

## 添付資料 2

### 合同調整委員会（JCC）議事録

**RECORD OF DISCUSSION  
OF THE 5<sup>TH</sup> JOINT COORDINATING COMMITTEE  
BETWEEN  
THE GOVERNMENT OF MALAYSIA AND  
THE JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
ON JAPANESE TECHNICAL COOPERATION FOR  
THE NETWORKED MULTIMEDIA EDUCATION SYSTEM (NMES)  
PROJECT**

The 5<sup>th</sup> Joint Coordinating Committee (JCC) Meeting, consisting of representatives of the Government of Malaysia (hereinafter referred to as "Government") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), was convened at the Ministry of Energy, Water and Communications, Putrajaya, on the 26<sup>th</sup> of May 2005 to review and endorse the Joint Evaluation Report (hereinafter referred to as the "Report") on the accomplishment of the objectives for the Networked Multimedia Education System (NMES) (hereinafter referred to as "the Project").

Both sides endorsed the "Report" that was duly conducted with the proposed Terms of Reference agreed upon during the Project Meeting held earlier on the 17<sup>th</sup> till the 18<sup>th</sup> of January 2005. The members of the meeting expressed their gratitude for the efforts of those involved in the preparation of the "Report".

A presentation of the current status of the "Project" by Multimedia University received consensus from the representatives of both sides.

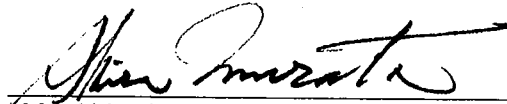
Both the Government and JICA agreed that the objectives of the "Project" had been achieved and agreed that the "Project" would be terminated as scheduled on the 30<sup>th</sup> of June 2005.

The Government extended its gratitude to JICA for their assistance and contribution towards the successful implementation of the "Project".

Putrajaya, Malaysia  
26 May 2005

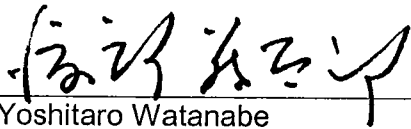


Y.Bhg. Dr. Halim Man  
Deputy Secretary-General 1  
Ministry of Energy, Water and  
Communications  
Malaysia

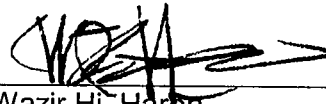


Mr. Akira Murata  
Resident Representative  
Japan International Cooperation Agency  
Malaysia Office

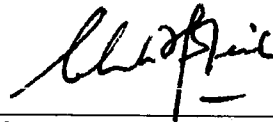
Witnessed by :-



Mr. Yoshitaro Watanabe  
Chief Advisor  
Networked Multimedia Education System  
(NMES) Project  
Japan International Cooperation Agency



Mr. Wazir Hj. Haron  
Senior Principal Assistant Director  
Economic Planning Unit  
Prime Minister's Department  
Malaysia



Professor Hean-Teik Chuah  
Vice President, Dean  
Faculty of Engineering  
Multimedia University  
Malaysia

## **ATTACHED DOCUMENT**

- I. Agenda**
- II. Attendance List**
- III. Joint Evaluation Report ( 本報告書の添付資料 1 に掲載 )**

# Network Multimedia Education System (NMES)

## Joint Coordinate Committee Members

26 May 2005, Putrajaya

### AGENDA

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1. OPENING AND WELCOME REMARKS BY THE MALAYSIAN LEADER
  - DR. HALIM MAN  
DEPUTY SECRETARY GENERAL I  
MINISTRY OF ENERGY, WATER AND COMMUNICATIONS
2. OPENING AND WELCOME REMARKS BY THE JAPANESE LEADER
  - MR. AKIRA MURATA  
RESIDENT REPRESENTATIVE  
JAPAN INTERNATIONAL COOPERATION AGENCY
3. PRESENTATION OF THE JOINT EVALUATION REPORT
4. DISCUSSION AND APPROVAL OF THE JOINT EVALUATION REPORT
5. UPDATES ON THE CURRENT STATUS OF THE NMES BY MULTIMEDIA UNIVERSITY
6. OTHER RELEVANT MATTERS
7. CLOSING REMARKS BY THE JAPANESE LEADER
8. CLOSING REMARKS BY THE MALAYSIAN LEADER
9. MEETING ENDS

## Joint Coordinate Committee

26 May 2005, Putrajaya

### Attendee's List

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#### **MALAYSIA**

##### **Ministry of Energy, Water and Communications**

1. Y.Bhg Dr. Halim Man - Chairman  
Deputy Secretary-General I
2. Mr. Anbalagan  
Undersecretary, International Relations Unit
3. Mr. Mohd Azman Hj Mohd Ariffin  
Principal Assistant Secretary
4. Mr. Ling Hau Yong  
Assistant Secretary

##### **Economic Planning Unit, Prime Minister's Department**

5. Mr. Wazir Hj. Haron  
Principal Assistant Director  
Social Services Department

##### **Ministry of Human Resource**

6. Ms. Norazian  
Assistant Director

##### **Ministry of Higher Education**

7. Dr. Guan Eng Chan  
Assistant Director  
Technical Education Department

### **Multimedia University**

8. Prof. Chuah Hean Teik  
Dean  
Faculty of Engineering
9. Dr. Lee Sze Wei  
Associate Dean  
Faculty of Engineering

### **Telekom Malaysia Berhad**

10. Mr. Jonedi Mohamed  
General Manager  
Government Sales Division
11. Business Development Manager  
Telekom Smart School Sdn Bhd.
12. Mr. Abd Halim Abd Razak  
Chief Executive Officer  
GITN Sdn Bhd

## **JAPAN**

### **Ministry of Foreign Affairs**

1. Mr. Shigeo OKAMOTO  
Second Secretary & Communications Attache
2. Mr. Naoya SATO  
Second Secretary & Communications Attache

### **Ministry of Internal Affairs Communications**

3. Mr. Yuji AOKI  
Assistant Director  
International Cooperation Division  
International Affairs Department  
Telecommunications Bureau

### **Institute for International Cooperation, Japan International Cooperation Agency (JICA)**

4. Mr. Akira MURATA  
Resident Representative
5. Mr. Nozomu GODA  
Senior Advisor
6. Mr. Tomoyuki YASUDA  
ICT Team, Group II  
(Information and Communication Technology)  
Social Development Department
7. Ms. Akiko KAWATA  
Assistant Resident Representative



## **Nagoya Institute of Technology**

8. Dr. Akira IWATA  
Professor, PhD  
Department of Computer Science and Engineering

## **International Development Associates Ltd**

9. Ms. Takako HARAGUCHI  
Evaluation Analysis

## **Project Coordinator Team**

11. Mr. Yoshitaro WATANABE  
Chief Advisor
13. Mr. Atshushi NAKAHIRA  
Expert in Satellite
14. Mr. Toshizo UCHIDA  
Expert in Network System Management
15. Mr. Izumi YAMAMOTO  
Project Coordinator

## 添付資料 3

### 評価グリッド（和文）

評価グリッド

1. プロジェクトの実績

プロジェクト要約	指標	収集情報
<b>スーパーゴール</b> マレーシア国内外において工学・IT・マルチメディア分野の人材が育成される	(協力終了後5~10年) ① 遠隔教育修了者の就職率 (%) ② マナレレッジワーカーの需給バランス (%) (2005年には3万人のITエンジニア不足)	① NMES 修了者の就職はまだ。マ国全体のデータは入手できず (MEWC「遠隔授業に関する研究は開始されたばかり」) ② アップデート情報入手できず。MSC 入居企業数増加。MEWC、MMU「需要はいまだに高い」
<b>上位目標</b> マルチメディアネットワーク教育システムがマレーシア国内外の工学・IT・マルチメディア分野において他機関へ普及する	(協力終了後5年) ① MMU の NMES と協力関係にある機関の数 ② 新規協力機関での開設コース数 ③ 新規協力機関を含む、遠隔授業科目の履修学生数 (累計) ④ 新規協力機関を含む、遠隔授業コース修了者数	① 現時点では新規機関はなし (拡大計画あり)。 ② 現時点ではなし。 ③ 現時点ではアウトプット 3②に同じ。 ④ 現時点ではプロジェクト目標指標 ②に同じ。
<b>プロジェクト目標</b> MMU 及びリモートサイトにおいてマルチメディアネットワーク教育体制が確立される	(協力終了時) ① MMU 及びリモートサイトにおける双方向送受信システムの構築 ② 遠隔授業を採用したコースの修了者数 ③ 遠隔授業を受けた学生の修了率 ④ 遠隔授業受講生の成績 (対面授業と比較) ⑤ MMU から各リモートサイトへの出張講義の回数	① 構築済み。 ② (DIT) MMU サイバージャヤ (対面) 3名、ILP クアantan (遠隔) 7名、TTC サバ (遠隔) 6名。(MEM) 現時点では修了者なし。 ③ (DIT) MMU サイバージャヤ 18%, ILP70%, TTC46%。(MEM) 現時点では該当せず。 ④ (DIT) 遠隔授業科目の成績は、ハブサイトとリモートサイトではほぼ同傾向。ハブサイト学生の方が成績がよい科目もあり (平均点、A の数等)。 ⑤ PSDC ペナンへ、一学期あたり 15 回程度出張講義あり。
<b>アウトプット</b> 1) MMU 及びリモートサイトにおいて遠隔授業を行うシステムが構築される ① 送信システム構築 ② 受信システム構築 ③ 遠隔授業実施	(協力終了時まで) ① MMU に構築された送信システムが機能する ② 各リモートサイトに構築された受信システムが機能する ③ 1) 講師用マニュアル 2) 授業実施時間数 ④ 1) ネットワークシステムのメンテナンスマニュアル 2) 授業中に起こった通信回線の中断期間・回数及び中断回数	① 送信システム構築済。遠隔授業アプリケーション使用に諸問題があり MPEG4 の使用に置き換えられ、帯域節約及び画質・音質向上。 ② 受信システム構築済、ほぼ良好に作動。 ③ 1) MMU がコンテンツ開発マニュアルを開発。遠隔授業を行う教官はこれを理解。 2) (2005年4月までの累積)計 3,082

プロジェクト要約	指標	収集情報
④メンテナンス		<p>時間（授業 2,246 時間、会議・セミナー等 836 時間）。05 年 4 月の DIT 授業への一日当たり使用時間は平均 6.4 時間。</p> <p>④ 1) 専門家・CP が 13 種のメンテマニュアル作成。CP はマニュアルを自力で改訂する技術力を持つ（専門家・CP の意見）。 2) 2004 年 6 月以来通信断絶なし。授業中の短時間の音声等途絶が 10 回未満あり。</p>
2) MMU 及び各リモートサイトが提供するカリキュラムに沿った遠隔授業が行われる	<p>① MMU とリモートサイトの間で確立された遠隔授業の科目数(6 履修過程で導入予定)</p> <p>② 遠隔授業の割合</p> <p>③ 遠隔授業担当者によるカリキュラム満足度</p> <p>④ 遠隔授業担当教員のカリキュラム満足度</p>	<p>① DIT: 25 中 18 科目 (72%) MEM: 13 中 6 科目 (46%)</p> <p>② DIT: 90 中 63 単位時間数 (70%) MEM: 10.5%</p> <p>③ 総じて満足</p> <p>④ 総じて満足</p>
3) 有効なマルチメディア教材が遠隔授業に活用される	<p>① 開発されたマルチメディア教材</p> <p>② 遠隔授業科目の履修人数 (DIT240 名、MEM120 人名を含み計 1,780 名 (運営指導報告では 920 名))</p> <p>③ 遠隔授業科目出席率</p> <p>④ 学生の満足度</p>	<p>① テキストとパワーポイントの講義ノート (各講師作成) がハブサイトのサーバーに蓄積され、教官・学生によりダウンロード可能。教材の著作権について注意喚起あり。</p> <p>② BIT700 名、DIT106 名、MEM50 名、短期コース・セミナー約 5,800 名。2005 年には MET コース開始予定 (PSDC ペナン)。</p> <p>③ 遠隔授業、対面授業で出席率の差みられず。</p> <p>④ DIT では総じて満足。MEM では画像・音声等に不満、対面授業をより好む傾向あり。</p>
投入 (インプット) <日本側>	<p>① 長期専門家 5 名</p> <p>② 短期専門家 30 名程度</p>	<p>① 長期専門家 8 名</p> <p>② 短期専門家のべ 24 名。</p> <p>③ その他技術調査を含む調査団 14 回</p>
1) 専門家派遣		
2) 機材供与	約 3.8 億円	468,805,000 円
3) 研修員受入れ	16 名程度	15 名
4) 現地活動費		16,564,000 円
<マレーシア側>	<p>① 無線・衛星系 7 人</p> <p>② ネットワークシステム技術マネジメント 8 名</p> <p>③ マルチメディア教材ソフト開発 11 名</p>	<p>ハブサイト 21 名 (MMCC ダイレクター、副ダイレクター、アシスタントダイレクター、無線・衛星系 5 名、ネットワークマネジメント 2 名、コースウェア開発 3 名、サイバー法 2 名、ラ</p>

プロジェクト要約	指標	収集情報
	④ サイバー法 3 名 ⑤ MMCC 6 名、等	ボ・エンジニア 3 名、ラボ・オペレーター 2 名)  リモートサイト 14 名
6) ローカルコスト	衛星通信費、管理費等	1,070,059RM
7) 施設	講義室、操作室、プロジェクト事務所等	計画通り。

## 2. プロジェクトの実施プロセス

調査項目	データ・情報源	収集情報
1) 活動は計画通りに実施されたか？ →計画以上の実施	活動実績	① PDM に記載された活動は、ほぼ PO に沿って開始されているが、ほとんどの技術移転活動は現在まで継続中 ② 2005 年に追加的な技術移転計画が実施され、計画通り進行している。
2) 技術移転の方法に問題はなかったか？ →問題なし	技術移転プロセス	① 技術移転は専門家と CP 共同でのシステム運用、専門家による座学・実地訓練、日本での研修により実施。 ② CP は技術移転につき満足。技術移転につき特に問題は報告されていない。
3) 機器設置プロセスに問題はなかったか？ →問題あり	機器設置プロセス	① 据付業者の業務内容にシステムインテグレーションが組み込まれていなかったため、初期トラブルの対応に専門家があたらなくてはならず、責任の所在が曖昧となったこと、日本でも使用例の少ないアプリケーションが導入されたこと、等によりトラブル解決が困難となった。 ② 専門家と CP はトラブル解決・システム安定化に多大な努力を払い、プロジェクト前半の大半の時間を費やした。
4) プロジェクトのマネジメント体制に問題はなかったか？ →問題なし	モニタリングの仕組み 意思決定過程 JICA の機能 プロジェクト内のコミュニケーション	① JCC は 3 回開催、運営会議・技術会議はほぼ毎週開催。 ② MMU 「JICA と MMU の連携はスムーズ」 ③ モニタリングは日マ双方によりガイドライン通り実施・報告、さらに日本側は特に専門家の活動内容につき、四半期ごとに報告。 ④ MMU は、トップダウンの指示と CP 各人の熱意の相互作用により的確なプロジェクト運営を行った。 ⑤ 日本での研修により CP の意識が向上 (CP の意見)。
5) CP、TG や関係組織のプロジェクトへの参加度やプロジェクトに対する認識は高いか？	定例会、JCC 等出席率 (議事録) プロジェクトに割いた時間	① モニタリング報告や JCC での報告は MMU のイニシアチブにより実施。システムのトラブル記録は CP 側に移管され、CP 側の責任により行われている。 ② MMU 「一部リモートサイトの参加が期待したほど活発ではなかった」

調査項目	データ・情報源	収集情報
→概ね高い		
6) 実施過程で生じている問題や、効果発現に影響を与えた要因は何か？ →問題生じたがほぼ解決	実施過程で生じた問題（技術面、運営面）とそれへの対処状況 その他促進要因	① システムの不安定さ→帯域拡張、機器交換・調整等によりほぼ解決。 ② 入札条件にも入っていたシステムの保守契約が実現しなかった（導入時に保守契約内容が詰められていなかった、実施途中で見積られた契約金額が高額だった）。MMUは保守契約なしでシステムを運用する方針とし、CPは技術移転により高度なメンテナンス技術を習得。

### 3. 評価5項目による評価

#### 3.1 妥当性

調査項目	データ・情報源	収集情報
<必要性> 1) 対象地域、TGのニーズに合致していたか？ →一部リモートサイトを除き合致	マレーシア全国、MSC、MMU、産業界等のニーズ 8MP, OPP等計画文書	① プロジェクト期間を通じ、高度なITワーカーへの高い需要。 ② 2005年4月25日時点で972企業がMSCにて操業（2010年までに250社との予測を大きく上回る）。 ③ <リモートサイトの遠隔授業ニーズ> 1) クアantanでは本プロジェクト以外にディプロマ以上が取得できる高等教育機関はなし。 2) サバではMMUによる学位・資格へのニーズが高い。 3) ペナンでは社会人の修士号へのニーズが高い。 4) マラッカでは教官の増員により遠隔授業のニーズはなくなった。
<優先度> 2) マ国、日本の開発政策との整合性はあるか？ →整合性は高い	8MP, OPP等計画文書 国別援助実施計画	① 第7次、第8次国家開発計画いずれでも、ITワーカーの育成は高い優先度。 ② MSCのための人材育成、教育におけるICTの活用にかかる協力は日マ政府間の合意事項(97年郵政大臣の訪マ、2000年九州沖縄サミット、教育大臣会合等) ③ マレーシア国別援助実施計画でも人材育成、ICT開発は優先度が高い。
<手段としての適切性> 3) 戦略として適切だったか？ →適切	戦略とその策定過程	① 複数の遠隔授業手段を検討し、対面授業と同じ環境を実現する方針から双方向映像・同期・マルチメディア型を選択。 ② 地上回線、衛星回線の双方を検討し、計画当時の地上回線普及状況とコスト比較により上下とも衛星回線使用。 ③ システム構築と授業内容（コンテンツ・教授法）双

調査項目	データ・情報源	収集情報
		方にかかる技術協力を組み合わせた。
4) TGの選定は適正だったか？ →おおむね適正	TG選定過程	リモートサイトは、教育機関としての重要性、遠隔教育の必要性（地理的条件等）、公益性等を考慮して選定された。ただし本件への積極性や学事暦の違いによる調整の困難さ等の懸念あり、リスクを抱えた上での選択。
5) 日本の技術の優位性はあったか？ →優位性あり	日本の遠隔教育にかかる経験	SCSプロジェクト（96～）、民間、大学等でネットワーク型授業・会議・研修等実施
<その他> 6) プロジェクトを取り巻く環境が変化したか？ →変化したがプロジェクトの妥当性を損なうものではない	技術革新の状況（地上回線の整備状況含む） マ国内高等教育整備、遠隔教育実施状況（タイプ別）	① 地上網通信の発展 ② 運営指導「IT技術革新の速さが本件に与えた影響は少ないと判断」（衛星通信を利用した本システムはIPパケット通信技術の革新やPCのOSアップグレードとは関係ない）

### 3.2 有効性

調査項目	データ・情報源	収集情報
1) プロジェクト目標は達成されるか？ →達成	「1. プロジェクトの実績」参照	① システム構築され、問題はほぼ解決済み。 ② TTC、ILPより計13名が遠隔DITコース修了。 ③ 遠隔授業科目履修者の良好なパフォーマンス、等
2) アウトプットは、プロジェクト目標達成に十分だったか？ →十分	遠隔授業に使われた機器・技術、使われなかった機器・技術	① 全ての機器・アプリケーションはシステム確立の試行錯誤過程の中で用いられ、システムは学期中ほぼフル稼働。導入した遠隔授業アプリケーションは本システムには適当ではないことが判明し、MPEG4で置き換えられた。これにより、2005年6月からの遠隔授業の質向上が期待される。 ② CPはシステム運用、点検、一次レベル障害復旧が自力でできるようになった。 ③ MEM学生の満足度は高くない。MMUは満足度向上のための努力を行っている。
3) アウトプットからプロジェクト目標に至る外部条件は満たされたか？ →一部満たされなかったが対策講じ影響はなし	日本のODA供与額 技術スタッフの定着状況	① 日本のODAは継続した。 ② オペレーター1名、エンジニア2名が技術移転を受けた後に離職。もっとも現在のエンジニアは必要技術をCPより移転（CPに技術移転能力あり）。
4) 目標達成の阻	履修人数が少ない理	① <履修人数が少ない理由>

調査項目	データ・情報源	収集情報
害・貢献要因は何か？	由 その他	1) 当初見込みが過大。 2) MMU マラッカでは教員採用により遠隔授業不要に。 3) 遠隔授業科目の認定、許可の遅れ。 4) システムは授業のみでなく会議やセミナーにも多用。 ② <阻害要因>一部リモートサイトで電圧不安定。 ③ <促進要因>TTCやILPでは対面チュートリアル(TTCでは補講も)を実施し学生の理解を助け、また授業時間以外にも学生がラボを使える環境を提供。

### 3.3 効率性

調査項目	データ・情報源	収集情報
<アウトプット産出> 1) アウトプットの産出状況は適正か？→適正	「1. プロジェクトの実績」参照	アウトプットは計画通り産出。
2) 活動はアウトプット産出に十分だったか？→十分	アウトプットに結びついた活動、結びつかなかった活動	活動は全てアウトプット産出のためのものだった。
3) 活動からアウトプットに至る外部条件は満たされたか？→一部満たされず	JICA の専門家リクルート状況 リモートサイトとのカリキュラム調整状況	① 専門家の適時のリクルートが困難な場合あり ② UNIMAS との調整が困難だった。
<投入実施> 4) 活動実施に過不足ない量・質の投入が、タイミング良く実施されたか？→タイミングに一部問題あり	投入実績（「1.プロジェクトの実績」参照） 使われた投入、使われなかった投入	① 全ての投入は活動実施に用いられた。ただしコースウェア開発専門家はシステムが不安定で教材開発に注力できるに至らない時期の派遣。 ② システムの問題を解決するために必要な追加投入実施。 ③ メーカー・納入業者の技術者を短期専門家や調査団員として派遣したことはメンテナンス技術移転に効果的だった。
<コスト> 5) 類似案件と比較して、アウトプットは投入に見合ったものか？→類似案件とは比較不能	総コスト、ユニットコスト 類似案件	① ユニークなシステムの構築であり他案件との比較困難。 ② 投入が増加したためアウトプット/インプット比は計画より低い。ただしNMESはユニークなシステムであり、マレーシアの教育環境にて用いるのも初めてであったことから、生じた問題の幾つか（及びその解決に必要な追加投入）は計画段



調査項目	データ・情報源	収集情報
		階では予見できなかった。

### 3.4 インパクト

調査項目	データ・情報源	収集情報
<p>&lt;上位目標達成見込&gt; 1) 上位目標は達成される見込みか?→不明</p>	「1. プロジェクトの実績」参照	幾つかの教育・訓練機関が NMES に関心示すも現時点では新規参入の具体的計画なし。
2) マ国開発計画へのインパクトは見込めるか? →追加投資の有無による	「1. プロジェクトの実績」参照	NMES が遠隔授業の有効なツールであることは実証されたので、受益者拡大にかかる追加投資がなされれば人材育成への貢献が期待される。
3) プロジェクト目標から上位目標に至る外部条件は満たされたか? →一部不確実	衛星回線通信料変更の有無 他機関への NMES の広報・宣伝状況と他機関からの照会の有無・数	<p>① 衛星回線使用料は少なくとも 2006 年までは現状据置き。MMU によるとその後も同条件で契約更新できる見込み有。</p> <p>② MMU、リモートサイトは遠隔授業受講学生増加の努力を行っている。他機関からの照会もあり。</p> <p>③ &lt;PDM では想定されていないが重要と思われる外部条件&gt; 遠隔授業への新規参加にかかる投資が行われることが必要</p>
<p>&lt;波及効果&gt; 4) 上位目標以外の正負のインパクトは生じたか? →技術革新への影響</p>		<技術革新へのインパクト>マレーシアの遠隔授業のほとんどが非同期である中、本プロジェクトは双方向映像・同期・マルチメディア型遠隔教育を実用化した初めてのケース。

### 3.5 自立発展性

調査項目	データ・情報源	収集情報
<p>&lt;政策・制度面&gt; 1) 政策支援は協力終了後も継続するか? →継続</p>	MMU への政策的支援の有無	MWEC は NMES の継続への支援を表明。
2) 関連規制・法制度は整備されているか?→整備	関連法規一覧	NMES を用いた遠隔授業コースは全て正規の学位・資格を付与するものとして認定済。サイバー法も施行。
3) プロジェクト効果の広がり支援する取組みが担保されて	将来計画	① マ国政府は NMES 拡大計画策定済み（遠隔地は引き続き衛星使用、都市部・準都市部は地上回線導入予定）。

調査項目	データ・情報源	収集情報
<p>いるか？ →計画あり</p>		<p>② 大都市では IP-VPN 及び専用リース回線の普及進む。ADSL は全国の中規模市街地までサービス拡張（ただし品質にはばらつきあり）。</p> <p>③ MMU は、コンテンツ開発については日本を含む他大学と協力関係を結ぶことを計画。</p>
<p>&lt;組織・財政面&gt; 4) 協力終了後も効果を上げるための活動を実施できる組織能力はあるか？ →高い組織能力あり</p>	<p>ハブ局、リモート局、MMCC の組織図、人材配置と将来見込 意思決定とフィードバックの仕組み</p>	<p>① MMU の高いマネジメント能力が認められる（カリキュラムの継続的な改善、NMES 時間割調整、学生のパフォーマンス・遠隔授業への満足度の継続的モニタリングとフィードバック）</p> <p>② 本プロジェクト CP は継続して NMES 運用に配置予定。プロジェクト事務局である MMCC は存続予定。</p> <p>③ MMU は協力終了後のシステム・メンテナンス計画策定済。</p>
<p>5) 実施機関のプロジェクトへのオーナーシップは十分か？→十分</p>	<p>協力終了後の本プロジェクトにかかる措置</p>	<p>上記 3)、4) は全てマレーシア側（政府、MMU）により実施。</p>
<p>6) 経常経費を含む予算は確保されているか？ →確保されている</p>	<p>MMU 財務データ メンテナンス予想額</p>	<p>① 2001 年 MMU 運営費 1.1 億 RM のうちメンテナンス費は 640 万 RM (5.8%)</p> <p>② 2004 年 4 月 MMU 見積りによる、協力終了後の年間メンテ費用（修理代、修理の人員費・送料等含む）は 25 万 RM、衛星回線使用料は約 27 万 RM (7 万米ドル)。一方 DIT 年間授業料収入は 62 万 RM (16.2 万米ドル)。</p> <p>③ 追加技術移転により少なくとも第一次障害復旧にかかる外注費は節約できる見込み。</p> <p>④ リモートサイト機関は衛星系を除く受信システム機器のメンテ経費負担に合意済。</p>
<p>&lt;技術面&gt; 7) 用いられた技術移転の手法は受容されているか？→受容されている</p>	<p>技術移転手法</p>	<p>① リモートサイトの運用、メンテ担当者は MMU サイバージャヤで 1 ヶ月研修後実務に入る。</p> <p>② CP は日本でも機会が少ない実地訓練を通し、保守の外注が不要なレベルの技術力を獲得（専門家・CP の意見）</p>
<p>8) 資機材の維持管理は適切に行われているか？ →適切</p>	<p>機材の現況 メンテナンス実施状況 移転技術を CP 独自で実践している度合い</p>	<p>① システムの不具合は迅速に解決、予備品も購入済。</p> <p>② ほとんどの障害はすでに CP により経験済み。</p> <p>③ リモートサイトのシステム保守は MMU の指示により実施。</p> <p>④ MEASAT2 は数年後に寿命到来・交換予定。CP は衛星入れ替えに伴う設定・調整技術を既に習得。</p>
<p>9) 他へ普及できる技術か？→普及できる</p>	<p>新規参入機関に必要な技術レベル</p>	<p>リモートサイトのスタッフには高度な技術不要（MMU に状況を報告できればよい）。</p>

添付資料 4

Summative updated

# **Summative evaluation report on the NMES 2003-2005**

**(with updates from the August 2004 report)**

prepared by

NMES Content development task force

January 2005

## Summative evaluation report on the NMES 2003-2005

### 1.0 Introduction

This report presents how the NMES has evolved from its inception in 2003 to 2005. The outline of this paper is as follows: Section 2 discusses comparative academic performance among all learning sites, Section 3 feedback from lecturers and students on the NMES, Section 4 achievements, Section 5 matters to be addressed and finally Section 6 concludes.

### 2.0 Academic performance

The academic performance of the Diploma in IT students in MMU Cyberjaya, ILP Kuantan and TTC Sabah is closely monitored every semester. Table 1 indicates the average GPAs (Grade Point Averages) of students at different sites. Out of a total of 40 students (17 in Cyberjaya, 10 in ILP Kuantan and 13 in TTC Sabah) as of August 2004, it is found that the average GPA for remote sites (ILP Kuantan and TTC Sabah) is better than that of the hub site (Cyberjaya).

**Table 1** Average GPA at different sites

	MMU Cyberjaya	ILP Kuantan	TTC Sabah
Trimester 1	1.59	2.60	2.45
Trimester 2	1.63	2.59	2.19
Trimester 3	2.14	2.75	2.50

More detailed breakdown of academic performance in every trimester is presented in the following subsections.

#### 2.1 Academic performance for trimester 1 2003/4

Tables 2 and 3 compare academic performance in terms GPA and in terms of average score and standard deviation for trimester 1 2003/4 respectively.

**Table 2** Students' performance in terms of GPA class

Courses\Site	MMU Cyberjaya		ILP Kuantan		TTC Sabah	
	No.	Percentage	No.	Percentage	No.	Percentage
Credit	1	5.00	4	36.36	4	28.57
Pass	6	30.00	4	36.36	6	42.86
Fail	13	65.00	3	27.27	4	28.57
<b>Total</b>	<b>20</b>		<b>11</b>		<b>14</b>	

TTC Sabah shows the best performance in terms of credit and passes followed by ILP and Cyberjaya. Failure rate in Cyberjaya is rather worrisome.

**Table 3 Average performance**

<b>Cyberjaya (20)</b>	A	B	C	F	Average	Stddev	Total
DCS5018		15.79	68.42	15.79	51.74	7.80	19
DCS5028	6.25	6.25	31.25	56.25	48.12	13.63	16
DEN5018	5.88	47.06	47.06		60.09	7.57	17
DIM5058	7.14	7.14	28.57	57.14	47.12	16.34	14
Cum. Average	6.42				51.77		

<b>ILP (11)</b>	A	B	C	F	Average	Stddev	Total
DCS5018	9.09	63.64	27.27		65.19	7.67	11
DCS5028		18.18	63.64	18.18	54.94	8.30	11
DEN5018		63.64	36.36		61.45	6.61	11
DIM5058	9.09	36.36	45.45	9.09	62.57	11.77	11
Cum. Average	6.06				61.04		

<b>TTC (14)</b>	A	B	C	F	Average	Stddev	Total
DCS5018	7.14	50.00	42.86		61.61	8.60	14
DCS5028	7.14	35.71	35.71	21.40	57.14	10.41	14
DEN5018	7.14	78.57	14.29		64.50	5.08	14
DIM5058		35.71	42.86	21.43	56.90	9.35	14
Cum. Average	7.14				60.04		

*\*DCS5018 = Computer systems and applications, DCS5028 Discrete structures, DEN5018 English, DIM5058 Mathematical Techniques I*

## 2.2 Academic performance for trimester 2 2003/4

It is observed from Tables 4 and 5 that in terms of quantity (number of passes), TTC Sabah is the best, followed by ILP Kuantan and MMU Cyberjaya. However, in terms of quality (number of A's), MMU Cyberjaya shows the best performance, followed by ILP Kuantan and TTC Sabah.

**Table 4 Students' performance in terms of pass or fail**

Courses/Site	MMU Cyberjaya		ILP Kuantan		TTC Sabah	
	Pass	Fail	Pass	Fail	Pass	Fail
Computer Systems Architecture	6	2	10	1	7	7
Systems Analysis and Design	9	5	10	1	14	0
Microeconomics	9	7	9	2	14	0
<b>Total</b>	<b>24</b>	<b>14</b>	<b>29</b>	<b>4</b>	<b>35</b>	<b>7</b>

*\*The number of people taking the courses is different because some of them drop the course.*

**Table 5 Average performance**

<b>Cyberjaya</b>	<b>A (%)</b>	<b>B (%)</b>	<b>C (%)</b>	<b>F (%)</b>	<b>Average</b>	<b>Stddev</b>
DCS5048	12.50	50.00	12.50	25.00	56.30	18.61
DCS5128	14.29	21.43	28.57	35.71	52.21	21.65
Micro	6.25	43.75	6.25	43.75	45.97	23.97
Cum. Avg	11.01				51.49	

<b>ILP</b>	<b>A (%)</b>	<b>B (%)</b>	<b>C (%)</b>	<b>F (%)</b>	<b>Average</b>	<b>Stddev</b>
DCS5048		63.64	18.18	18.18	60.66	10.72
DCS5128		50.00	50.00		62.40	6.80
Micro	8.33	50.00	33.33	8.33	56.67	19.27
Cum. Avg	2.78				59.91	

<b>TTC</b>	<b>A (%)</b>	<b>B (%)</b>	<b>C (%)</b>	<b>F (%)</b>	<b>Average</b>	<b>Stddev</b>
DCS5048		14.29	35.71	50.00	42.48	15.48
DCS5128		64.29	35.71		59.82	6.39
Micro		50.00	50.00		59.43	5.43
Cum. Avg	0				53.91	

*\*DCS5048 = Computer Systems Architecture, DCS5128 = Systems analysis and design*

### **2.2.1 Comments from Dr. Madhubala (Director of CADP)**

- 1) Sabah and ILP students enjoy more support as they have their coordinators at their respective centres. Although Mr. Rajan (CMLC) and Mr. Gurdave (ADP) have been appointed as advisors, students are still reluctant to see them regarding any problem that they have. Correspondence between Mr. Gurdave and the students is via e-mail and phone.
- 2) ILP students are more mature. They were already in their own diploma programmes before converting to MMU's diploma programme. Hence, they are more disciplined.
- 3) Environment (glass doors) – students are easily distracted. It is better to put up blinds as blinds are flexible, easy to manipulate. Then students will be able to concentrate better.
- 4) Lecturers have to be very firm about attendance to reduce high failure rate.
- 5) The NMES system is not a problem. The fact that the ILP and Sabah students are doing better (in terms of the number of passes) than the Cyberjaya students indicate that the high failure rate is attributable more towards the students' attitude and lecturers' delivery style.

### **2.2.2 Comments from Mr. Gurdave (CADP advisor)**

- 1) Cyberjaya students do not have proper time management. They usually chat and have fun during the night and when they come to class, sometimes, they sleep.
- 2) The students find some lecturers' delivery style uninteresting. Sometimes, the lecturer merely reads from the slides. They read in a monotonous manner. They

would prefer if the lecturer has presents key points and explains and adds more graphical elements.

- 3) IL Kuantan students would prefer a mixture of Bahasa Malaysia and English as their grasp of English is not so good.
- 4) Lecturers should be advised how to deliver more interesting lectures prior to the commencement of the course

### **2.2.3 Comments from the NMES Content development task force**

Any change should be gradual and upon positive feedback from users after its implementation. It is better to find a solution which is the most cost-effective, and easy to maintain or upgrade. Hence, the content development task force would like to suggest the following:

- 1) LiveSpiral restricts the types of file formats. Hence, it is better not to use LiveSpiral.
  - a. In the previous technical meeting, it was decided that the remote site servers will mirror the Cyberjaya server and updates are done at midnight every night. Hence, lecture content can be made available to the students' laptop in any file format prior to the lecture. This is important in the case of subjects, which are programming-oriented and require a demo of the program. Laptops should show different materials than the Starboard as it is a very small room. Laptops should be fully utilised.
  - b. It is also better to use the courses-on-line to replace LiveSpiral. That way, we solve the problem of slide transition delays and visual problems.
  - c. The broadcast of the lecture will be in MPEG4 as was suggested by Mr. Uchida in one of the technical meetings to address the problem of slide delay.
- 2) Since every student is an MMU student, they have access to the MMLS. We can use MMLS's forum and mailing list for lecturers, advisors and students to interact as requested by Mr. Gurdave.
- 3) Lecturers will be advised how to present more interesting slides during the briefing next trimester via recommendations by the Effective Teaching Methodology Committee led by the head of CADP (Centre for Affiliated Diploma Programmes), Dr. Madhubala.

### **2.2.4 Suggested administrative action**

- 1) Putting blinds at the Cyberjaya NMES centre to reduce distraction from people passing by

*\*These actions were taken up immediately by CRPP.*



### 2.3 Academic performance for trimester 3 2003/4

A comparative analysis of students' performance for trimester 3 2003/4 is presented in Table 6. DCS 5018 (Business management) and DEN5058 (Business and technical communications) are included although they are not delivered via the NMES to provide an overall picture of students' academic performance.

**Table 6** Academic performance for trimester 3 2003/4

<b>Cyberjaya</b>	A (%)	B (%)	C (%)	F (%)	Avg.	Std
DBS5018		55.56	44.44		63.94	8.99
DCS5038	13.33	26.67	53.33	6.67	56.75	11.35
DCS5058	7.14	64.29	28.57		63.30	7.04
DEN5028	14.29	28.57	57.14		62.77	9.65
DIM5068	14.29		14.29	71.43	48.07	17.39
DTC5028	40.00	30.00	30.00		71.03	12.03
Cum. Average	14.84				60.97	

<b>ILP</b>	A (%)	B (%)	C (%)	F (%)	Avg.	Std
DBS5018	10.00	70.00	20.00		64.93	7.29
DCS5038		70.00	30.00		61.22	6.13
DCS5058	10.00	70.00	20.00		65.58	7.25
DEN5028	10.00	90.00			67.60	5.08
DIM5068		11.11	55.56	33.33	48.11	7.28
DTC5028	80.00	20.00			79.16	4.43
Cum. Average	18.33				64.43	

<b>TTC</b>	A (%)	B (%)	C (%)	F (%)	Avg.	Std
DBS5018		69.23	30.77		61.08	5.33
DCS5038		61.54	30.77		64.10	6.47
DCS5058		46.15	46.15		60.74	8.44
DEN5028		69.23	30.77		62.54	3.84
DIM5068		20.00	40.00	40.00	48.13	10.95
DTC5028		44.44	11.11		72.51	9.25
Cum. Average	0				61.52	

\* DBS5018 = Business management, DCS5038 = Program Design, DCS5058 = Operating System, DEN 5028 Business and Technical Communications, DIM 5068 Mathematical Techniques 2 and DTC 5028 Data Communications

For DBS5018, performance for all sites is almost comparable in terms of average. However, ILP Kuantan surpassed both Cyberjaya and TTC Sabah in terms of the quality of results with 10% A's for DBS5018.

For DCS5038, TTC Sabah scored the highest average but qualitatively did not perform as well as ILP Kuantan and Cyberjaya. ILP Kuantan again outshone Cyberjaya in terms of average although it showed lesser average compared to TTC Sabah. However, Cyberjaya students scored better with 13.33 % A's.

Almost comparable averages are found for DCS5058 for all sites. However, once again ILP Kuantan performed best with 10% A's as compared to Cyberjaya's 7.14%.

Average scores for DIM5068 are almost similar across sites. But Cyberjaya students performed best with 14.29% of students scoring A.

In a comparison between the average scores for technical and non-technical subjects, there is no marked difference in averages for all sites. Therefore, neither the delivery mode or delivery system nor the subject is the determiner of student performance. More obvious contributing factors are the students' attitude, age and discipline.

The results indicate that learning via the NMES at a distance as in the case of ILP Kuantan is not a problem. In fact, in some instances they scored better than students at the hub site. ILP Kuantan scored better for two subjects, i.e. DBS5018 and DCS5038. TTC Sabah performed the best in terms of average score for DCS5038.

#### 2.4 Academic performance for trimester 1 2004/5

More subjects have been added since students' results are promising. Tables 7 and 8 indicate the comparative performance in terms of GPA and CGPA while Table 9 shows the comparative breakdown of results. Again, TTC Sabah performs the best in terms of average followed by the ILP and Cyberjaya students. However, Cyberjaya leads in terms of CGPA. It is also noted that averages for technical and non-technical subjects across sites are relatively similar.

**Table 7** Students' performance in terms of GPA class

Courses\Site	MMU Cyberjaya		ILP Kuantan		TTC Sabah	
	No.	Percentage	No.	Percentage	No.	Percentage
Credit	3	5.36	3	15.00	5	17.86
Pass	6	10.71	12	60.00	18	64.29
Fail	28	50.00	5	25.00	5	17.86
<b>Total</b>	<b>56</b>	<b>33.93</b>	<b>20</b>		<b>28</b>	

**Table 8** Students' performance in terms of CGPA class

Courses\Site	MMU Cyberjaya		ILP Kuantan		TTC Sabah	
	No.	Percentage	No.	Percentage	No.	Percentage
Distinction	3	5.36				
Credit	6	10.71	3	15.00	6	21.43
Pass	28	50.00	12	60.00	17	60.71
Fail	19	33.93	5	25.00	5	17.86
<b>Total</b>	<b>56</b>		<b>20</b>		<b>28</b>	

**Table 9** Comparative breakdown of results

<b>Cyberjaya</b>	A (%)	B (%)	C (%)	F (%)	Avg.	Std	Total
DCS5018	5.13	35.90	51.28	7.69	60.03	7.09	39
DCS5068	7.69	30.77	7.69	53.85	51.74	18.35	13
DCS5078		18.75	31.25	50.00	46.49	12.20	16
DCS5088		7.69	23.08	69.23	41.02	14.47	13
DCS5288	13.33	26.67	33.33	26.67	55.61	11.82	15
DTC5018	13.33	20.00	33.33	33.33	55.60	13.38	15
Cum. Avg.	6.58				51.75		
DEC5018	7.32	53.66	29.27	9.76	61.12	11.97	41
DEN 5018	5.00	47.50	35.00	12.50	60.03	10.17	40

<b>ILP</b>	A (%)	B (%)	C (%)	F (%)	Avg.	Std	Total
DCS5018		25.00	50.00	25.00	54.32	7.30	8
DCS5068		80.00	20.00		65.32	4.47	10
DCS5078		100.00			64.55	3.44	10
DCS5088			70.00	30.00	48.90	8.30	10
DCS5288	13.33	26.67	33.33	26.67	55.61	11.82	15
DTC5018		80.00	20.00		64.30	6.91	10
Cum. Avg.	2.21				58.83		
DEC5018	7.32	53.66	29.27	9.76	61.12	11.97	41
DEN5018		44.44	55.56		59.33	6.41	9

<b>TTC</b>	A (%)	B (%)	C (%)	F (%)	Avg.	Std	Total
DCS5018		31.25	62.50	6.25	57.11	6.49	16
DCS5068		90.91	9.09		69.06	4.11	12
DCS5078		8.33	83.33	8.33	53.44	5.46	13
DCS5088			70.00	30.00	49.68	7.34	10
DCS5288	9.09	81.82	9.09		66.40	6.26	11
DTC5018	16.67	75.00	8.33		68.12	8.36	12
Cum. Avg.	4.29				60.64		
DEC5018		40.00	60.00		57.20	7.28	15
DEN5018	37.50	37.50	25.00		68.69	11.36	16

*\*DCS5018 Computer systems and applications, DCS5068 Data structures and algorithms, DCS5078 Database systems, DCS5088 Object-oriented programming, DCS5288 Internet and web publishing, DEC5018 Microeconomics, DEN5018 English*

## 2.5 Academic performance for trimester 2 2004/5

Average performance for all three subjects in trimester 2 2004/5 is compared followed by comparative performance of DCS5048 and DCS5128 in trimester 2 2003/4. Average performance for DEN5028 is compared with that of DEN5028 in trimester 3 2003/4. Detailed breakdown of results is shown in Table 10 below.

**Table 10** Students' performance in terms of GPA class

Courses\Site	MMU Cyberjaya		ILP Kuantan		TTC Sabah	
	No.	Percentage	No.	Percentage	No.	Percentage
Distinction	1	1.92			1	3.85
Credit	6	11.54	3	17.65	5	19.23
Pass	18	34.62	3	17.65	14	53.85
Fail	23	44.23	3	17.65	6	23.08
I	4	7.69	8	47.06		
<b>Total</b>	<b>52</b>		<b>17</b>		<b>26</b>	

**Table 11** Students' performance in terms of CGPA class

Courses\Site	MMU Cyberjaya		ILP Kuantan		TTC Sabah	
	No.	Percentage	No.	Percentage	No.	Percentage
Distinction	2	3.85				
Credit	6	11.54	5	29.41	7	26.92
Pass	27	51.92	8	47.06	19	73.08
Fail	17	32.69	4	23.53		
I						
<b>Total</b>	<b>52</b>		<b>17</b>		<b>26</b>	

**Table 12** Comparative breakdown of results

Cyberjaya	A (%)	B (%)	C (%)	F (%)	Avg.	Std	Total
DCS5048		2.70	51.35	45.95	52.96	4.18	37
DCS5128	4.55	54.55	36.36	1.55	60.22	7.69	44
Cum. Avg.	2.26				56.59		
DEN5028	17.50	52.50	20.00	10.00	61.65	11.53	40

ILP	A (%)	B (%)	C (%)	F (%)	Avg.	Std	Total
DCS5048	16.67	33.33	50.00		63.74	9.83	6
DCS5128		20.00	80.00		57.96	6.03	5
Cum. Avg.	8.33				60.85		
DEN5028	20.00	80.00			73.42	2.82	5

TTC	A (%)	B (%)	C (%)	F (%)	Avg.	Std	Total
DCS5048		45.00	55.00		60.03	5.69	20
DCS5128		46.67	53.33		60.43	6.88	15
Cum. Avg.	0.00				60.23		
DEN5028	40.00	53.33	6.67		73.13	9.46	15

\*DCS5048 = Computer Systems Architecture, DCS5128 Systems analysis and design, DEN5028 Business and Technical Communications

ILP performed best in terms of average for DCS5048 followed by TTC and Cyberjaya. However, for DCS5128, Cyberjaya and TTC had almost similar averages with ILP slightly behind by around 2%. On the other hand, for DEN5028 TTC and ILP were similar in averages with Cyberjaya tailing by almost 12%.

Compared to trimester 2 2003/4, the new batch of Cyberjaya students' average performance for DCS5048 is lesser by 3.34%. For DCS5128, average performance is better by 8.01% although the number of A's scored is less. Average for DEN5028 is maintained.

Significant performance is shown by ILP students with 16.67% A's for DCS5048 compared to none in 2003/4. Average performance for DCS5048 also improved by 3.08%. However, there is a slight decline in average for DCS5128. Average for DEN5028 improved by 5.82%.

TTC made marked increase in the average in DCS5048 by 17.55% and in DEN5028 by 10.59%. Average performance is maintained for DCS5128 with a slight increase of 0.61%.

### **2.5.1 Remedial steps taken by CADP**

It is surprising that Cyberjaya students are faring poorer compared to those at the remote sites. The disparity is not as obvious in the first batch of students (2003/4). A meeting has been held between CADP, lecturers and tutors from both Cyberjaya and the remote sites.

It is known that the ILP and TTC students are older, more mature and disciplined. The Cyberjaya students are the youngest among the three. Their attitude and mentality toward their studies need to be guided more than that of ILP and TTC students. In view of this, CADP has conducted briefings for students with regards to the system and provides study skills workshops and personal consultation after trimester 2 2003/4. The academic performance has shown improvement in trimester 3 2003/4.

Similar briefings and workshops are conducted for those in trimester 1 and 2 2004/5. However, different batches of students need different and sometimes, more guidance, counselling and remedial steps to help them improve.

As such, CADP requests that Cyberjaya lecturers:

- 1) must upload their lecture/tutorial/quizzes one week in advance
- 2) send a softcopy of their lecture/tutorial/ quizzes or fax to their counterparts to make sure that everyone receives the learning materials
- 3) be very strict about attendance – if there are problematic students, inform Dr. Madhubala immediately. Do not wait until the end of the semester to take action. Dr. Madhubala will deal with them personally.
- 4) Monitor every assessment very closely and adjust accordingly. Lecturers/tutors from the remote sites are to mark the mid-term marks within one week and submit to the Cyberjaya coordinator. Cyberjaya coordinators will submit the marks for every assessment to Mr. Gurdave (CADP) who will forward problematic cases to Dr. Madhubala.

- 5) have additional tests or make-up quizzes or additional assignments to help students with their course marks if necessary.
- 6) have a review of the lecture before proceeding to tutorial as currently practised in TTC
- 7) force students to meet lecturers during consultation hours. If the students do not come during consultation hours, inform Dr. Madhubala.

### **2.5.2 Comments from the content development task force**

Students need to have a sense of belonging to the centre. In TTC Sabah, the students stayed in the NMES lab almost the whole day, making it like their home. They had constant interaction with the lecturers and tutors there. This factor may be the most important in addressing the lack of a sense of belonging found most pertinent in the Cyberjaya students.

The NMES centre however, is sometimes used for other functions and students are not aware of the lab's availability. In TTC, the NMES lab is fully for the students' use. Currently, for lab tutorials, the FIT lab is used. The booking for FIT labs is very tight. Students must leave after their class.

So to encourage students to stay on in the NMES lab and discuss and consult their lecturers, CADP might want to consider having their own lab in Cyberjaya where lab tutorials can be conducted. Alternatively, the students can request for the daily timetable of the NMES lab and be given the option to reserve certain days in the NMES timetable for them to use. Another alternative is to have a room in CMLC Cyberjaya where students can discuss their assignments and lecturers go to the room for consultation. The FIT and FOE lecturers are currently sharing rooms. Hence, the space for discussion is very small and not conducive especially if another lecturer is also there. Private consultations in the consultation room may be preferred.

In addition, to encourage students to discuss among themselves in doing their assignments, they can try using a collaborative concept mapping software recently developed but undergoing final user testing. This collaborative concept mapping software encourages students to plan their tasks, chat and visualise their ideas using a collaborative concept map (what their friends draw will be seen by everyone else logged on into the system). Results of their discussion can be uploaded to the lecturer to view. After that, short tests can be conducted and help is provided by the system to guide them to understand where they went wrong. However, designing the short test would require more time by the lecturer who is also teaching the Bachelor courses. Hence, a simplified version of the collaborative concept map can be explored for use.

### 3.0 Performance assessment

Quantitative analysis of staff and student assessments are presented first according to chronological order so as to provide an overview of feedback from the staff and students, which influenced the decisions behind the evolution of the NMES thus far. This is followed by a comparative analysis of the students' academic performance from the year 2003 to 2004. This comparison involves only the Diploma in IT program since it fully utilises the NMES for the delivery of its lectures. Major problems and issues observed from these two analyses are subsequently highlighted. The report concludes with achievements and recommendations for future improvement.

### 3.1 Staff and student assessment on the NMES

Only technical subjects were chosen to be delivered via the NMES as there is a great need in Malaysia for knowledge workers. The NMES is thus used to test its potential as a distance learning platform to leverage access and equity to quality education.

The detailed assessment report is in Appendix A. A summary of the quantitative analysis on the NMES based on staff and student responses are indicated in Table 13 below.

**Table 13** Quantitative analysis on the NMES for the year 2002

	<b>March 2002</b>	<b>Oct-Dec. 2002</b>
	B. IT (Melaka-Cyber)	M. Eng (Cyber-Penang)
B1 (text quality)	O.K.	O.K.
B2 (image quality)	- Problems in writing long equations – need to consider other equipment	O.K.
B3 (voice quality)	- the camera location was fixed as initially, class transmission from Melaka was not planned.	- Bad because of echo in Cyberjaya. Should use headset with microphone and headphone or personal microphone
B4 (slide transition time)	- huge latency	- Huge latency in drawing or illustrating wastes time – makes lesson delivery very tedious. Prefer IP system, which is instantaneous and interactive.
B5 (screen size)	O.K.	- Need bigger plasma display
B6 (more multimedia elements?)	O.K.	O.K.
B7 (viewing lecturer on the screen is acceptable?)	- Improper camera angle – cannot see what the lecturer is writing on the whiteboard	very tiring and boring as there is little interaction except staring at the TV screen. Should provide one microphone to each student to increase interactivity.

B8 (classroom environment is acceptable?)	- Classroom environment in Cyberjaya is not acceptable due to insufficient PCs, inappropriate camera angle and problems with sound (internal echo)	- cannot communicate 2-way because of the delay time and bad voice quality
B9 (overall satisfied with the NMES)	- Stability of LiveSpiral is the most important issue raised by both campuses as the current version of Livespiral has a lot of bugs and improper specifications. Powerpoint XP should be used for Livespiral. OS should be upgraded from Win98 to Win2000	- No. Very tiring because of eye strain (staring for 3 hours at the screen). Suggest downloading everything to local hard drive first before starting lecture.

The huge latency in slide transitions complicated the process of writing mathematical equations on the digital board. The instability of LiveSpiral is further compounded by the lack of clarity in sound and image of students from the remote site. Thus, the degree of interaction between students and lecturer was compromised.

In the first quarter of 2003, the situation improved slightly better in terms of image quality as shown in Table 14. However, the problem with latency in slide transition persisted. In Penang, where the Masters of Engineering course was conducted, audio problems were still not resolved. In addition, the screen size was too small for comfortable viewing.

**Table 14** Improvement in first quarter of 2003

	March 2003	Sept 2003
	B. IT (Cyber-UNIMAS)	M. Eng (Cyber-Penang)
B1 (text quality)	O.K.	O.K.
B2 (image quality)	O.K.	O.K.
B3 (voice quality)	O.K.	- Audio problems prevents interactive communication - Huge delay time when communicating 2-way
B4 (slide transition time)	slow	Slow
B5 (screen size)	O.K.	- Screen size too small and constant camera adjustment is needed
B6 (more multimedia elements?)	- The marker drawing system has a lag on the local site, where it won't register the connection of a continuous point immediately (for example, if I were to draw a circle... it will become a D unless	O.K.



	I press, pause then continue to draw the circle)	
B7 (viewing lecturer on the screen is acceptable?)	O.K.	O.K.
B8 (classroom environment is acceptable?)	O.K.	O.K.
B9 (overall satisfied with the NMES)	O.K.	O.K.

In the fourth quarter of 2003, audio and image problems have been resolved for ILP Kuantan and TTC Sabah but still persisted in Penang (Table 15). The common problem among them continued to be the huge latency in slide transitions which complicated the process of writing any technical equations using the digital board.

**Table 15** Resolution of audio and image problems for Dip. IT in fourth quarter of 2003

	Sept 2003		Dec 2003
	Dip. IT (Cyber-ILP, TTC)	Dip. IT	M. Eng (PSDC)
B1 (text quality)	O.K.	O.K.	O.K.
B2 (image quality)	O.K.	Not good	Need improvement
B3 (voice quality)	O.K.	Often breaks	Need improvement
B4 (slide transition time)	Slow	Slow	Slow
B5 (screen size)	O.K.	O.K.	O.K.
B6 (more multimedia elements?)	O.K.	O.K.	O.K.
B7 (viewing lecturer on the screen is acceptable?)	O.K.	O.K.	O.K.
B8 (classroom environment is acceptable?)	O.K.	O.K.	O.K.
B9 (overall satisfied with the NMES)	O.K.	O.K.	O.K.

In 2004, the Diploma in IT lecturers have become accustomed to the system and were willing to explore other uses of software to enhance the delivery of lecture as shown in Table 16. Examples of lecturers who have requested for new installations are for the Basic Programming and Internet Computing courses. They have further requested that laptops be used to allow the students to experiment as compared to its current use in presenting slides shown using LiveSpiral. Students also found the system easy to use and fun.

**Table 16** Exploration of better ways to deliver lectures initiated by lecturers

	<b>July 2004</b>	<b>December 2004</b>
	Dip. IT	Dip. IT
B1 (text quality)	- The electronic pen seems to be difficult to draw very fine line.	O.K.
B2 (image quality)	O.K.	O.K.
B3 (voice quality)	O.K.	O.K.
B4 (slide transition time)	Slow	Access ppt slides through laptop instead of through LiveSpiral
B5 (screen size)	O.K.	O.K.
B6 (more multimedia elements?)	- Besides supporting only PowerPoint presentation, it should also be able to support other format of file. For example, Ms. Word format, and the installation of software to allow demo during class	O.K.
B7 (viewing lecturer on the screen is acceptable?)	- Need bigger screen size	O.K.
B8 (classroom environment is acceptable?)	O.K.	O.K.
B9 (overall satisfied with the NMES)	<ul style="list-style-type: none"> <li>- Easy, fun,</li> <li>- chat can be misused and be distracting, but sometimes problems occur which hold up the lecture session</li> <li>- Overall, good because exposure to new environment in Sabah but need improvement.</li> </ul>	O.K. but <ul style="list-style-type: none"> <li>- chat must be disabled are students in Cyberjaya often chat and giggle among themselves through chat</li> <li>- every student should be equipped with a microphone so that they can ask the lecturer on the spot whenever they have any query. To avoid interruption, an indicator (i.e. LED) can be included to</li> </ul>

		acknowledge the lecturer. - delay in voice transmission must be further reduced
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For PSDC, further investigation into the audio problem will be carried out as site inspections by the counterparts in Cyberjaya indicate that the problem was resolved earlier. Furthermore, some students have highlighted that there is lack of maintenance in PSDC with some computers always out of order. In Table 17, student feedback points out that technical support in PSDC is generally poor.

**Table 17** Lack of technical support and maintenance in PSDC

	<b>December 2004</b>
	M. Eng (PSDC)
B1 (text quality)	O.K.
B2 (image quality)	O.K.
B3 (voice quality)	Needs improvement
B4 (slide transition time)	Slow
B5 (screen size)	Needs improvement
B6 (more multimedia elements?)	O.K.
B7 (viewing lecturer on the screen is acceptable?)	Not acceptable
B8 (classroom environment is acceptable?)	Many computer terminals are always out of order
B9 (overall satisfied with the NMES)	Prefer live lecture

A summary of the major issues raised is presented in the following section.

### **3.2 Major issues and recommendations**

The major issues and recommendations for the year 2002, first quarter of 2003 and the fourth quarter of 2003, second quarter of 2004 are summarised in Tables 18, 19, 20 21 and 22 respectively. They are presented below.

**Table 18** Major issues and recommendations for the NMES for the year 2002

	<b>March 2002</b>	<b>Oct-Dec. 2002</b>
	B. IT (Melaka-Cyber)	M. Eng (Cyber-Penang)
Major issues raised by lecturers	<ul style="list-style-type: none"> <li>- Use NMES for theoretical subjects, not mathematics/computation/calculation</li> <li>- Failure in remote site connection always causes huge delay in lecture delivery</li> <li>- Quality of the sound (clarity, echo)</li> <li>- Slide transition time from a remote site</li> <li>- Synchronization of image of the lecturer and his or her voice from a remote site</li> <li>- Clarity to view students from the remote site</li> <li>- Methods to improve interactivity</li> <li>- Slide transition time</li> <li>- Compatibility with latest software e.g. XP</li> </ul>	<ul style="list-style-type: none"> <li>- NMES is not suitable for subjects which require the use of drawing and lots of writing</li> <li>- Difficult to understand students because of the sound quality due to poor room design. Audio problem is accentuated when it rains.</li> </ul>
Recommendations by lecturers/ students	<ul style="list-style-type: none"> <li>- Facility to use whiteboard and slides simultaneously</li> </ul>	<ul style="list-style-type: none"> <li>- Should use headset with microphone and headphone or personal microphone</li> </ul>

**Table 19** Major issues and recommendations for first quarter of 2003

	<b>March 2003</b>	
	B. IT (Cyber-UNIMAS)	M. Eng (Cyber-Penang)
Major issues raised by lecturers	<ul style="list-style-type: none"> <li>- Students are actually less focused when the same material on the whiteboard is displayed on their laptops. Is there a possibility to show slides on the laptop while showing other media on the screen?</li> <li>- consider using a clip-on mike, as they are lighter and easier to deal with.</li> <li>- There was a weird problem where if I click wrongly on the next slide button, the frame will have sliders on the side and bottom of it. This actually shifts the page making it harder to press (I had to go to the PC to click afterwards)</li> <li>- Since Malaysia uses multisystem</li> </ul>	<ul style="list-style-type: none"> <li>- Need serious improvement on handwriting and drawing</li> <li>- quality via projector is unacceptable as the image is blur.</li> <li>- big screen projector is too bright.</li> </ul>

	video products, it was unusual that the NMES system only uses PAL. Please consider multisystem support, esp since lecturers might have electronic equipment from other countries that uses alternative video systems. The quality of the devices, however are top notch.	
Recommendations by lecturers/ students		- Need serious improvement – cannot illustrate well

**Table 20** Major issues and recommendations for fourth quarter of 2003

	<b>Sept 2003</b>	<b>Dec 2003</b>	
	Dip. IT (Cyber-ILP, TTC)	Dip. IT	M. Eng
Major issues raised by lecturers	<ul style="list-style-type: none"> <li>-Better means for interaction with the students</li> <li>- The chat room function, while useful if used properly, can lead to a lot abuses (read that as students chatting among themselves) I strongly suggest that the students be able to chat with the INSTRUCTOR only, thus allowing for better lecturer-student communication while disallowing chats.</li> <li>- The whiteboard function is still unresponsive, many times we resort to the StarBoard Pen program.</li> </ul>	<ul style="list-style-type: none"> <li>- Chat facility in LiveSpiral is abused. It should be disabled.</li> <li>- Handwriting/ drawing quality</li> </ul>	<ul style="list-style-type: none"> <li>-Handwriting and drawing unacceptable</li> <li>- Only have problems starting up</li> <li>- Not all workstations can be used</li> <li>- Need bigger table to put PC on so that students have space to write notes</li> </ul>
Recommendations by lecturers/ students		1. Communication with peers from the remote site is very important. A bulletin board or chat forum	<ul style="list-style-type: none"> <li>-should have whiteboard and teaching material side by side</li> <li>- Should benchmark webcast.Berkeley.edu to</li> </ul>

		<p>is needed.</p> <ul style="list-style-type: none"> <li>- If possible, it's better to put a mike on every table so that students (especially remote site) can use the mike to ask questions during Q&amp;A session, instead of using the chat function</li> <li>- Provide lab/demo session using NMES, so those students can understand better.</li> <li>- Connection to the remote site must be made early before the lecture starts.</li> </ul>	<p>see how they deliver lectures effectively.</p>
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**Table 21** Major issues and recommendations for second quarter of 2004.

<b>July 2004</b>	
Dip. IT	
Major issues raised by lecturers	<ul style="list-style-type: none"> <li>- System is easy to use, no major issues</li> <li>- Lecturers and students want bigger screens to view each other</li> <li>- Should have smaller and less visible mikes (pin-mikes), so it feels more natural</li> </ul>
Recommendations by lecturers/ students	<ul style="list-style-type: none"> <li>- Interactive white-boards. Students in remote sites should be able to write on their white boards and share this information</li> <li>- Record videos presentation of lecturers so they can view themselves and use that for improvement. Perhaps they should also be able to view other lectures</li> </ul> <p>2) Interaction needs to be increased somewhere, since it is reduced by not having a lecturer. Perhaps interactive notes, educational games or guest video-conferencing sessions with other universities</p>

Physical whiteboards have been provided at the remote sites to enable the students to draw to show lecturers what they mean but observations indicate whiteboards are seldom used.

The lack of interaction is again highlighted by feedback report in the December 2004 survey results shown in Table 22.

**Table 22** Further exploration of means to increase interaction

	<b>December 2004</b>
	Dip. IT
Major issues raised by lecturers	<ul style="list-style-type: none"><li>- System is easy to use, no major issues</li><li>- Make it easier for students to ask questions</li><li>- Chat must be disabled</li><li>- Improve on voice quality</li></ul>
Recommendations by lecturers/ students	<ul style="list-style-type: none"><li>- Should have smaller and less visible mikes (pin-mikes), so it feels more natural and LED indicators needed to inform the lecturers that someone would like to ask questions</li></ul>

As reflected in Tables 18, 19, 20, 21 and 22, major issues in the year 2002 revolved around the instability of LiveSpiral, image and audio problems. However, the image and audio problems were eventually resolved for ILP Kuantan and TTC Sabah though more investigations have to be carried out in the case of PSDC. The huge latency in LiveSpiral, a common problem for all remote sites will be addressed by the possible use of MPEG 4. It is hoped that with MPEG 4, the image quality will be improved and latency eliminated.

#### **4.0 Achievements**

1. Management: Achievement in the NMES is seen notably in the results for the Dip. IT program with the inclusion of orientation programs in terms of introduction to the NMES system, the difference in roles due to the nature of distance learning, introduction of study skills prior to the commencement of the Dip. IT program, constant monitoring from the CADP and the content development task force and the provision of curtains to reduce distraction by CRPP.
2. Technical: We managed to resolve the
  - a) sound problem to a certain extent by reducing internal echo.
  - b) the writing of equations on the whiteboard problem by using the visualizer
  - c) the packet loss problem by having wired connections

#### **5.0 Matters to be addressed**

1. Management: a) Incorporation of effective teaching skills in order to improve lecture delivery.
  - i. Incorporating more graphical presentations of concepts rather than having many slides of text as it is very tiring to stare at the screen for 3 hours. For example, concept maps have been proven to be an effective means for communicating certain ideas (as evidenced in the M. Eng course in Penang (lecturer for the course was Dr. Fabian Kung).

- ii. Record video presentations of lecturers (if they request) so that they can view themselves and others teaching in order to learn from each other
  - b) Provide students with pin-mikes so that they are encouraged to ask questions
  - c) Provide interactive digital whiteboards installed in the students' laptop that allow students to explain and draw (if necessary) in order to clarify any ambiguity in their question. This interactive digital whiteboard should also enable chat outside the lecture. In short, a collaborative whiteboard is necessary. A simplified version of the Merlin collaborative concept map can be tested for use in the NMES lab (not available over the Internet).
  - d) Training in web page design, how to ftp and how to use the NMES for novice lecturers
2. Technical:
- a) Sound and image quality in Penang is not resolved yet
  - b) Technical/Mathematical courses were not suitable due to latency in LiveSpiral but Malaysia needs knowledge workers in these fields. Hence, it is hoped that MPEG4 will help solve the problem.

## 6.0 Conclusions

Lecturers and students generally have come to accept the NMES as a viable and convenient means for distance education. Comparative analyses of academic performances for all sites indicate that remote site students have outperformed hub site students in some cases, either in terms of the percentage of A's or in terms of average score.

In addition, most technical and managerial issues have been resolved. We look forward to the possible use of MPEG4 (pending test results ending 21 October 2004) to address the issue of latency and improve on image quality.

Hence, the NMES is a viable and convenient means for distance learning. Its potential for training future knowledge workers in line with the 8<sup>th</sup> Malaysian plan should be supported by all parties concerned in order to provide equity and quality education to as many as possible. Maintenance cost can be leveraged through economy of scale.