 2013 for IMG were effective in facilitating communication and discuss issues between the Japanese experts and the ITC counterparts. TV conference system can be an effective tool for the latter period of the project duration. If rapport with the Japanese experts is developed, the experts and counterparts will use the system more often.

(3) Ownership

All the project activities such as the development of teaching materials and the improvement of teaching methods are part of their regular activities. Therefore, the ownership of the project activities was strongly felt by the counterparts.

3. RESULTS OF THE EVALUATION BY FIVE CRITERIA

3-1 RELEVANCE

Relevance is considered to be high for the following reasons.

"Rectangular strategy for Growth, Employment, equity and efficiency" in the National Strategic Development Plan (2009 – 2013) emphasizes the human resource development for industry as a prioritized agenda. National Educational Strategic Plan (2014 – 2018) will prioritize the capacity development of teachers and upgrading of laboratories at the universities in the eight priority fields that include engineering to meet ASEAN standards. The objective of the project is clearly in alignment with the national strategy.

The project aims at improving the quality of education at ITC. This aim servers the need for quality engineers. The job prospect for graduates of IME and EEE to get a job is very high while the demand is

being generated for prospective GGE graduates. In the labor market, the immediate need is the development of skilled labor in such sectors as construction, manufacturing and agro-businesses. Therefore, targeting not the quantity but the quality of eugineers is also appropriate.

Out of 10 public universities under the Ministry of Education, only 3 of them have engineering related departments. The ministry of education has recognized ITC as the leading university in the field of engineering. Therefore, targeting ITC as the implementing organization is also appropriate.

Japan's ODA policy for Cambodia (April 2012) prioritizes the strengthening of the private sector as one of the three thrusts for the strengthening of the economy. The development of engineers for potential sectors such as manufacturing is highlighted as a means of the strengthening of the private sector. The project is in line with the ODA policy.

3-2 EFFECTIVENESS

Effectiveness is considered to be moderate for the following reasons.

It is difficult to judge progress in accordance with the indicators specified in the PDM. At present, no objectively verifiable indicator specific to this project is available to measure the improvements of the quality of education at the three target departments. A realistic, reliable indicator will be the evaluation of the teaching capacity of the academic staff by the Japanese experts at the final evaluation of the project.

The three expected outputs of improved coursework, teaching methods and proper utilization of equipment are all necessary to improve the quality of education with emphasis on practice and experiments. Tangible outputs are being produced for the Improvement of teaching methodology for coursework, but further efforts are necessary for the improvement of teaching methods and the proper utilization of equipment.

It is quite possible to improve the quality of education to a satisfactory level if the lecturers work harder to utilize the equipment for experiments and they are able to have more opportunities to learn from the short-term experts.

3-3 EFFICIENCY

Efficiency is considered to have some issues for the following reasons.

Project progress was slow in the first year and more activities were seen in the second and third years. Many of the expected outputs have been produced for Output 1 although the schedule is a little behind. On the other hands, more activities should be implemented to achieve Output 2 and 3 in the 2nd half of the project.

Communication among the participating members has been improved through increased interactions between the short-term experts and the lecturers and guidance given by short-term experts in Cambodia and counterpart training is very effective to produce good outputs. But weak project management at the operational level and difficulties to send short-term experts remain critical issues for an effective implementation of project activities.

The lecturers do not know much about the framework of the project. Also, they are not so familiar with the modality of JICA's technical cooperation. Therefore, they need more guidance on how to proceed with project activities.

3-4 IMPACT

The prospect of impacts is high for the following reasons.

ITC set up Industrial linkage Office staffed by one lecturer and one secretary in 2012 to strengthen ties with the industry, but it has not yet conducted survey to the industry about the performance of its graduates. Therefore, it is difficult to quantitatively measure to what extent the recent graduates have more practical skills than those who graduated earlier times before the project. ITC graduates are already well accepted by the industry. ITC also tries to understand the needs of the industries through meetings and feedback from the companies that accepted interns. Because the students from the fifth grades onward will be trained with more practice and experiments, companies should rate them more favorably than the previous graduates.

Other expected impacts are as follows:

- There is a scope for the lecturers to conduct research by utilizing skills and equipment obtained by the project. Research fund is available from the Ministry of Education until 2015.
- Through the project, ITC is able to get partnership with Japanese universities. ITC has signed MOU with Kyushu University, and the preparation of MOU with TIT is underway. TIT has also joined the international consortium. It is expected that ITC would expand its formal ties with other universities and develop linkage with researchers from Japan and ASEAN countries.

3-5 SUSTAINABILITY

Sustainability would probably have some issues for the following reasons.

As mentioned in 3-1, the Government policy for human resource development for the industry will be consistent and ensured by the national strategic plan until 2018.

As for the sustainability of the project outputs, practices and experiments will be continuously performed because these activities are incorporated into the course work. It is unclear how much output 2 and 3 can be secured because activities to improve teaching methods and the proper utilization of equipment have not yet been institutionalized.

For the operation and maintenance (O&M) of the equipment, the lecturers need to fully understand the methods of regular and preventive maintenance because the budget available for equipment is very small. For the same reason, ITC needs to procure accessories and spare parts before the end of the project duration while ITC may be able to procure consumables with its own budget.

For the technical aspect, the international consortium would be one platform to support ITC. Partnership with Japanese universities developed and strengthened through the project would also help ITC lecturers further develop learning opportunities. Yet, few opportunities are available to ITC lecturers and students to get scholarship in Japan.

3-6 CONTRIBUTING FACTORS

52% of the ITC lecturers received degrees through JICA-assisted AUN/SEED-Net Project (9 lecturers out of 13 from GGE, 7 lecturers out of 21 from EEE and 13 lecturers out of 22 from IME). Networks between the lecturers of ITC and the professors in several Japanese universities developed through AUN/SEED-NET project are a good advantage for Japan to implement the project.

International consortium of 17 universities (Thailand, France, Japan, Belgium) (2014 – 2018) is beneficial to the academic development of ITC. The benefits of the consortium include exchange programs with member universities and the recognition of credits obtained at ITC by member universities, etc.

3-7 HAMPERING FACTORS

The list and the specifications of the equipment were decided prior to the arrival of the project coordinator and project activities. Early arrival of equipment was an advantage for the project, but at the same time, some equipment had problems such as lack of spare parts and it took some time to utilize them for teaching. The equipment procured by cultural grant aid for GGE had more problems (e.g., lack of essential equipment in the equipment list, insufficient guidance and poor quality operation manuals).

4. CONCLUSIONS AND RECOMMENDATIONS

4-1 CONCLUSIONS

The conclusion of the evaluation is summarized as follows:

Summary of Five Evaluation Criteria

Criteria	Evaluation Results
1. Relevance	Relevance is high as the policy support for human resource development for industry is consistent and the project responds to the needs of target industries.
2. Effectiveness	Effectiveness is moderate. It is possible to achieve the project purpose if the project's efficiency is increased.
3. Efficiency	Efficiency has some issues. Particularly project management needs to be strengthened to facilitate the dispatch of experts and involve the counterparts in project activities more extensively.
4. Impact	The prospect of impacts is high as ITC graduates are highly accepted by the industry and other impacts on academic development to ITC.
5. Sustainability	Sustainability would probably have some issues; the maintenance of the equipment needs special attention.

4-2 RECOMMENDATIONS

To ITC:

- In order to evaluate the performance of graduates and understand the needs of the industries, ITC and its industrial linkage office should conduct survey periodically to obtain both qualitative and quantitative data.
- ITC should develop a plan for the proper use and maintenance of the equipment based on the proposal submitted by the three departments.

To the project office and the three departments:

- The project office and the three departments should communicate with the short-term experts to inform necessary information and progress made by ITC on a regular basis via TV conference.
- The project office (including short-term experts) and ITC including core counterparts from the three departments should have the bi-monthly or monthly meeting to strengthen the managerial aspects of the project and develop necessary systems for the development of teaching methods and the proper use and maintenance of the equipment (e.g., stock/inventory management, standardized monitoring and planning for the operation and maintenance of the equipment).
- Currently the budget available for equipment is very small, the project office and the counterpart

should make sure that all necessary accessories and spare parts be procured before the end of the project duration. In this connection, the three departments should make proposal for the O&M and revenue generation to submit to ITC.

- The project office and the three departments develop detailed plan of operation in order to successfully implement the activities and to eventually achieve the project purpose within a limited timeframe. The detailed plan of operation with names of responsible person for each activity should be prepared and agreed upon by all concerned parties by the end of January, 2014
- Before dispatching the participants of the training in Japan, the project office and the three departments should specify the purpose of the training program through discussions with Japanese experts.

To JICA:

- JICA should promote the dispatch of Japanese short-term experts to ITC by organizing the support committee meetings in Japan and taking measures to facilitate their increased participation.
- JICA should consider the dispatch of experts who are able to stay and work in ITC for weeks and months to oversee the revision of coursework and model teaching activities.
- Grant aid assistance is scheduled to ITC during the project duration. JICA should ensure the effective installation of equipment based on the lessons learned from the experiences of cultural grant aid and this project.

(END)

Project Design Matrix (PDM) **ANNEX 1**

Project Title: The Project for Educational Capacity Development of Institute of Technology of Cambodia (ITC)
Duration: Four years
Target Group : Academic staff of three target Departments of ITC (Electrical and Energy Engineering, Industrial and Mechanical Engineering, and Geo-resources and Geotechnical Engineering)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(Overall Goal) Graduates with stronger practical skills are developed by the target departments of ITC.	1. 70% of employers of ITC graduates consider graduates after the Project have stronger practical skills than those before the Project.	➢ Questionnaire/Interview with employers in public and private sectors	
(Project Purpose) The quality of education is improved with more emphasis on practice and experiments at the target departments of ITC as a leading university.	1. Evaluation committee to be established for the Project assesses the quality of education is improved with more emphasis on practice and experiments.	➢ Result of evaluation by the evaluation committee for the Project	➢ Trained academic staff stay with ITC
(Outputs) 1. Syllabus for course works is improved with more practice and experiments.	1.1. Ratio of practice and experiments in curriculum increases. 1.2. Number of students per equipment decreases. 1.3. Number of revised syllabus 1.4. Number of revised instruction for practices and experiments	➢ Record of each Department of ITC	
2. Teaching method of academic staff is enhanced to conduct practice-oriented education.	2.1. All heads of the departments consider capacity of academic staff is enhanced to conduct practice-oriented education. 2.2. Faculty Development activity is regularly conducted.	➢ Record of each Department of ITC ➢ Questionnaire/Interview to heads of departments ➢ Record of faculty development activity	
3. Equipment for experiments is properly utilized for practice and experiment.	3.1. Regulation for utilization of equipment is developed. 3.2. Periodical review is conducted by the taskforce.	➢ Record of each Department of ITC, Reports from taskforce on periodical review	
(Activities) 1-1. Set up a taskforce for syllabus revision. 1-2. Review and revise syllabus and instruction for practices and experiments. 1-3. Conduct a periodical review on the implementation of the revised syllabus and instruction for practices and experiments. 2-1. Train academic staff by model teaching by Japanese and/or ASEAN country experts. 2-2. Train academic staff by joint research activities with Japanese and/or ASEAN country experts. 2-3. Conduct Faculty Development activities to share good practices in teaching among academic staff 3-1. Set up a taskforce for utilization of equipment. 3-2. Develop a regulation for utilization of equipment. 3-3. Conduct a periodical review on utilization of equipment by the taskforce.	Inputs 1. JICA a) Long-term Experts: Chief Advisor and Project Coordinator b) Short-term Experts: Three to four experts per department per year from Japan and/or ASEAN country c) Provision of equipment d) Short-term training of academic staff in Japan: three to four staff per department per year 2. Cambodia a) Assignment of necessary administrative and academic staff for implementation of the Project b) Provision of office space for experts c) Provision of maintenance costs of facilities and equipment d) Provision of running expenses for the implementation of the Project		Preconditions ➢ Needs for the engineering fields do not change drastically.

ANNEX 2

Project Design Matrix (PDM)

Project Title: The Project for Educational Capacity Development of Institute of Technology of Cambodia (ITC)
Duration: Four years
Target Group : Academic staff of three target Departments of ITC (Electrical and Energy Engineering, Industrial and Mechanical Engineering, and Geo-resources and Geotechnical Engineering)

Revised on Dec. 5, 2013

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(Overall Goal) Graduates with stronger practical skills are developed by the target departments of ITC.	The ITC interns are highly evaluated by the companies which receives them.	Survey results on companies' evaluation on the ITC interns	
(Project Purpose) The quality of education is improved with more emphasis on practices and experiments at the target departments of ITC as a leading university.	1. The rate of satisfaction of the fifth-year students increases. 2. The evaluation on the quality of education given by the Japanese experts improves. 3. The information on equipment is updated in each semester, and necessary consumable supplies and materials are prepared.	1. Survey results on the fifth-year students' performance 2. Evaluation results by the Japanese experts 3. Records of the surveys on equipment and consumable supplies and materials	➢ Trained academic staff stay with ITC
(Outputs) 1. Coursework in the target departments is improved with more practices and experiments.	1.1 The ratio of practices and experiments to lectures in coursework increases. 1.2. The number of students per equipment decreases. 1.3. 100 % of the subjects in which new equipment is installed is improved with more practices and experiments. 1.4. 100 % of the student laboratory manuals for the above improved subjects is drafted.	1.1 Survey results on the ratio of practice and experiments to lectures in each syllabus in the target departments 1.2 Survey results on the number of students per equipment 1.3 List of the subjects with more practices and experiments in the target departments 1.4 List of the revised students laboratory manuals in the target departments	
2. Teaching method of academic staff is enhanced to conduct practice-oriented education.	2.1 Model teaching conducted by the Japanese and/or ASEAN country experts are shared and applied to their teaching among the teaching staff of the target departments. 2.2 The lessons learned from the knowledge and skills of the training participants in Japan are shared with the other members of the target departments.	2.1 Records of the sharing and applying activities of the model teaching given by Japanese and/or ASEAN country experts 2.2 Records of the sharing and applying activities of the lessons learned in the target departments	

3. Equipment for experiments is properly utilized for practice and experiment.	3. The survey on the conditions and utilization of the equipment and consumable supplies and materials is implemented by each department in each semester.	3.1 List of regulations for utilization of equipment in each three department 3.2 Survey results on the conditions of equipment and consumable supplies and materials in each three department.	
(Activities) 0. Conduct periodical survey of satisfaction of companies received ITC interns, of satisfaction of the fifth-year students, and of satisfaction on the quality of education in the target departments. 1-1. Set up a taskforce in each department for the revision of coursework. 1-2. Review and revise coursework and student laboratory manuals for practices and experiments. 1-3. Conduct a periodical review on the implementation of the revised coursework and student laboratory manuals for practices and experiments by the taskforce in each department and Japanese experts. 2-1. Train academic staff by model teaching by Japanese and/or ASEAN country experts. 2-2. Train academic staff by guidance on research methodology by Japanese and/or ASEAN country experts 2-3. Conduct sharing activities of model teaching and lessons learnt of the training in Japan and discuss how to apply to their teaching among academic staff. 3-1. Organize a taskforce in each department for utilization of equipment. 3-2. Develop a regulation for utilization of equipment. 3-3. Conduct surveys on the conditions and the utilization of equipment, consumable supplies and materials in each semester by the taskforce and Japanese experts.	Inputs 1. JICA a) Long-term or short-term Experts: Chief Advisor and Project Coordinator b) Short-term Experts: Three to four experts per department per year from Japan and/or ASEAN country c) Provision of equipment d) Short-term training of academic staff in Japan: three to four staff per department per year 2. Cambodia e) Assignment of necessary administrative and academic staff for implementation of the Project f) Provision of office space for experts g) Provision of maintenance costs of facilities and equipment h) Provision of running expenses for the implementation of the Project		Preconditions ➢Needs for the engineering fields do not change drastically

ANNEX- 3

List of Experts from Japan and ASEAN Countries (From October 2011 to November 2013)

1. Long Term Expert

	Name	Designation/Expertise	Assignments Period
Project Coordinator			
1	Mr. Hiroshi IWADATE	Long Term Expert on Project Coordinator	6 Feb. 2012 – 5 Feb. 2014 (6 Feb. 2012 – 30 Nov. 2013 (21.2 M/M))

2. Short Term Expert

	Name	Designation/Expertise	Assignments Period
Chief Adviser			
1	Dr. Jun-ichi TAKADA (Tokyo Institute of Technology)	Short Term Expert on Chief Adviser	30 Mar. 2012 – 4 Apr. 2012 (6 M/D) 3 Sept. 2012 – 8 Sept. 2012 (6 M/D) 4 Dec. 2012 – 5 Dec. 2012 (2 M/D) 26 Mar. 2013 – 29 Mar. 2013(4 M/D)
Experts on Industrial and Mechanical Engineering			
2	Dr. Kenji AMAYA (Tokyo Institute of Technology)	Short Term Expert on Industrial and Mechanical Engineering	30 Mar. 2012 – 3 Apr. 2012 (5 M/D)
3	Dr. Yoshihiro MIZUTANI (Tokyo Institute of Technology)	Short Term Expert on Industrial and Mechanical Engineering	30 Mar. 2012 – 4 Apr. 2012 (6 M/D) 16 Mar. 2013 – 23 Mar. 2013 (8 M/D) 24 Nov. 2013 – 26 Nov. 2013 (3 M/D)
4	Dr. Takemi CHIKAHISA (Hokkaido Univ.)	Short Term Expert on Industrial and Mechanical Engineering	30 Mar. 2012 – 4 Apr. 2012 (6 M/D)
5	Dr. Yutaka TANABE (Hokkaido Univ.)	Short Term Expert on Industrial and Mechanical Engineering	30 Mar. 2012 – 4 Apr. 2012 (6 M/D)
6	Dr. Takanori EMARU (Hokkaido Univ.)	Short Term Expert on Industrial and Mechanical Engineering	30 Mar. 2012 – 4 Apr. 2012 (6 M/D)
7	Dr. Hiroyuki HARADA (Hokkaido Univ.)	Short Term Expert on Industrial and Mechanical Engineering	30 Mar. 2012 – 4 Apr. 2012 (6 M/D)
8	Dr. Kazuaki INABA (Tokyo Institute of	Short Term Expert on Industrial and Mechanical Engineering	12 Sept. 2013 – 15 Sept. 2013 (3 M/D)

	Technology)		
Expert on Geo-resources and Geotechnical Engineering			
9	Dr. Koichiro WATANABE (Kyushu Univ.)	Short Term Expert on Geo-resources and Geotechnical Engineering	30 Mar. 2012 – 5 Apr. 2012 (7 M/D) 26 Mar. 2013 – 29 Mar. 2013 (4 M/D) 20 May 2013 – 23 May 2013 (4 M/D)
10	Dr. Hideki SHIMADA (Kyushu Univ.)	Short Term Expert on Geo-resources and Geotechnical Engineering	30 Mar. 2012 – 3 Apr. 2012 (5 M/D)
11	Dr. Kyuro SASAKI (Kyushu Univ.)	Short Term Expert on Geo-resources and Geotechnical Engineering	15 May 2012 – 19 May 2012 (5 M/D)
12	Dr. Hideki MIZUNAGA (Kyushu Univ.)	Short Term Expert on Geo-resources and Geotechnical Engineering	10 Mar. 2013 – 16 Mar. 2013 (7 M/D)
13	Dr. Yasuhiro YAMADA (Kyoto Univ.)	Short Term Expert on Geo-resources and Geotechnical Engineering	3 Jun. 2013 – 7 Jun. 2013 (5 M/D)
14	Dr. Salahuddin Husein (Universitas Gadjah Mada)	Short Term Expert on Geo-resources and Geotechnical Engineering	23 Jun. 2013 – 29 Jun. 2013 (7 M/D)
Expert on Electrical and Energy Engineering			
15	Dr. Shinichi IWAMOTO (WASEDA Univ.)	Short Term Expert on Electrical and Energy Engineering	12 Jun. 2013 – 16 Jun. 2013 (5 M/D)
16	Dr. Tadahiro GODA (Doshisha Univ.)	Short Term Expert on Electrical and Energy Engineering	12 Jun. 2013 – 15 Jun. 2013 (4 M/D)
17	Dr. Kiyomichi ARAKI (Tokyo Institute of Technology)	Short Term Expert on Electrical and Energy Engineering	4 Dec. 2013 – 7 Dec. 2013 (4 M/D)
18	Dr. Monai KRAIRIKSH (King Mongkut's Institute of Technology Ladkrabang)	Short Term Expert on Electrical and Energy Engineering	25 Nov. 2013 - 28 Nov. 2013 (2 M/D)

	Expertise	M/D (M/M)
1	Chief Adviser	18M/D (0.6M/M)
2	Industrial and Mechanical Engineering	49M/D (1.63M/M)

3	Geo-resources and Geotechnical Engineering	44M/D (1.47M/M)
4	Electrical and Energy Engineering	15M/D (0.5M/M)
TOTAL (Short-term)		126M/D (4.2M/M)

List of Counterpart Training Participants

ANNEX 4

1) Short Term Training in Japan JFY 2012

Department at ITC		Name of the trainee (lecturer)	Japanese University to accept the training	Japanese professor in charge	Training period		Remarks
					Arrival in Japan	Departure from Japan	
GEE (Electrical and Energy Engineering department)	1	Mr. NGETH Rithea	TIT	Prof. ARAKI Kiyomichi	Jul. 02, 2012	Aug. 01, 2012	
	2	Mr. LENG Sovannarith	TIT	Assoc. Prof. FUJITA Hideaki	Jul. 02, 2012	Aug. 01, 2012	
	3	Mr. THOURN Kosorl	TIT	Prof. TAKADA Junichi	Feb. 04, 2012	Mar. 01, 2012	
	4	Mr. SOEUN Somuny Outdom	TIT	Assoc. Prof. FUJITA Hideaki	Feb. 04, 2012	Mar. 01, 2012	
GIM (Industrial and Mechanical Engineering department)	1	Mr. SOK Ratnak	Hokkaido Univ.	Prof. CHIKAHISA Takemi	Jul. 02, 2012	Aug. 01, 2012	
	2	Mr. SAR Sambo					
	3	Mr. TO Dara	TIT	Prof. AMAYA Kenji	Jul. 02, 2012	Aug. 01, 2012	
	4	Mr. CHHITH Saosometh	TIT	Assoc. Prof. MIZUTANI Yoshihiro	Jul. 02, 2012	Aug. 01, 2012	
GGG (Geo-resources and Geotechnical Engineering department)	1	Mr. VAMOEURN Nimol	Kyushu Univ.	Prof. WATANABE Koichiro	Jul. 02, 2012	Aug. 02, 2012	
	2	Dr. BUN Kim Ngun					
	3	Mr. KONG Sangva	Kyushu Univ.	Prof. WATANABE Koichiro	Jan. 27, 2012	Mar. 01, 2012	
	4	Ms. Sio Sreymean					

2) Short Term Training in Japan JFY 2013

Department at ITC		Name of the trainee (lecturer)	Japanese University to accept	Japanese professor in charge	Training period		Remarks
					Arrival in Japan	Departure from Japan	
GEE (Electrical and Energy Engineering department)	1	Mr. SRENG Sokchenda	TIT	Prof. TAKADA Junichi	Jul. 15, 2013	Aug. 10, 2013	
	2	Mr. SEAN Piseth	Waseda Univ.	Prof. IWAMOTO Shinichi	Sep. 16, 2013	Oct. 10, 2013	Tokyo: Sep.18 to Sep. 28 and Oct. 4 to Oct. 9 Hiroshima
			Hiroshima Univ.	Prof. YORINO Naoto			
	3	Mr. SAN Sim*	TIT	Prof. NAKAGAWA Shigeki Director at Center for Photonic Nano-Device	Sep. 29, 2013	Oct. 31, 2013	
	4	Ms. SAM Savda*					
	5	Mr. SOK Sean**					
GIM (Industrial and Mechanical Engineeri	1	Mr. NGUON Kollika	TIT	Assoc. Prof. INABA Kazuaki	Sep. 29, 2013	Oct. 26, 2013	
	2	Mr. Khoun Rithymean					
	3	Mr. Meng Chamnan	Hokkaido Univ.	Assoc. Prof. TABE Yutaka	Sep. 16, 2013	Oct. 12, 2013	
	4	Mr. Nhem Sophal	Hokkaido Univ.	Prof. CHIKAHISA Takemi	Sep. 16, 2013	Oct. 12, 2013	

ng departme	5	Mr. Sry Vannei	Hokkaido Univ.	Assoc. Prof. EMARU Takanori	Sep. 16, 2013	Oct. 12, 2013	
GGG (Geo-resources and Geotechnical Engineering department)	1	Dr. PICH Bunchoeun	Kyushu Univ.	Prof. WATANABE Koichiro	Jul. 11, 2013	Aug. 10, 2013	
	2	Mr. CHEA Samneang	Kyoto Univ.	Assoc. Prof. YAMADA Yasuhiro	Aug. 22, 2013	Sep. 21, 2013	Kyushu: Aug. 25 to Aug. 31 Kyoto: Sep. 2 to
	3		Kyushu Univ.	Prof. SASAKI Kyuro			
	4	Dr. BUN Kim Ngun	Hokkaido Univ.	Assoc. Prof. ITO Mayumi	Plan to do in Feb. 2014		Training at Hokkaido univ. is longer
			Kyushu Univ.	Prof. WATANABE Koichiro			
	5	Ms. PEN Chhorda and Dr KRY Nallis	Kyushu Univ.	Prof. WATANABE Koichiro	Plan to do in Feb. 2014		Training at Kyushu Univ. is longer
			Hokkaido Univ.	Assoc. Prof. ITO Mayumi			

TIT: Tokyo Institute of Technology

* assistant lecturer ** technician

Short Term Training in Japan **JFY 2013** ANNEX 4-2

Department at ITC		Name of the trainee (lecturer)	Japanese University to accept the training	Japanese professor in charge	Training period		Remarks
					Arrival in Japan	Departure from Japan	
GEE (Electrical and Energy Engineering department)	1	Mr. SRENG Sokchenda	TIT	Prof. TAKADA Junichi	Jul. 15, 2013	Aug. 10, 2013	
	2	Mr. SEAN Piseth	Waseda Univ.	Prof. IWAMOTO Shinichi	Sep. 16, 2013	Oct. 10, 2013	Tokyo: Sep.18 to Sep. 28 and Oct. 4 to Oct. 9 Hiroshima: Sep. 30 to Oct. 3
			Hiroshima Univ.	Prof. YORINO Naoto			
	3	Mr. SAN Sim*	TIT	Prof. NAKAGAWA Shigeki Director at Center for Photonic Nano-Device Integrated Engineering	Sep. 29, 2013	Oct. 31, 2013	
	4	Ms. SAM Savda*					
	5	Mr. SOK Sean**					
GIM (Industrial and Mechanical Engineering department)	1	Mr. NGUON Kollika	TIT	Assoc. Prof. INABA Kazuaki	Sep. 29, 2013	Oct. 26, 2013	
	2	Mr. Khoun Rithymean					
	3	Mr. Meng Chamnan	Hokkaido Univ.	Assoc. Prof. TABE Yutaka	Sep. 16, 2013	Oct. 12, 2013	
	4	Mr. Nhem Sophal	Hokkaido Univ.	Prof. CHIKAHISA Takemi	Sep. 16, 2013	Oct. 12, 2013	
	5	Mr. Sry Vannei	Hokkaido Univ.	Assoc. Prof. EMARU Takanori	Sep. 16, 2013	Oct. 12, 2013	
GGG (Geo-resources and Geotechnical Engineering department)	1	Dr. PICH Bunchoeun	Kyushu Univ.	Prof. WATANABE Koichiro	Jul. 11, 2013	Aug. 10, 2013	
	2	Mr. CHEA Samneang	Kyoto Univ.	Assoc. Prof. YAMADA Yasuhiro	Aug. 22, 2013	Sep. 21, 2013	Kyushu: Aug. 25 to Aug. 31 Kyoto: Sep. 2 to Sep. 20
	3		Kyushu Univ.	Prof. SASAKI Kyuro			
	4	Dr. BUN Kim Ngun	Hokkaido Univ.	Assoc. Prof. ITO Mayumi	Plan to do in Feb. 2014		Training at Hokkaido univ. is longer
			Kyushu Univ.	Prof. WATANABE Koichiro			
	5	Ms. PEN Chhorda and Dr KRY Nallis	Kyushu Univ.	Prof. WATANABE Koichiro	Plan to do in Feb. 2014		Training at Kyushu Univ. is longer
			Hokkaido Univ.	Assoc. Prof. ITO Mayumi			

TIT: Tokyo Institute of Technology

* assistant lecturer ** technician

List of Equipment common to the target three departments ANNEX 5-1

Name of Equipmen	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
Video Conferenc e System	Polycom Vrewstation HDX 7000 with MPPlus software for up to 4 sites (SDCP)	Aug. 27, 2012	1 set	12,459	12,459
Wireless microphone set	SHURE SVX24/PG28 Wireless Vocal System	Aug. 27, 2012	1 set	598	598

US$ 13,057

List of Equipment of Electrical and Energy Engineering Department ANNEX 5-2

I- Electro-Technique Lab

I-1) Experiment on Electrical Machines, Motors, and Transformer:

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Resistive, Inductive and Capacitive Loads Module	Edibon RCL3R	Jul. 01, 2013	5 sets	2,900	14,500
2	D.C. Series excitation motor-generator	Edibon EMT2		2 sets	1,600	3,200
3	D.C. Shunt excitation motor-generator	Edibon EMT3		2 sets	1,600	3,200
4	A.C. Synchronous Three-phase motor alternator	Edibon EMT6		2 sets	2,390	4,780
5	Asynchronous Three-phase motor of squirrel cage	Edibon EMT7		2 sets	400	800
6	Asynchronous Three-phase motor with wound rotor	Edibon EMT8		2 sets	2,325	4,650
7	Asynchronous Single-phase motor with starting capacitor	Edibon EMT11		2 sets	550	1,100
8	D.C. Brushless motor:	Edibon EMT18		1 sets	1,520	1,520
9	D.C. Permanent magnet motor	Edibon EMT15		1 sets	1,000	1,000
10	Tachogenerator	Edibon TECNEL/T		3 set	800	2,400
11	Variable Auto-transformer:	Edibon AUTR		5 set	750	3,750
12	Compact and robust box for the study of the main electrical functions.	Edibon EME	Jul. 01, 2013	5 sets	5,735	28,675
13	Unit that allows to regulate the braking torque of a motor.	Edibon FRE-FE.		3 sets	2,700	8,100
14	Three-phase and single-phase Transformers Unit	Edibon ETT.		2 sets	6,200	12,400

I-2) Experiment Kits on Electrical Installation

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
15	Fundamental and Installation Trainer	PUDAK Scientific PT 980410 Fundamental and Installation Trainer	Mar. 28, 2012	5 sets	3,113.17	15,565.87

I-3) Power Analyzer (Harmonic and Efficiency Measurement)

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
16	Power Analyzer	Yokogawa WT500 Power Analyzer	Mar. 22, 2012	2 pcs	14,500	29,000
17	Analog Power Meter	Gossen Metrawatt 4 Power Meter	Mar. 06, 2012	10 pcs	990	9,900

II-Electronic Lab

II-1) Electronic Experiment Kits

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Basic Electronic Trainer	PUDAK Scientific PT 93120 Basic Electronic Trainer	Mar. 28, 2012	5 sets	1,412.20	**7,061.01**
2	Power Electronic Trainer.	Pudak Scientific PT970721-Power Electronic Trainer	Mar. 28, 2012	5 sets	1,674.36	**8,371.78**

II-2) Measurement Instruments for Electronics

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
3	Analog Ammeter	Matrix MX-35 Ammeter	Mar. 22, 2012	15 pcs	590	**8,850**
4	Analog Voltmeter	Matrix MX-25 Ammeter	Mar. 22, 2012	15 pcs	530	**7,950**

III- Telecommunication Lab

III-1) Telecommunication Experiment Kits (Advance)

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Signals Sampling and Reconstruction Module	Edibon EDICOM 1	Jan. 15, 2013	5 sets		**48,510**
2	Time Division Multiplex (TDM), PAM Transmitter and Receiver	Edibon EDICOM 2		5 sets		
3	MIC-TDM Transmission/ Reception module	Edibon EDICOM 3		5 sets		
4	Delta Modulation and Demodulation	Edibon EDICOM 4		5 sets		
5	Line Codes, Signal Modulation and Demodulation	Edibon EDICOM 5		5 sets		
6	Optical Fiber Transmission and Reception Module	Edibon EDICOM 6		5 sets		
7	Power Supply	Edibon FACO		10 sets		
8	Data Acquisition System/ Virtual Instrumentation System	Edibon EDAS/VIS Sampling velocity 1,250,000 samples per second		1 set		
9	Telephony Systems Trainer	Edibon CODITEL		1 set		

III-2) Telecommunication Experiment Kits (Basic)

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
10	Module FM Transceiver Trainer	Pudak Scientific PT 94330-Module FM Transceiver Trainer	Mar. 15, 2012	5 sets	1,159	**5,795**
11	Module AM Transceiver Trainer	Pudak Scientific PT 94329-Module FM Transceiver Trainer	Mar. 15, 2012	5 sets	1,278	**6,390**
12	Microwave Trainer	Pudak Scientific PT 94124-Microwave Trainer	Mar. 15, 2012	5 sets	3,221	**16,105**

13	Basic Digital Communication Trainer	Pudak Scientific PT 93229-Basic Digital Communication Trainer	Mar. 15, 2012	5 sets	2,255	**11,275**
14	Digital Storage Oscilloscope	Tektronix TDS2012C Digital Storage Oscilloscope	Feb. 17, 2012	7 pcs	2,180	**15,260**

III-3) Measurement Instruments

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Microwave Spectrum Analyzer	Anritsu MS2718B Economy Microwave Spectrum Analyzer	Feb. 17, 2012	3 pcs	24,000	**72,000**
2	Vector Network Analyzer	Agilent Technologies E5071C ENA Series Network Analyzer	Mar. 22, 2012	1 pcs	81,900	**81,900**
3	EMC analyzer (EMI Receiver)	Rhode & Schwartz EMI Receiver	Mar. 22, 2012	1 set	106,000	**106,000**
4	High Frequency Signal Generator/Modulator	Agilent Technologies E4428C ESG analog signal generator	Mar. 22, 2012	1 pcs	32,800	**32,800**
5	RF Power Meter	Agilent Technologies E4416A Power meter	Feb. 17, 2012	2 pcs	6,800	**13,600**
6	Sensor of RF Power Meter	Agilent Technologies E9300B Power Sensor	Mar. 22, 2012	2 pcs	5,250	**10,500**
7	Noise source	Agilent Technologies N4001A Noise Source	Mar. 22, 2012	3 pcs	4,700	**14,100**
8	Noise source test	Agilent Technologies N2002A Noise Source Set	Apr. 24, 2012	2 pcs	22,950	**45,900**
9	Power reflection meter	Rohde-Schwarz NRT Power reflection meter	Mar. 15, 2012	2 pcs	5,370	**10,740**
10	Power Sensor R&S NRT z44	Rohde-Schwarz NRT Z44 Directional power sensor	Mar. 15, 2012	2 pcs	4,570	**9,140**
11	Power Sensor R&S NRT z14	Rohde-Schwarz NRT Z14 Directional power sensor	Mar. 15, 2012	2 pcs	5,080	**10,160**
12	Calibration Kit for VNA + Cable	Agilent Technologies N4431B, N6314A	Mar. 22, 2012	1 pcs	17,650	**17,650**
13	BBAA9114 and BBVU9135 antenna	Schwarzbeck UBAA9114&BBVU9135 antenna	Mar. 22, 2012	2 pcs	2,500	**5,000**
14	USLP 9143 antenna	Schwarzbeck USLP9143 antenna	Mar. 22, 2012	2 pcs	2,580	**5,160**
15	SBA 9112 antenna	Schwarzbeck SBA9112 antenna	Mar. 22, 2012	2 pcs	3,290	**6,580**
16	Antenna Mast AM 9104	Schwarzbeck AM9104 Antenna Mast	Mar. 22, 2012	2 pcs	4,690	**9,380**
17	EMC antenna	Rhode & Schwartz HFH2-Z2 Antenna	Apr. 05, 2012	1 set	16,800	**16,800**
18	EMC antenna	Rhode & Schwartz HFH2-Z6 Antenna	Apr. 05, 2012	1 set	10,490	**10,490**
19	EMC antenna	Rhode & Schwartz HL562 Antenna	Apr. 05, 2012	1 set	15,280	**15,280**

III-4) Wireless Communication Experiment Equipment

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
20	USRP (Universal Software Radio Peripheral) Networked Series kit	Ettus Research USRP N210	Nov. 22, 2012	3 set		11,331
21	Notebook computer (for outdoor data measuring and data processing)	Lenovo ThinkPad T430 with the option of Mini Dock Series 3 with USB 3.0	Nov. 22, 2012	3 sets		
22	Dual Band Transceiver	Ettus Research XCVR 2450 Dual Band Transceiver	Mar. 06, 2012	4 pcs	579.50	2,318.00
23	Transceiver RFX900	Ettus Research RFX900-Transceiver	Mar. 06, 2012	4 pcs	398.40	1,593.60
24	Antenna LP0965	Ettus Research PL0965-Antenna	Mar. 06, 2012	4 pcs	65.20	260.80
25	Antenna VERT2450	Ettus Research VERT2450-Antenna	Mar. 06, 2012	4 pcs	50.70	202.80
26	Antenna VERT900	Ettus Research VERT900-Antenna	Mar. 06, 2012	4 pcs	50.70	202.80
27	SMA-BNC	Ettus Research SMA-BNC	Mar. 06, 2012	4 pcs	43.50	174.00
28	LPBK-KIT	Ettus Research LPBK-KIT	Mar. 06, 2012	4 pcs	143.50	574.00
29	SD-Card and SD-Reader	Ettus Research SD-Card	Mar. 06, 2012	4 pcs	43.50	174.00

IV) Renewable Energy Lab

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Curve Tracer	IVT Solar Curve Tracer VS-6810	Mar. 15, 2012	1 pcs	8,900	8,900
2	Portable Multimeter	GW Instek GDM395 Handheld Multimeter	Mar. 15, 2012	5 pcs	105	525
3	Clamp phase Power meter	Extech Power clamp meter	Mar. 15, 2012	5 pcs	980	4,900
4	PV System 40Wp/12V	Solar World Sunmodule SW50 Poly RMA	Feb. 17, 2012	5 pcs	225	1,125
5	PV System 80Wp/12V	Solar World Sunmodule SW85 Poly R5A	Mar. 27, 2012	5 pcs	385	1,925
6	Adjustable Wirewound Vitreous Resistors	Vishay / Sfernice Adjustable Wirewound Vitreous Resistors	Mar. 15, 2012	5 pcs	195	975
7	Inverter	Santak Solar Power Inverter 600W	Mar. 22, 2012	2 pcs	450	900
8	Battery	Ritar RA12-150D Deep Cycle Battery	Feb. 17, 2012	4 pcs	290	1,160
				total		US$ 810,530

Laboratory of Material Science & Strengthen of Material

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	High speed Microscope camera and Lens	Keyence VW-9000 High Speed Microscope VW-600C Camera unit for VW-9000E VH-Z250 Zoom lens 250X to 2500X	Feb. 22, 2012	1 set	105,500	105,500
2	Tensile machine	Shimadzu AG-X plus Autograph Table-top type Universal Machine	Mar. 27, 2012	1 set	46,910	46,910
3	Universal Recorders	Kyowa EDX-100A Universal Recorder	Mar. 22, 2012	1 set	20,360	20,360
4	Strain Amplifier -Signal Conditioners	Kyowa CDV-700A A220 Amplifier	Mar. 22, 2012	4 pcs	5,985	23,940
5	Strain gauges	Kyowa Strain gages KFR-5-120-C1-11 L2M2R & KFR-5-120-C1-23 L2M2R	Mar. 22, 2012	200 pcs	21	4,200
6	Hardness machine	Shimadzu HMV-2TADW Automatic Reading & Load Change Micro Vickers Hardness Tester	Mar. 27, 2012	1 set	44,940	44,940

Laboratory of Fluid mechanics

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Flow visualization (stream line)	TOKYO METER HAS-80225 Flow visualization (stream line)	May. 18, 2012	1 set	16,068	16,068
2	Head, Discharge coefficient, Bernoulli equation	TOKYO METER OFE-1600-50SW-Head,Discharge coefficient, Bernoulli equation	May. 18, 2012	1 set	26,014	26,014
3	Laminar & turbulent flow, Flow transition, Reynolds number	TOKYO METER RNM-15-900A-Laminar & turbulent flow, Flow transition, Reynolds number	May. 18, 2012	1 set	19,129	19,129
4	Impact force of jet	TOKYO METER JIA-1000-Impact force of jet	May. 18, 2012	1 set	19,894	19,894
5	Free vortex, Forced vortex	TOKYO METER FFV-400-800-Free vortex, Forced vortex	May. 18, 2012	1 set	24,485	24,485

Computational Laboratory

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
54	Desktop computer and licenses	Dell XPS 8300/W7Pro & computer tables and chairs	Mar. 15, 2012	30 pcs	1,133	33,990

Thermal Laboratory

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	FORCED CONVECTION HEAT TRANSFER Laboratory apparatus	TecQuipment Ltd. TD1-FORCED CONVECTION HEAT TRANSFER	Aug. 20, 2012	1 set	16,737	16,737
2	A bench-top service module with small-scale demonstration heat exchanger	TecQuipment Ltd. TD360-HEAT EXCHANGER SERVICE MODULE 1)TD360A-Tubular Heat Exchanger 2)TD360B-Plate Heat Exchanger 3)TD360C-Shell and Tube Heat Exchanger 4)TD360D-Jacketed Vessel and Coil 5)VDAS-VDAS(Frame Mounted Version)	Jul. 18, 2012	1 set	16,452	16,452
3	HEAT TRANSFER EXPERIMENT BASE UNIT	TecQuipment Ltd. TD1002-HeatTransfer Experiments Base Unit 1)TD1002A-Linear Heat Conduction Experiment 2)TD1002B-Radial Heat Conduction Experiment 3)TD1002C-Extend surface Heat Transfer 4)TD1002D-Conductivity of Liquid & Gasses	Jul. 18, 2012	1 set	13,473	13,473

4	Free and Forced Convection Experiment Apparatus	TecQuipment Ltd. TD1005-FREE AND FORCED CONVECTION EXP.	Jul. 18, 2012	1 set	7,160	7,160
5	THERMAL CONDUCTIVITY EXPERIMENT Apparatus	TecQuipment Ltd. TE19-THERMAL CONDUCTIVITY EXPERIMENT 1)RE19-Lab Vacuum Pump	Jul. 18, 2012	1 set	9,038	9,038
6	BOILING, CONDENSING HEAT TRANSFER Apparatus	TecQuipment Ltd. TE78-BOILING, CONDENSING HEAT TRANSFER	Jul. 18, 2012	1 set	21,460	21,460
7	NATURAL CONVECTION AND RADIATION Apparatus	TecQuipment Ltd. TE85-NATURAL CONVECTION AND RADIATION	Jul. 18, 2012	1 set	26,459	26,459
8	CROSS FLOW HEAT EXCHANGER EXPERIMENTAL Apparatus	TecQuipment Ltd. TE93-CROSS FLOW HEAT EXCHANGER	Jul. 18, 2012	1 set	14,366	14,366
9	Humidity and temperature meter	Bestone Industry AR847	Feb. 17, 2012	5 pcs	150	750
10	Data logger	Graphtec GL900 midi logger 8-channel high speed isolated multifunction logger	Feb. 17, 2012	2 pcs	9,800	19,600
11	Thermal arraycorder	Graphtech WR300 Thermal Arraycorders 8-channel	Mar. 06, 2012	2 pcs	16,790	33,580

Internal Combustion Engine Laboratory

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Engine Dynamometer and controller	Taylor Dynamometer DE150 Eddy Current Dynamometer	Apr. 24, 2012	1 pcs	45,300	45,300
2	DYNPRO INSTRUMENTATION FOR ENGINE DYNAMOMETERS	Taylor Dynamometer No. 044006-ENG DYNPRO INSTRUMENTATION FOR ENGINE DYNAMOMETERS	Sep. 12, 2013	1 set	22,170	22,170
3	LOAD CONTROL ASSEMBLY ENGINE DE SERIES, 230V	Taylor Dynamometer No. 04499-021 LOAD CONTROL ASSEMBLY ENGINE DE SERIES, 230V	Sep. 12, 2013	1 set	8,970	8,970
4	MASS AIR FLOW METER, DYNPRO 25' CABLE	Taylor Dynamometer No. 051040000-25E MASS AIR FLOW METER, DYNPRO 25' CABLE	Sep. 12, 2013	1 set	14,800	14,800
5	Pressure transducer	Kistler 6052C72U20 Piezo Star Pressure Sensor	Jun. 05, 2012	2 pcs	6,500	13,000
6	Charge amplifier	Kistler Charge amplifier, Type 5018A1002	Dec. 20, 2012	2 set		11,160
7	Coupling for a pressure sensor	Kistler Coupling, high-insulation Type 1700A31	Dec. 20, 2012	2 set		
8	Exhaust gas analyzer	Testo Testo 350 and option parts for it	Jul. 01, 2013	1 set	14,020	14,020

Mechanical Dynamics Laboratory

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Oscilloscope	Hameg HMO2022 Digital Oscilloscope	Mar. 22, 2012	10 pcs	5,800	58,000
2	Current probe	Tektronix P6021current probe	Mar. 15, 2012	3 pcs	2,390	7,170
3	Current sensors	E-Mon CS100 Current Sensor	Feb. 17, 2012	5 pcs	420	2,100
4	Signal conditioner	PCB Piezotronics PCB 482-C05 signal conditioner	Mar. 06, 2012	1 pcs	990	990
5	Pressure transducer for lower pressure	PCB Piezotronics PCB 113B21 High frequency ICPr pressure sensor	Mar. 06, 2012	2 pcs	1,100	2,200

6	Pressure transducer for higher pressure	PCB Piezotronics PCB 113B22 High frequency ICPr pressure sensor	Mar. 06, 2012	2 pcs	1,100	2,200
7	Noise measurement	Landtek SL-5868P Noise measurement	Feb. 17, 2012	5 pcs	120	600
8	Laser displacement	Keyence LK-G405 Laser Sensor Displacement System	Feb. 22, 2012	1 pcs	16,900	16,900
9	Digital high speed camera	Nikon Coolpix P500 digital camera	Feb. 17, 2012	1 pcs	890	890

Mechanical Workshop

No.	Name of Equipment	Manufacturer and model No.	Inspection date	Q'ty	Unit price (USD)	Total price (USD)
1	Tool grinder	Tormek T-7	Feb. 17, 2012	1 pcs	2,900	2,900

Total US$ 787,875

ANNEX 6

List of Subjects with Improved Practices and Experiments at Each Department

1. List of subjects with improved practices and experiments (EEE)

For JICA Project for Educational Capacity Development of ITC

No.	Subjects with improved practices and experiments	Improvement of practices and experiments				Group of students	Student laboratory manual**	
		Before, [H]		Now, [H]				
		L	T/L	L	T/L ( )*		D	T
1	Micro-wave and antenna	32	0	32	16 (16)	5 - 6	4	4
2	Telecommunication system	48	0	16	32 (6)	5 - 6	0	2
3	Optical communication	48	0	16	32 (6)	5 - 6	1	2
4	Principle of communication	16	16	16	16 (16)	5 - 6	2	2
5	Transmission and telephone system	48	0	16	32 (8)	5 - 6	5	5
6	Digital communication	16	32	16	32 (13)	5 - 6	1	2
7	Renewable energy	16	32	16	32 (4)	5 - 6	4	4
8	Motor drive	16	32	16	32 (10)	5 - 6	4	4
9	Circuit and analog filter	48	32	48	32 (8)	5 - 6	3	3
10	Electrical machine and electrical equipment	32	32	32	32 (16)	5 - 6	0	5
11	Power electronic	16	32	16	32 (6)	5 - 6	4	4
12	Power electronic	32	32	32	32 (12)	5 - 6	6	6
13	Electrical circuit	32	32	32	32 (8)	5 - 6	3	3
14	Analog electronic 1	16	32	16	32 (16)	5 - 6	6	6
15	Electrical Machine	16	48	16	48 (32)	5 - 6	7	8
16	Power electronic	16	32	16	32 (14)	5 - 6	7	7
17	Analog filter design	16	32	16	32 (12)	5 - 6	0	8
18	Electrical equipment	16	32	16	32 (14)	5 - 6	4	4
	Total	480	448	384	560 (217)		61	79

* The figures in the blankets indicate the total hours using equipment provided by the project.
** D: The number of manuals for each topic drafted, T: The total number of manuals for each topic that need to be prepared

2. List of subjects with improved practices and experiments (GIM)

For JICA Project for Educational Capacity Development of ITC

No.	Subjects with improved practices and experiments	Improvement of practices and experiments		Group of students	Lab related	Remarks	Student laboratory manual	
		Before, [H]	Now, [H]				D	T
1	Material sciences	16	16	I3	Material sciences & Strength of material	Using additional new equipment to improve the quality of experiments	9	9
2	Strength of materials	0	32	I3	Material sciences & Strength of material	Using additional new equipment		
3	Fluid mechanics	0	16	I3	Fluid mechanics	New lab	5	5
4	Computer programming (Matlab)	16	16	I3	Computer room	Using new PC room Software use only	0	0
5	Computer Aid Design	32	32	I3	Computer room	Using new PC room Software use only	0	0
6	Mechanical constructions	0	16	I4-Meca	Dynamics	New lab but not full application	5	5
7	Heat exchangers	0	32	I4-Meca	Thermal	New lab, Additional use for research in the future	7	8
8	Theory of engines	16	32	I5-Meca	Internal combustion engine	In term of installation, Will be used also for research in the future	8	9
9	Product design	0	32	I4-Indu	Computer room	Using new PC room Software use only	0	0
	Total	80	224					

D: The number of manuals for each topic drafted, T: The total number of manuals for each topic that need to be prepared
Some topics under "Strength of materials", "Mechanical constructions", "Heat exchangers" and "Theory of engines" need to be checked by the Japanese experts or other ITC lecturers before finalization. One more topic will be added to "Theory of engines".

3. List of subjects with improved practices and experiments (GGE)

For JICA Project for Educational Capacity Development of ITC

No.	Subjects with improved practices and experiments	Improvement of practices and experiments		Group of students	Field work		Lab related	Remarks	Student instruction manual
		Before, [H]	Now, [H]		Before	Now			
1	Petrology and Mineralogy	0	32	I3			Preparation Room & Microscope Laboratory	Using new equipment to improve the quality of experiments	Not yet
2	Structural Geology	0	0	I3	No	Yes	None	Using equipment/tools for geological fieldworks	Not yet
3	Mineral Exploration	0	0	I4	No	Yes	None	Using equipment/tools for fieldworks	Not yet
4	Basic Geological Mapping	0	0	I4	No	Yes	None	Using equipment/tools for fieldworks	Not yet
5	Mineral Processing	0	0	I5			Preparation Room	Going to increase the practice hour in next facial year	Not yet
6	Petrology and Mineralogy	0	48	T2			Preparation Room, Microscope Laboratory & X-Ray Laboratory	Using most of the equipment to improve the quality of experiments	Not yet
7	Mineral Deposit and Exploration	0	0	T2	No	Yes	Microscope Laboratory	Using equipment/tools for fieldworks	Not yet
8	Mineral Processing	0	0	T2	No	Yes	Preparation Room	Going to increase the practice hour in next facial year	Not yet
9	Technical Analysis of Minerals	0	32	T2			Preparation Room, Microscope Laboratory & X-Ray Laboratory	Using new equipment to improve the quality of the analysis	Not yet
	Total	0	112						

Detail Expense of JICA Project Office

ANNEX 7

As of Nov. 30

Item of expenses	Department			Cost (US$)
	GEE	GIM	GGG	
Lightning and surge protection work for laboratory rooms to protect equipment from electrical damages	common			15,947.00
LED TV (for Video conference system)	common			1,700.00
Printing cost of the proceeding for Scientific day 2012	common			1,000.00
Technical books		44	50	12,699.10
UPS (uninterruptible power system)	4	3		875.00
Desktop computer			5	6,654.00
External HDD			2	137.00
Inkjet printer		1	1	621.00
Projector		3	2	2,866.00
Internet security software		35	7	632.00
ICDD database for XRD			1	1,650.00
Rock polisher and option parts for it			1	7,218.00
Electric balance			1	780.00
Ultrasonic cleaner			1	600.00
Lab coats and water proof aprons			5	320.00
Parts to set up robots for the robot competition on Scientific day	1 set			1,455.00
Refrigerator (for cooling materials for test)		1		225.00
Booster pump		1		942.22
Liquid Nitrogen container		1		1,484.41
Grinders and grinding wheels (set)		2 sets		132.50
Welding machine and necessary items for it		1 set		304.50
Wireless microphone & amplifier		2	1	185.50
IC voice recorder			1	110.00
Filing Cabinets (to store small equipment and parts)		9		2,449.00
Desks		1	6	890.00
Rental cost of a bus for the filed work			1 day	480.00
ICDD database for XRD			1	1,650.00
Dispatch of Third-Country Expert	1 expert			810.00
			total	64,817.23

ANNEX 8-1

List of Counterpart Personnel, Project Director & Project Manager

As of Nov. 15, 2013

		Name	Title	Gender	Remarks
Project Director	1	Dr. PHOEURNG Sackona	President	Female	
	2	Dr. Yuok Ngoy	-	Male	
Project Maneger	1	Dr. OM Romny	Director	Male	

ANNEX 8-2

List of Counterpart Personnel
Institute of Technology of Cambodia, Industrial and Mechanical Engineering department (GIM)

as of Oct. 31, 2013

	Name	gender	title	Academic Background			Remarks
				specialty	degree	Country	
1	PAN Sovanna	Male	Head of department	Internal-combustion engine	M.Eng	Russia, Belgium	
2	UN Amata	Male	Deputy Head of department	Refrigerator & Air conditioning	M.Eng	NUS	
3	SEANG Chan Sopheak	Male	Lecturer	Welding	M.Eng PhD	France INSA	
4	KHOUN Rithymean	Male	Lecturer	Fuel consumption	M.Eng	Belgium	
5	NGOR Bun Roth	Male	Lecturer	Material Science	M.Eng	Japan	
6	NGUON Kollika	Male	Lecturer	Fluid-Structure interaction	M.Eng PhD	ITB TIT	SEED-Net alumni. Got PhD from TIT
7	KIM Vireak	Male	Lecturer	Manufacturing Engineering	(M.Eng)	UM Burapha Univ.	SEED-Net alumni. Could not get M. Eng. from UM. Currently taking a Master course at Burapha Univ. in Thailand
8	SAR Sambo	Male	Lecturer	Micro Machines	M.Eng (PhD)	Belgium UM	He finished the doctor's course at UM (SEED-Net scholarship) and is going to get PhD soon.
9	CHHITH Sabsometh	Male	Lecturer	Optimization of Mechanical Design	M.Eng	Korea Kyungpook national Univ. Belgium	From June, 2013 he has started to study in Belgium for PhD
10	REY Sopheak	Male	Lecturer	Internal-combustion engine using Bio-fuel	M.Eng PhD	ITB Kyoto Univ.	SEED-Net alumni (M. Eng. at ITB) PhD
11	SRANG Sarol	Male	Lecturer	Mechanical control	M.Eng	ITB	SEED-Net alumni. From Oct. 2011 he has started to study at TIT for PhD.
12	MENG Chamnan	Male	Lecturer	Refrigerator & Air conditioning	M.Eng	ITB	SEED-Net alumni
13	KRUY Sothea	Male	Lecturer	Machine design & manufacturing	M.Eng	UM	SEED-Net alumni. From Oct. 2012 he has started to study at Keio Univ. for PhD
14	CHAN Sarin	Male	Lecturer	Refrigerator & Air conditioning	M.Eng PhD	ITB ITB	SEED-Net alumni (M. Eng. & PhD.)
15	TO Dara	Male	Lecturer	Mechanical design	M.Eng	ITB	SEED-Net alumni
16	SOK Ramak	Male	Lecturer	Internal-combustion engine using Bio-fuel	M.Eng	ITB	SEED-Net alumni From Oct. 2012 he has started to study at Waseda Univ. for PhD
17	SIV Easeng	Male	Lecturer	Material Engineering	M.Eng	France	
18	Sry Vannei	Male	Lecturer	Dynamics and control (vibration)	M.Eng	ITB	Indonesian government scholarship Became ITC staff from Sep. 2012
19	Nhem Sophal	Male	Lecturer	Thermo dynamics	M.Eng	ITB	SEED-Net alumni Became ITC staff from Sep. 2012
20	TANN Siengdy	Male	Lecturer	Computational fluid dynamics	M.Eng	ITB	SEED-Net alumni Became ITC staff from Sep. 2013
21	SENG Piseth	Male	Lecturer	Industrial management	M.Eng	UM	SEED-Net alumni Became ITC staff from Sep. 2013
22	Ngor Peing Seang	Male	Lecturer	Emission reduction	M.Eng	Waseda Univ.	Became ITC staff from Oct. 2013

注 ITB: Institute of Technology of Bandung
UM: University of Malaya

ANNEX 8-3

List of Counterpart Personnel

Institute of Technology of Cambodia, Electrical and Energy Engineering department (GEE)

as of Oct. 31, 2013

	Name	Gender	Title	Academic Background			Remarks
				Specialty	Degree	Country	
1	CHY Chea Pok	Male	Head of department	Control Engineering	Bachelor	ITC	
2	BUN Long	Male	Deputy Head of department	Solar Energy	PhD	France	
3	PO Kim Tho*	Male	Lecturer	Telecommunication	M.Eng PhD	Chula TIT	SEED-Net alumni (M. Eng. & PhD.)
4	KHOV Makara	Male	Lecturer	Power Engineering	PhD	France	
5	KY Leng	Male	Lecturer	Wireless Networking	M.Eng PhD	Chula TIT	SEED-Net alumni (M. Eng. & PhD.)
6	CHRIN Phok	Male	Lecturer	Power Engineering	M.Eng	KMITL	SEED-Net alumni From June. 2013 he has started to study in France for PhD
7	BUN Seang	Male	Lecturer	Electrical Engineering	Bachelor	ITC	
8	CHHIT Chhun Ny	Female	Lecturer	Electrical Engineering	Bachelor	ITC	
9	SEAN Piseth	Male	Lecturer	Power Engineering	M.Eng	AIT	
10	SENG Silong	Male	Lecturer	Electrical Engineering	M.Eng	France	
11	LENG Sovennarith	Male	Lecturer	Power Engineering	M.Eng	Chula	SEED-Net alumni From June. 2013 he has started to study in France for PhD
12	KHUN Chanthea	Male	Lecturer	Power Engineering	M.Eng	KMITL	SEED-Net alumni
13	PING Sethika	Female	Lecturer	Power Engineering	Bachelor	ITC	
14	SRENG Sokchenda	Male	Lecturer	Telecommunication	PhD	France	
15	KEO Lychek	Male	Lecturer	Robotics	M.Eng PhD	Chula TIT	SEED-Net alumni (M. Eng. & PhD.)
16	THOURN Kosorl	Male	Lecturer	Image processing	M.Eng	KMITL	SEED-Net alumni
17	Nget Rithea	Male	Lecturer	Wireless Sensor Networking	M.Eng	China	
18	SOEUN Somuny Outdom	Male	Lecturer	Power Electronics	M.Eng	France	
19	CHUM Pharino	Male	Lecturer	Signal processing	M.Eng	Korea	Became ITC staff from Oct. 2013
20	KIM Bunthern	Male	Lecturer	Power Electronics	M.Eng	France	Became ITC staff from Oct. 2013
21	VAI Vannak	Male	Lecturer	Power Electronics	M.Eng	France	Became ITC staff from Oct. 2013

*Officially Mr. PO Kim Tho and Dr. KHOV Makara have other titles at ITC but they are also teaching staff at this department.

Mr. PO Kim Tho: Head of Planning & Development

注 Chula: Chulalongkorn University

KMITL: King Mongkut's Institute of Technology Ladkrabang

ITC: Institute of Technology of Cambodia

TIT: Tokyo Institute Technology

ANNEX 8-4

List of Counterpart Personnel, Institute of Technology of Cambodia, Geo-resources and Geotechnical Engineering (GGG)

as of Oct. 25, 2013

	Name	Gender	Title	Academic Background			Remarks
				Specialty	Degree	Country	
1	Mrs. PEN Chhorda	Female	Head of department	Environmental Geology	M.Eng	France	
2	Mr. PHAT Bone	Male	Advisor	Geology	M.Eng	France	
3	Mr. KONG Sangva	Male	Lecturer	Petrography	Bachelor	ITC	
4	Mr. SIENG Peou	Male	Lecturer	Geotechnical Engineering	M.Eng	France	
5	Dr. HORNG Vuthy	Male	Lecturer	Geotechnical Engineering	M.Eng PhD	Chula Hokkaido Univ.	SEED-Net alumni (M. Eng. & PhD.) Advisor at Hokkaido Univ.:
6	Dr. PICH Buchoeun	Male	Lecturer	Environmental Geology	M.Eng PhD	UGM Hokkaido Univ.	SEED-Net alumni (M. Eng. & PhD.) Advisor at Hokkaido Univ.:
7	Ms. Sio Srey Mean	Female	Lecturer	Mining Geology	M.Eng	UGM	SEED-Net alumni
8	Mr. VAMOEURN Nimol	Male	Lecturer	Environmental Engineering	M.Eng	UGM	SEED-Net alumni (M. Eng. & PhD.) He took a doctor's course, environmental Eng., at UP but hasn't got PhD yet.
9	Dr. BUN Kimngun	Male	Lecturer	Cray mineralogy & ceramic	M.Eng PhD	USM	SEED-Net alumni (M. Eng. & PhD.) Became ITC staff from March 2012
10	Dr. KONG Sitha	Male	Lecturer	mineral recourses	M.Eng PhD	UGM Kyushu Univ.	インドネシア政府奨学金(Mr. Eng. UGM) SEED-Net alumni (PhD at Kyushu Univ..) Advisor at Kyushu Univ.
11	Dr. CHEA Chandara	Male	Lecturer	Material Engineering	M.Eng PhD	USM	SEED-Net alumni (M. Eng. & PhD.)
12	Mr. CHEA Samneang	Male	Lecturer	Petroleum geology	M.Eng	UGM	SEED-Net alumni (M. Eng.) Became ITC staff from Sep. 2012
13	Dr KRY Nallis	Female	Lecturer	Material Engineering	M.Eng PhD	USM	SEED-Net alumni (M. Eng. & PhD.) Became ITC staff from Aug. 2013

注 Chula: Chulalongkorn University
UGM: Universitas Gadjah Mada
USM: Universiti Sains Malaysia
ITC: Institute of Technology of Cambodia

ANNEX 9

CONTRIBUTION FROM ITC FOR THE PROJECT

1. ITC

Until the end of October 2013

No.	Detail works	Total expense (USD)	Status
Operation Cost for the project			
1	Meeting arrangement	4,000	Completed
2	Transportation	500	Completed
3	Meal and others	1,000	Completed
	Total =	**5,500**	

2. Department of Mechanical and Industrial Engineering

Until the end of October 2013

No.	Detail works	Total expense (USD)	Status
I. Running expense for the implementation of the project			
1	Room repair	20,000	Completed
2	Air conditioner installation	5,000	Completed
3	Lighting and electrical circuit	2,000	Completed
4	Furniture	2,000	Completed
5	Curtains	1,000	Completed
6	Labour cost	3,000	Completed
	Sub-total	**33,000**	
II. Operation Cost for the project			
7	Financial support admin staff	4,000	Completed
8	Financial support academic staffs	5,000	Completed
9	Office expenses	3,000	Completed
10	Lab experiment expenses	2,000	Completed
11	Maintenance cost	1,000	Completed
12	Others	2,000	Completed
	Sub-total	**17,000**	
	Total =	**50,000**	

3. Department of Geo-resources and Geotechnical Engineering

Until the end of October 2013

No.	Detail works	Total expense (USD)	Status

I. Running expense for the implementation of the project			
1	Repairing the laboratories	1,200	Completed
2	Installation of new water supply and electrical line	500	Completed
3	Enhancing the Microscope Laboratory • Tables and chairs • Air conditioner • Window grid • Curtain • Filling cabinet • Window cabinets for displaying specimen	4,320	Completed
4	Enhancing the X-Ray Laboratory • Tables and chairs • Air conditioner • Window grid • Curtain • Filling cabinet	1,350	Completed
5	Enhancing the Preparation Room • Counter tables and chairs • Lockers • Air conditioners • Filling cabinet	3,050	Completed
	Sub-total	**10,420**	
II. Operation Cost for the project			
6	Conducting geological mapping at the site	500	Completed
7	Meeting expense	1,220	Completed
8	New staffs and laboratory assistant	36,600	From the starting of the project until today. Five staffs and 1 lab assistant were recruited
9	Consumable	500	Completed
	Sub-total	**38,820**	
	Total =	**49,240**	

4. Department of Electrical and Energy Engineering

Until the end of October 2013

No.	Detail works	Total expense (USD)	Status
I. Running expense for the implementation of the project			
1	Repairing the laboratories (room 312B) • Tables and Chairs • Air conditioner • Electric installation • Curtain	15,000	Completed

	• Filling cabinet		
2	Repairing the laboratories (room 313B) • Tables and Chairs • Air conditioner • Filling cabinet • Electric Installation • Curtain	10,000	Completed
3	Repairing the laboratories (room 314B) • Tables and Chairs • Air conditioners • Electric Installation • Curtain • Filling cabinet	15,000	Completed
4	Repairing room 315B for video conference • Air conditioner • Curtain • Filling cabinet	5,000	Completed
	Sub-total	**45,000**	
II. Operation Cost for the project			
7	Meeting expense& other arrangement	1,500	Completed
8	New staffs, Laboratory assistant & Extra charge for experimental work to academic staffs	28,600	
9	Consumable	500	Completed
	Sub-total	**30,600**	
	Total =	**75,600**	

A total of ITC's Operational Costs	**860,740 USD**

Project for Educational Capacity Development of Institute of Technology of Cambodia

	Evaluation Question	Indicators/Specific areas of concern	Means of verification
Relevance	How much is the educational capacity development of ITC relevant to the Government policy on industrial HRD and higher education?	• Has been any change in the Government policy on industrial HRD and higher education since the commencement of the project? • What is the latest policy on industrial HRD and high education apart from "Rectangular strategy for Growth, Employment, equity and efficiency" in the National strategic Development Plan (2009 – 2013)?	• Interview to Ministry of Education in charge of higher education and vocational education • Questionnaire and interview to the dean and vice dean of ITC
	Does the project reflect the needs of the relevant organizations of the project?	• To what extent has the project responded to the needs for the three fields of engineering supported by the project? • How is the latest situation about the demand for and supply of engineers in Cambodia?	• Statistical data on the enrolments and graduates of universities in Cambodia • Statistical data on demand/supply of graduates, and interview to companies
	To what extent is the project purpose of strengthening ITC relevant to the HRD for industry?	• What is the specific importance of ITC for HRD for industry? • Is there any document that indicates the strategic roles or responsibilities of ITC for the development of human resources and educational development?	• Interview to Ministry of Education in charge of higher education and vocational education
	Are there any factors that affect the relevance of the project?	• Are there external factors (e.g., change in economic climate, educational system, etc.) significantly affecting the project?	• Interview to Ministry of Education in charge of higher education and vocational education, and the dean and vice dean of ITC
	Is the scope and target sector appropriate?	• Are the rationales for Japanese ODA to support the three departments of ITC still relevant to the needs of the Cambodian Government? • Does Japanese ODA have a comparative advantage to support the three departments of ITC?	• Interview to Ministry of Education in charge of higher education and vocational education • Interview and questionnaire to ITC and counterparts
	Is the Project in line with the country assistance policy of Japan to Cambodia?	• Has there been any change in the ODA policy since the commencement of the project? • Are any synergy effects recognized with other JICA-assisted	• The latest ODA policy paper • Interviews to JICA Cambodia

		projects in the same sector?	Office
Effectiveness	(PP) To what extent has the project purpose of "The quality of education is improved with more emphasis on practice and experiments at the target departments of ITC as a leading university." been achieved?	• How much has the project achieved in accordance with the indicators: • Evaluation committee to be established for the project assesses the quality of education is improved with more emphasis on practice and experiment.	• Results of evaluation committee meeting
	Are all the three outputs important to achieve the project purpose?	• To what extent is the importance of three expected outputs (the development of syllabus, the improvement of teaching methods and the proper utilization of equipment) to achieve the project purpose? • Are there any other outputs that are not specified in the PDM but necessary to achieve the project purpose?	• Interview and questionnaire to ITC and counterparts
	What are the promoting and inhibiting factors to achieve the project purpose?	• To what extent has the project purpose been achieved and what are issues or problems to be tackled?	• Interview and questionnaire to ITC and counterparts
Efficiency	(OP1) To what extent has the project's output 1 of "Syllabus for course work is improved with more practice and experiments." been produced?	• How much has the project achieved in accordance with the indicators: • Ratio of practice and experiments in the curriculum • The number of students per equipment • The number of revised syllabus • The number of revised instruction for practice and experiments	• Interview and questionnaire to ITC and counterparts
	(OP2) To what extent has the project's output 2 of "Teaching method of academic staff is enhanced to conduct practice-oriented education" been produced?	• Does ITC (the heads of each department) recognize the improved teaching methods of academic staff? • Is faculty development activity conducted on regular basis? Please describe what kinds of activities are conducted to develop the faculties.	• Interview and questionnaire to ITC and counterparts
	(OP3) To what extent has the project's output 3 of "Equipment for experiments is properly utilized for practice and experiment." been produced?	• For the proper utilization of equipment, what regulations and systems have been introduced? • For the proper utilization of equipment, what and how periodical review has been conducted by the taskforce?	• Interview and questionnaire to ITC and counterparts

	Has the project been implemented as scheduled in accordance with the plan of operations?	• If progress is not made as scheduled, what is the reason(s) for the delay and what measures have been taken to expedite project progress. Also, what are the factors when the progress was made as scheduled?	• Interview and questionnaire to ITC and counterparts, and experts
	Have the inputs provided by both sides as scheduled in an effective way?	• How much has input provided by both sides (e.g., operation costs, assignment of counterparts, dispatch of experts, training in Japan and third countries) and is such input appropriate? • If inputs such as assignments of experts, provision of equipment, allocation of the sufficient number of counterparts has been provided by both sides as scheduled? • Is the input provided in a cost effective manner? What measures are taken to manage the project in a cost effective manner?	• Interview and questionnaire to ITC and counterparts, and experts • Interview to ITC, counterparts and experts
	What project activities have been effective and what project activities have not been so effective?	• Identification of good activities that yields good outcomes and weak activities that need to be strengthened • Measures taken to improve activities.	• Interview and questionnaire to ITC and counterparts, and experts
	Are the project's framework, scope and approaches effective and efficient to produce outputs?	The following points will be reviewed: • Logicality and viability of PDM • Appropriateness of indicators to measure the achievements of Project Purpose and outputs • The scope of the project (target number and contents) against the size of inputs and duration of the project • Efficiency and effectiveness of the project's approach (prime targets, external factors and environment)	• Interview and questionnaire to ITC and counterparts, and experts
	Are there any factors that significantly reduce or promote the smooth implementation of the project activities?		• Interview and questionnaire to ITC and counterparts, and experts
Impact	To what extent has the overall goal of the project, "Graduates with stronger practical skills are developed by the target departments of ITC." been achieved?	• Will the overall goal likely be achieved by the project purpose? • Does ITC conduct follow-ups of its graduates about their employment, performance and evaluation by employers? • If ITC has not yet conducted such study, please give the current plan or ideas about the study (when, how, whom to be conducted by who). • What does ITC need to do or plan to do to provide practical skills to its graduates?	• Interview to Ministry of Education in charge of higher education and vocational education, and ITC

	What impacts can be generated by the successful implementation of the project?	• Apart from the above-mentioned impact, what impacts can be expected from the project to the HRD for industry (e.g., roll-out of project's good practices or introduced systems to other universities and vocational institutions)? • Are there factors (e.g., change in the needs for local engineers, the absorptive capacity of other educational institutions to emulate project's outputs, etc.)	• Interview to Ministry of Education in charge of higher education and vocational education, and ITC
	Are there any change to ITC and its staff because of the project?	• Any positive and negative impacts of the project to ITC and its staff • Indications and/or evidence of changes in the attitude, awareness and knowledge of counterparts	• Interview and questionnaire to ITC and counterparts, and experts
Sustainability	How does ITC plan to sustain and/or further improve the outputs being produced by the project?	• How does ITC plan to maintain the improved syllabus, teaching skills of academic staff and proper maintenance of equipment? • What would be a risk factor for the sustainability of the project's outputs? • To what extent will engineering education focusing on practice and experiment be entrenched in ITC, and what measure will be taken for the purpose by ITC?	• Interview and questionnaire to ITC and counterparts, and experts • Interview to ITC and counterparts • Interview to ITC and counterparts
	Is the importance of ITC, the policy support for engineering education consistent?	• Evidence (e.g. mid-term and long-term planning documents, policy papers, etc.) to show the consistent policy support for ITC after the project duration	• Interview to Ministry of Education in charge of higher education and ITC
	Will ITC be able to financially sustain the current activity level after the project duration?	• Budget allocation for the last three years • Fund and resource availability after the project duration	• Interview and questionnaire to ITC and counterparts
	Will ITC be able to properly maintain the equipment?	• If the management system of equipment (registration, budget availability for maintenance, responsible persons for operation and maintenance, equipment maintenance system – operation records, availability of operation manual and standard operating procedures) set up and operational?	• Interview and questionnaire to ITC and counterparts
	How does ITC plan to sustain the technical capacity developed by the project?	• What measures are taken by ITC to sustain and further develop the technical capacity of academic staff (e.g., measures for sharing knowledge and teaching skills, incentives or opportunities for continuous learning from external institutions including Japanese universities)	• Interview to ITC and counterparts

	Would the counterparts of the project continuously work with ITC after the project duration?	• Trends of staff turnover, transfer, restructuring, etc.	• Interviews to ITC
Process	Is the current implementation structure and system effective to facilitate project progress?	• What types of activities are used to facilitate project activities and make decisions at the operational level (e.g., organizing regular meetings and/or workshops, technology transfer sessions, etc.) and are such types of activities effective? • Is JCC meeting effective to address important issues and solve problems? • What measures are taken to facilitate communication among the participating members (experts and counterparts)	• Interview to ITC and counterparts, and experts
	What measures have been taken to overcome problems in the course of the project implementation?	• Problems identified during the project period • Measures taken to motivate the counterparts and the effects of such measures • Measures taken to deal with financial and budgetary constraints	• Interview and questionnaire to ITC and counterparts, and experts
	How was the monitoring of project progress conducted?	• Who was responsible for the monitoring of project progress and how was it conducted? • How were the results of monitoring shared and addressed to overcome problems?	• Interview and questionnaire to ITC and counterparts, and experts
	Was communication among important stakeholders often and effective?	• How did the stakeholders communicate and how often? • Was the means of communication effective? • How was the communication sufficient with the JICA headquarters, Cambodia office and the project office?	• Interview and questionnaire to ITC and counterparts, and experts
	Is the project implemented with imitative and ownership of ITC?	• Do the counterparts understand the PDM and their roles and responsibilities? • Have all the designated counterparts been participating in project activities? • How much have the counterparts participated in project activities (e.g., attendance of meetings, conduct of assignments, etc.)? • What initiatives taken by ITC to facilitate project progress?	• Interview and questionnaire to ITC and counterparts, and experts

	Are there any other factors that need to be addressed during the mid-term review for the smooth implementation of the project?		• Interview and questionnaire to ITC and counterparts, and experts

4．質問票（短期専門家対象/ITC教員対象）

付属資料 4-1

カンボジア工科大学教育能力向上プロジェクトの中間レビュー調査の一環として ITC、日本側専門家双方に簡易なアンケート調査を実施することになりました。このアンケートは、現状を把握すると同時に、プロジェクト後半の課題を明確にしてプロジェクトの効果や効率性を高めるために活用させて頂きます。ご協力よろしくお願い致します。

回答者：

所属：

支援対象学科：

1 プロジェクト全般の効率性・プロセスについて

1.1 プロジェクトの枠組み(Project Design Matrix: PDM)について、

A. 十分理解している（ ） B. ある程度理解している （ ）

C. 担当部分だけ理解している（ ） D. わからない（ ）

1.2 実施内容・量に対してプロジェクトの期間は、

A. 妥当である （ ） B. ある程度妥当である （ ）

C. あまり十分でない（ ） D. 非常に足りない（ ）

【C、Dと回答された場合】 主な理由はなんでしょうか。

1.3 専門家派遣の期間とタイミングは、

A. 十分である （ ） B. ある程度足りている （ ）

C. 不足している （ ） D. 非常に足りない （ ）

【C、Dと回答された場合】 主な理由はなんでしょうか。また、改善すべき点があればご記入ください。

1.4 機材投入の量とタイミングは、

A. 十分である （ ） B. ある程度足りている （ ）

C. 不足している （ ） D. 非常に足りない （ ）

【C、Dと回答された場合】 主な理由はなんでしょうか。また、改善すべき点があれ

ばご記入ください。

1.5 カンボジア側教員の本邦研修の期間とタイミングは、

A. 十分である　（　）　B. ある程度足りている　（　）

C. 不足している　（　）　D. 非常に足りない　（　）

【C、Dと回答された場合】　主な理由はなんでしょうか。また、改善すべき点があればご記入ください。

1.6 カンボジア側教員の本邦研修は全体的に、

A. 非常に有効だった　（　）　B. ある程度有効だった　（　）

C. あまり有効でなかった　（　）　D. 有効でなかった　（　）

1.7 本邦研修について、特にどのようなケースで有効性が高く、どのようなケースであまり有効でなかったか、お気付きの点があればご記入ください。また、研修の効果を高める必要のある点があれば、合わせてご記入ください。

1.8 ITCについて

A. 受入・実施体制に問題・困難はなかった　（　）

B. 受入・実施体制に問題・困難があった　（　）

【Bと回答された方へ】　どんな問題・困難があったでしょうか。また、改善すべき点があればご記入ください。

1.9 カウンターパートとのコミュニケーション

A. 非常に円滑　（　）　B. ある程度円滑　（　）

C. あまり円滑ではない（　）　　D. 大きな問題がある（　）

【C、D と回答された方へ】　どんな問題・困難があったでしょうか。また、改善すべき点があればご記入ください。

1.10 日本人専門家間（プロジェクト全体）のコミュニケーション・連携

A. 非常に円滑　（　）　B. ある程度円滑　（　）

C. あまり円滑ではない（　）　　D. 大きな問題がある（　）

【C、D と回答された方へ】　どんな問題・困難があったでしょうか。また、改善すべき点があればご記入ください。

1.11 日本人専門家間（学科内）のコミュニケーション・連携

A. 非常に円滑　（　）　B. ある程度円滑　（　）

C. あまり円滑ではない（　）　　D. 大きな問題がある（　）

【C、D と回答された方へ】　どんな問題・困難があったでしょうか。また、改善すべき点があればご記入ください。

1.12 カウンターパートの意欲

A. 非常に高い　（　）　B. ある程度高い　（　）

C. あまり高くない（ ）　　D. 低い （ ）

【C、Dと回答された方へ】　どんなことが原因となっているでしょうか。

1.13 カウンターパートの理解度・技術移転の効果

A. 非常に高い （ ）　B. ある程度高い （ ）

C. あまり高くない（ ）　　D. 低い （ ）

【C、Dと回答された方へ】　どんなことが原因となっているでしょうか。

1.12 本プロジェクトの円滑な促進上、特によかった点（促進要因）はなんでしょうか。

1.13 本プロジェクトを円滑に促進する上で、特に課題・問題であったことはなんでしょうか（上記1.1 - 1.7以外で）

2 プロジェクトの効果

2.1.1 ご担当の教科について、「より実習・実験を重視したコースのシラバス改善」は、

A. 非常に順調 （ ）　B. ある程度順調 （ ）

C. 遅れ気味である（ ） D. かなり遅れている（ ）

遅れている場合、どんなことが原因となっているでしょうか。

2.1.2 これまでのシラバス・カリキュラム改訂の進捗状況と今後の改訂スケジュールについて簡単にご説明ください。

2.2.1 ご担当の教科について、「ITC 教員の教授法の改善」は、

A. 非常に順調 （ ） B. ある程度順調 （ ）

C. 遅れ気味である（ ） D. かなり遅れている（ ）

遅れている場合、どんなことが原因となっているでしょうか。

2.2.2 これまでの Model Teaching の指導方法や内容と今後の取組みについて簡単にご説明下さい。

2.3 ご担当の教科について、「実習・実験機材の適切な活用」は、

A. 非常に順調　（　）　B. ある程度順調　（　）

C. 遅れ気味である（　）　D. かなり遅れている（　）

【C、Dと回答された方へ】　どんなことが原因となっているでしょうか

3 プロジェクトの効果、効果を高めるために今後特に重視するべきこと、改善すべきこと、新たな提案、その他これまでの質問に含まれていない点についてご意見・コメントなどご教示ください。

ご協力ありがとうございました。

付属資料 4-2

Questionnaire to Institute of Technology of Cambodia (ITC)

Name of respondent: _____

Title and department _____

Email: _____

Cellphone: _____

<Questions related to policy and institutional aspects>

1. It is understood that "Rectangular strategy for Growth, Employment, equity and efficiency" in the National strategic Development Plan (2009 – 2013) and the Educational Strategic Plan (2009 – 2013) prioritize human resource development for industry. Since the commencement of the project, has been any other policy issued with respect to university education or any change to the current policy on human resource development for industry?
   ☐ Yes ☐ No

Please describe if the answer is "Yes".

2. From the perspective of ITC, what are the most important achievements of the project that ITC expects from the project in order to improve the quality of education of ITC? The expected achievements include but not limited to the improved syllabus for course work, improved teaching methods of academic staff and improved utilization of laboratory equipment.

Please describe.

3. Please provide information that indicates the comparative importance for the project to support ITC (e.g., the university ranking of Cambodia, the number of applicants and enrolments to ITC, any other documents that show the importance of ITC to the strengthening of engineering education in Cambodia)

<Questions related to the achievements of the project>

4.1 To what extent do you think the project has achieved for each expected output. Please circle the appropriate number (percentage) below and give a reason(s) for your judgment.

4.1.1 Output 1: "Syllabus for course work is improved with more practice and experiments."

0 10 20 30 40 50 60 70 80 90 100 (%)

Please give the reason(s) for your judgment and also please provide data or information to support your judgment (if any).

Please describe the remaining tasks and/or issues that still need to be tackled before the end of the project (if any).

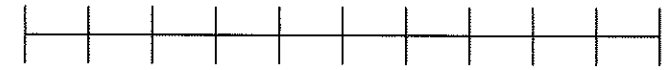
4.1.2 please describe the current situation about the following in accordance with the indicators specified in the PDM (Electrical and Energy Engineering: E, Industrial and Mechanical Engineering: I, Geo-resources and Geotechnical Engineering: G)

Indicator	Before the Project	Now
Ratio of practice and experiments in the curriculum	(E) (I) (G)	(E) (I) (G)
The number of students per equipment	(E) (I) (G)	(E) (I) (G)
The number of revised syllabus	(E) (I) (G)	(E) (I) (G)
The number of revised student laboratory manual for practice and experiments	(E) (I) (G)	(E) (I) (G)

4.1.3 Please provide information on the taskforce to revise syllabus.

Month/year of the taskforce established: The members: The method of revising syllabus:

4.2.1 Output 2: "Teaching method of academic staff is enhanced to conduct practice-oriented education."



Please give the reason(s) for your judgment and also please provide data or information to support your judgment (if any).

Please describe the remaining tasks and/or issues that still need to be tackled before the end of the project (if any).

4.2.2 Does ITC (the heads of each department) recognize the improved teaching methods of academic staff?

☐ Yes ☐ No

Please describe how and how much their teaching methods improved.

4.2.3 Is faculty development activity conducted on regular basis? Please describe what kinds of activities are conducted to develop the faculties.

4.3.1 Output 3: "Equipment for experiments is properly utilized for practice and experiment."

Please give the reason(s) for your judgment and also please provide data or information to support your judgment (if any).

Please describe the remaining tasks and/or issues that still need to be tackled before the end of the project (if any).

4.3.2 For the proper utilization of equipment, what regulations and systems have been introduced? Please describe.

4.3.3 For the proper utilization of equipment, what and how periodical review has been conducted by the taskforce? Please describe.

4.4.1 Project Purpose: "The quality of education is improved with more emphasis on practice and experiments at the target departments of ITC as a leading university."

0 10 20 30 40 50 60 70 80 90 100 (%)

Please give the reason(s) for your judgment and also please provide data or information to support your judgment (if any).

Please describe the remaining tasks and/or issues that still need to be tackled before the end of the project (if any).

4.4.2 When was the evaluation committee to assess the quality of education in ITC established?

4.4.3 Please provide information on the evaluation committee in the box below.

The members: The number of times Committee meetings organized: The method to evaluate the quality of education:

4.5 Are there any other outputs that are not specified in the PDM but necessary to achieve the project purpose? Please describe such outputs if your answer is "Yes".

☐ Yes ☐ No

<Process of project implementation and efficiency>

5 Please tick the appropriate box below and give reason(s) for your answer.
5.1 Overall plan of the project (Project Design Matrix)

☐ Very clear ☐ Clear to some extent ☐ Not so clear ☐ Not clear

Please comment if there is any issue or request.

5.2 Communication and coordination with the experts

☐ Very good ☐ Satisfactory ☐ Not so good ☐ Need improvement

Please comment if there is any issue or request.

5.3 The number and expertise of the Japanese experts (long-term and short-term)

☐ Very good ☐ Satisfactory ☐ Not so good ☐ Need improvement

Please comment if there is any issue or request.

5.4 Timing and quantity of inputs (experts, project budget, equipment, etc.) provided for the project activities by the Japanese side

☐ Very good ☐ Satisfactory ☐ Not so good ☐ Need improvement

Please comment if there is any issue or request.

5.5 Timing and quantity of inputs (staff assignment, etc.) provided for the project activities by the Cambodian side

☐ Very good ☐ Satisfactory ☐ Not so good ☐ Need improvement

Please comment if there is any issue or request.

5.6 Method and contents of technology transfer from the Japanese expert to the counterpart personnel

☐ Very good ☐ Satisfactory ☐ Not so good ☐ Need improvement

Please comment if there is any issue or request.

5.7 Comments and suggestions on how to further improve the process of project activities and work efficiency

Comments and suggestions:

<Questions related to expected, project's impacts>

6.1 The expected overall goal of the project is "Graduates with stronger practical skills are developed by the target departments of ITC." Does ITC conduct follow-ups of its graduates about their employment, performance and evaluation by employers?

☐ Yes ☐ No

6.2 If ITC has conducted such follow-up study, please provide the results of the study. If ITC has not yet conducted such study, please give the current plan or ideas about the study (when, how, whom to be conducted by who).

<Questions related to Sustainability after the project duration>

7.1 Prospects of sustainability

Please give your assessment about the sustainability of the outputs produced by the project (e.g., continuous syllabus development, improvement of teaching skills and proper maintenance and utilization of equipment, etc.) and provide reason(s) for your judgment.

☐ Highly sustainable

☐ Sustainable to some extent

☐ Not so sustainable

Please list the issues or problems that may affect the sustainability: (1) (2) (3) (4) (5)

7.2 Please provide data on budget of ITC for the last three years in the below format.

Budget items	2011	2012	2013
Total			

7.3 Please provide the latest organizational chart of ITC. Also, please provide the latest list of counterpart personnel.

7.4 Please briefly answer to the following questions about operation and maintenance of equipment.

	Question	Answer
1	Are all pieces of equipment provided by the project registered by ITC?	
2	Is the registration of equipment periodically updated and checked by ITC?	
3	Is ITC able to allocate a sufficient budget for the operation and maintenance of equipment? Please also describe the system of ITC to allocate a budget for equipment.	
4	Please describe the current system of equipment operation and maintenance of ITC (e.g., record keeping, designation of responsible persons for operation and maintenance, availability of operation manual and standard operating procedures, etc.)	

7.5 What measures are taken by ITC to sustain and further develop the technical capacity of academic staff (e.g., measures for sharing knowledge and teaching skills, incentives or opportunities for continuous learning from external institutions including Japanese universities)?

7.6 In your view, what measures the project should take to ensure the sustainability of the project activities after the project duration

8. The project is going to be terminated in one and half years. Please feel free to give any comments, suggestions and recommendations to further improve the project.

Thank you very much for your cooperation.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