教育省
ヨルダン・ハシェミット王国

ヨルダン・ハシェミット王国 ICT を活用した理科教育のための 学習センター機能強化プロジェクト
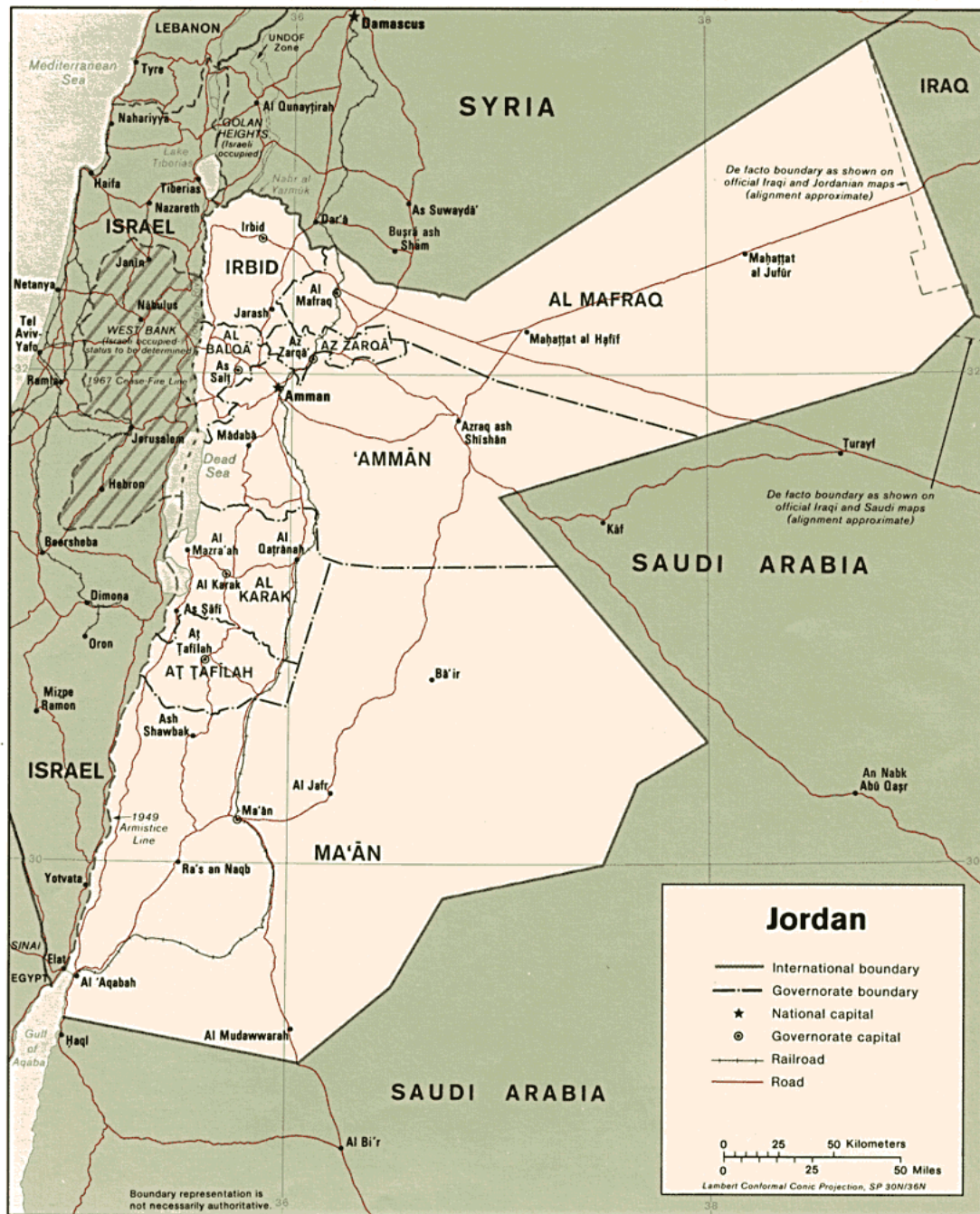
プロジェクト事業完了報告書

平成 21 年 3 月
（2009 年）

独立行政法人　国際協力機構

株式会社　パデコ

プロジェクト対象地位置図

出典 ： 在ワシントン　ヨルダン大使館 HP より
(http://www.jordanembassyus.org/new/aboutjordan/map.shtml)

写真

プロジェクトオフィス (Queen Rania Center)

ワーキンググループ A（教員）と B（実験技師）

ワーキンググループ C（IT）

JCC ミーティング

LRC 及び地方教育委員会代表者向けの SEED プロ
ジェクトに関するオリエンテーション

LRC 研修(TOT)のオープニングワークショップ

LRC 研修(TOT)中のカラック地区でのモデル授業
実施風景

LRC 研修(TOT)中のサルト地区での
グループディスカッション風景

LRC 研修(TOT)中のモデル授業を撮影する
IT スタッフ

LRC 研修(TOT)中のモデル授業での ICT 活用事例
（細胞と染色体の映像提示）

LRC 研修(TOT)中のモデル授業で実験を行う生徒

LRC 研修(TOT)でのモデル授業後の振返り議論

理科教員研修のモデル授業でロールプレイを行う
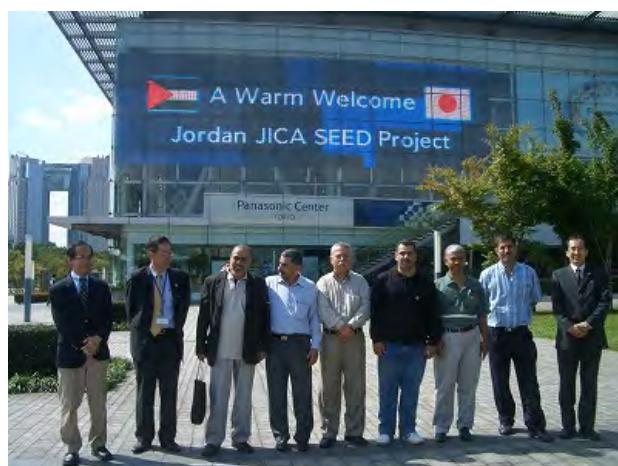生徒（アルバシャ地区）

理科教員研修のモデル授業でグループワークを行
う生徒（アンマン 1 地区）

モデル授業での ICT 活用及び生徒発表

理科教員研修のクロージングワークショップ

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略　　　語

略語、正式名称、和訳の順に並べる。

CIDA	Canadian International Development Agency	カナダ国際開発庁
DCT	Directorate of Curricula and Textbooks	教育省・カリキュラム・テキスト局
DCU	Development Coordination Unit	教育省・援助調整ユニット
DET	Directorate of Educational Technology and Informatics	教育省・教育工学局
DTQS	Directorate of Training, Qualifications and Educational Supervision	教育省・トレーニング局
DEX	Directorate of Exams and Tests	教育省・試験局
ELCU	e-learning Coordination Unit	教育省・e ラーニング調整ユニット
ERfKE	Education Reform for Knowledge Economy	（通称）教育改革 5 ヵ年計画
ESP	ERfKE Support Project	USAID による援助プログラム
FD	Field Directorate	地方教育委員会
ICDL	International Computer Driving License	国際コンピュータスキル資格
ICT	Infromaiton and Communication Technology	情報通信技術
JCC	Joint Coordinating Committee	合同調整委員会
LMS	Learning Management System	学習管理システム
LRC	Learning Resource Center	学習教材センター
MOE	Ministry of Education	教育省
PDM	Project Design Matrix:	プロジェクト・デザイン・マトリックス
QRC	Queen Rania Center	クイーン・ラニア・センター
SC	Steering Committee	プロジェクト運営委員会
SEED	Science Equations Enhancement and Development	理科教育強化開発
STT	Siecne Teacher Training	理科教員研修
TSC	Technical Supervisory Committee	技術支援委員会
TOT	Training of Trainer	トレーナー研修
USAID	United States Agency for International Development	米国国際開発庁
WB	World Bank	世界銀行
WBT	Web Based Training	Web 学習
WG	Working Group	ワーキンググループ
WS	Workshop	ワークショップ

要　　　　約

はじめに

　ヨルダン国（以後「ヨ」国と略す）は他のアラブ諸国に比べて天然資源に恵まれていないため、新しい教育システムを通じて、高度で競争力高い人的資源を育成することは、国家経済と社会開発のために、最重要課題である。アブドッラー2 世国王のビジョンと指揮のもと、教育省は意欲的かつ総合的な教育改革プログラム "Education Reformation for Knowledge Economy (ERfKE)" を実施した。教育方法を教師中心から生徒中心に、教育に ICT を活用する、生徒の評価方法を革新する、学習環境を整備するなどを、この改革は目指している。

　この ERfKE を支援するため、教育省と JICA は技術協力プロジェクトを実施することに合意し、この目的は QRC と LRC の理科教員研修能力を強化することにあった。この両サイドによって調印された R/D に基づき、プロジェクトは 2006 年 3 月から 2009 年 3 月にかけて実施された。

1. プロジェクト概要

　本プロジェクトはアンマン、サルト、イルビット、カラックの 4 つの LRC 地域（この中には 8 つの地方地方教育委員会がある）の公立学校の理科教育を対象としている。プロジェクト・デザイン・マトリックス (Project Design Matrix: PDM) に提示されている各目標は以下の通りである。

[上位目標]
　ターゲット地域の基礎教育の教員が ICT を活用した効果的な理科教育を展開している。

[プロジェクト目標]
　QRC とパイロット LRCs/FDs が ICT を活用した効果的な理科教育を実施する教員の能力向上のセンターとして機能できるようになる（7-10 年生)。

[プロジェクト成果]
　　1.　効果的な理科教育を実施できるトレーナーを育成する QRC の制度的枠組みが確立される。
　　2.　QRC において ICT を活用した理科教育についての教員研修が開発・更新される。
　　3.　QRC においてコアトレーナー*が、ICT を活用した理科教育についての教員研修を指導するのに必要な技能を修得する（*「コアトレーナー」は、日本人専門家チームから QRC で直接技術移転を受けた教師及び職員)。
　　4.　パイロット LRCs/FDs 教員・職員が、トライアル校の教員に対し ICT を活用した理科教育についての教員研修を実施するのに必要な技能を修得する。

2. 投入実績

　三年間のプロジェクト期間で、12 名の技術協力専門家が 50.0 人月現地作業をし、2.9 人月の国内作業を行った。「ヨ」国政府からは 3 人の管理・計画チーム、19 名の理科教員と IT 要員からなるワーキンググループ、270 名の理科教員や IT 教師がトレーナー・受講者としてプロジェクトに参加した。JICA はプロジェクトの運用費用を負担し、教育省は理科実験室、オフィス、PC 教室と必要な電気、インターネット接続など負担した。また、JICA はプロジェクトに必要な IT 機材と事務機材を負担した。

3. プロジェクトの活動

　PDM 上の成果に基づき以下をはじめとする様々な活動をカウンターパート機関とともに行った。

- QRC と LRC の組織改革を行いながら、ICT 活用した理科教育を実施できるトレーナーを育成するの制度的枠組みが確立する
- ICT を活用するための教員研修を開発する。これには ICT の活用状況の調査、研修カリキュラム、研修教材の開発を含む。
- QRC が、ICT を活用した理科教育についての教員研修を実施するのに必要な能力を開発する。この中には研修計画の立案や実習や講義を通じた技術移転を含む。
- 実習や講義を通じた技術移転を通じて、LRC/地方教育委員会が ICT を活用した理科教育についての教員研修を実施するのに必要な能力を開発する。

4. プロジェクトの成果

　プロジェクトは全ての成果と目標を達成し、QRC/LRC/地方教育委員会が、ICT を活用した理科教育についての教員研修を実施する能力もかなり向上した。主なプロジェクトの成果を以下に示す。

- ワーキンググループメンバーがコアトレーナーとして技術移転は成功した。
- TOT と理科教員研修は成功した。
- 印刷版とデジタル版の理科教員ハンドブックが研修用教材として開発され、配布された。
- 理科教育ポータルサイトが開発された。

　教員研修と主なプロジェクトの活動は LRC/地方教育委員や学校の協力で成功し、研修の評価の調査結果は次のようなものだった。

- ほとんどの受講者は研修の内容とトレーナーの能力に満足していた。
- ほとんどの受講者は授業研究や研修の方法について好ましいと評価している。
- 学校長などの管理職に対して研修は好印象を与え、さらに研修に教員を参加させたいと考えている。
- 受講者である理科教員の授業に対して、生徒も生徒中心型学習や ICT の活用にそった良い授業であると評価している。
- 上記の生徒は授業を受けた後、理科により興味を持つようになった。
- 終了時評価団（2008 年 12 月）は、開発援助委員会 (Development Assistance Committee: DAC) 評価 5 項目のうち、本プロジェクトは「妥当性」「有効性」につ

いては「高い」、「効率性」については「比較的高い」、「インパクト」については「高いインパクトを持つことが見込まれる」、「自立発展性」については「比較的高い自立発展性を持つと想定される」と結論づけた（日本人専門家としては、終了時評価後に各項目についてもさらに改善されたと考える）。

5. 今後の対応に関する提言

　本プロジェクトはプロジェクトの成功をもとに今後の提言と、それに対する協議を教育省と行った。プロジェクト終了時には下記の提言に対して教育省は対応を開始している。

1. 他の地方教育委員会への教員研修の拡大
2. Teacher's Community の確立と理科教育ポータルサイトの維持
3. プロジェクトの研修方法の他の研修への応用
4. QRC での新理科グループの形成

終わりに

　この三年間のプロジェクトの実施において、プロジェクトは、QRC/LRC/地方教育委員会の研修能力の開発を達成した。プロジェクト成果の達成の後に、すでに教育省から研修の継続と拡大のための作業を開始したことが示されている。さらに QRC も幾つかのパイロット地方教育委員会で Teacher's Community の設立に取り掛かっている。教育省と QRC が「ヨ」国の理科教員に対して生徒中心型教育と ICT の活用を関する能力を強化する機会を提供し、その結果、「ヨ」国の教育システムの質が改善されることを望む。

要約-4

はじめに

　ヨ国は人口約 535 万の 40%が 14 歳以下の児童である。さらにヨ国は、他の中東諸国のように、石油などの天然資源に資源に恵まれていない。このため、教育システムの強化と能力開発はヨ国の重要な政治課題である。アブドッラー2 世国王の"the Hashemite Kingdom of Jordan has quality and competitive human resources development systems that provide all people with lifelong learning experiences relevant to their current and future needs in order to respond to and simulate sustained economic and social development thought an educated population and as skilled workforce"というビジョンは教育システムの改革を加速し、"Education Reformation for Knowledge Economy (ERfKE)"と名づけられた意欲的でかつ総合的な教育改革プログラムが 2002 年に開始された。教室での ICT の活用、教師中心型から生徒中心型、豊かな学習環境の構築、教育評価の強化などがこの改革の中核である。事実、教育省は多大な努力の末、巨大な出デジタル教材（e-contents と呼ばれている）を構築し、学校に多数の IT 機材を配布した。また、ERfKE 内において、いくつかの研修も開発・実施した。

　しかし、理科教師においても、教える教育をまだ使用していていて、生徒は自分で学習したり、ICT を利用する機会はまだまだ少ない。アンマンに所在する Queen Rania Al Abudulla Educational Technology Center（以後 QRC と略す）と地方に設置されている Learning Resource Centers（以後 LRCs と略す）は、学校に必要な指導支援を行うことを成立されたが、しかしながら、QRC と LRCs の能力はそれらの期待に十分に沿うものではなかった。ここにおいてヨ国は日本政府に対して、QRC と LRCs の機能強化を行う、技術支援を要請した。

　教育省と JICA はマスタープラン、実施方法、相互の責任を RD および M/M として合意し、2005 年 12 月に署名した。プロジェクトは 2006 年 3 月に開始された。プロジェクトは LRCs の ICT を活用した理科教育のための能力開発としてデザインされ、プロジェクト目標は"QRC とパイロット LRCs/FDs が ICT を活用した効果的な理科教育を実施する教員の能力向上のセンターとして機能できるようになる。（7-10 年生）"であり、このプロジェクトの主要な活動は、QRC の組織改革と QRC 職員の能力開発、LRC 職員及び地方教育委員会職員への技術移転を含んだ研修コースの開発とパイロット実施である。

　RD、MM に記載さているように JICA は技術協力プロジェクトとして、日本人専門家チームを 2006 年 3 月より派遣した。3 年間のプロジェクト期間において、新しい ICT を活用した理科教育の開発と実施の目的は達成された。

　本報告書は、この 3 年間のプロジェクトの進捗と成果を述べた本文と、添付資料から構成される。

1. プロジェクト概要

1.1 序文

　本章では、プロジェクト・デザイン・マトリックス (Project Design Matrix: PDM) における本プロジェクトの概略、成果、実施体制、実施方針、PDM に基づいた作業工程の計画・実績を示す。また、2007 年 12 月に行われた PDM の改訂についても詳述する。

1.2 対象とプロジェクト期間

　PDM における本プロジェクトの対象は以下の通りである。

ターゲット地域と学校

- パイロット LRC と地方教育委員会（4 地域）、アンマン、サルト、イルビット、カラック
- トライアル学校（各パイロット LRC と地方教育委員会地域における数校）

対象学年/科目

- 7 – 8 学年：総合理科
- 9 – 10 学年：化学、物理、生物、地球科学の各理科教科

　上記のターゲット地域は、全国で 13 ある LRC の内 4 箇所と、各 LRC 地域のなかから次のような 2 つの地方教育委員会を対象としたものである。
- アンマン：アンマン 1 地方教育委員会・アンマン 4 地方教育委員会
- サルト：サルト地方教育委員会・アルバシャ地方教育委員会
- イルビット：イルビット地方教育委員会・ラムザ地方教育委員会
- カラック：カラック地方教育委員会・マザール地方教育委員会

　教育省には 1980 年代、13 個の地方教育委員会とそれに対応した 13 の LRCs があった。但し、1980 年代以降、生徒数および学校数の増加により、地方教育委員会は 37 までに増加している（一つの地方教育委員会を分割したり、また新たに人口が増加した地区に新設したりなどの処置により）。この結果、現在では複数の地方教育委員会が一つの LRC を共有している状況である。プロジェクトでは、TOT (Training of Trainers) は主にパイロット LRC 地域を単位として実施し、理科教員研修は地方教育委員会を単位として実施した。
　プロジェクト期間は 2006 年 3 月から 2009 年 2 月までの 36 ヶ月で、以下の通り 4 ヵ年に分けて設定され、予定通り実施された。
- 1 年次： 2006 年 3 月
- 2 年次： 2006 年 4 月～2007 年 3 月
- 3 年次： 2007 年 4 月～2008 年 3 月
- 4 年次： 2008 年 4 月～2009 年 2 月

1.3　　　プロジェクト目標、期待される成果

　PDM 上の上位目標、プロジェクト目標、及びプロジェクトに期待される成果は次の通りである（PDM 全体については、添付資料 1 を参照のこと）。

[上位目標]
- ターゲット地域の基礎教育の教員が ICT を活用した効果的な理科教育を展開している。

[プロジェクト目標]
- QRC とパイロット LRCs/FDs が ICT を活用した効果的な理科教育を実施する教員の能力向上のセンターとして機能できるようになる。（7 – 10 年生）

[プロジェクトの期待される成果]
1. 効果的な理科教育を実施できるトレーナーを育成する QRC の制度的枠組みが確立される。
2. QRC において ICT を活用した理科教育についての教員研修が開発・更新される。.
3. QRC においてコアトレーナー*が、ICT を活用した理科教育についての教員研修を指導するのに必要な技能を修得する。＊「コアトレーナー」は、日本人専門家チームから QRC で直接技術移転を受けた教師及び職員
4. パイロット LRCs/FDs 教員・職員が、トライアル校の教員に対し ICT を活用した理科教育についての教員研修を実施するのに必要な技能を修得する

1.4　　　成果品

　プロジェクトは次のような成果品の開発を行った

1. 研修用教材と受講者の成果品
- 理科教員ハンドブック（印刷版）
- デジタル理科教員ハンドブック (CD-ROM)
- 研修リソースキット（研修用教材と受講者の成果品を格納）

2. SEED 理科ポータルサイト(研修支援機能を含む)
- QRC 理科ポータルサイト
- LRC 理科ポータルサイト

1.5　　　プロジェクトの実施体制

　プロジェクトの実施体制を図 1.1 に示す。プロジェクトは大きく二つの期間からなりフェーズ 1（～2008 年 7 月まで）は、LRC 研修 (TOT) の開発と実施、フェーズ 2 は理科教員研修 (STT)の実施である。実施体制もこのフェーズに対応している。

　1 年次と 2 年次の始めに実施したベースライン調査の結果、次のような点を考慮し、RD に記載されている体制から幾分変更を行った。

- 初めは、プロジェクト組織は MOE の各局協力のもとカリキュラム・テキスト局をカウンターパート機関として実施する。それは、その時点において教育省も QRC の改革に着手していたが、QRC はあまりにも弱体化していてプロジェクトを進めることもできないからであった。
- 研修内容の確立だけではなく、理科研修システム全体として強化するため、プロジェクトは関連部局と活動内容の協議を進めていく。関連する局としてはカリュラム・テキスト局とトレーニング局がある。

　QRC 改革の良好な進捗を受け、プロジェクト自体の自立発展性確保のため、RD に記載されているように QRC を改めてカウンターパート機関とする変更は 2008 年 11 月に実施され、JCC において承認された。
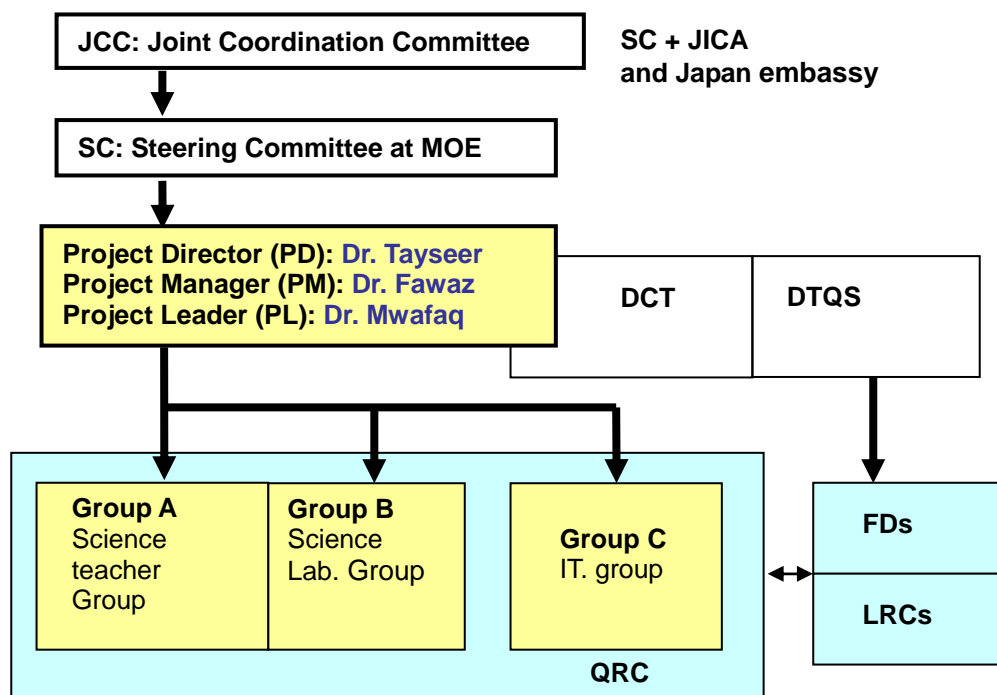
a) プロジェクト実施体制：フェーズ 1

図 1-1　プロジェクト実施体制

| JCC: Joint Coordination Committee | SC + JICA and Japan embassy |
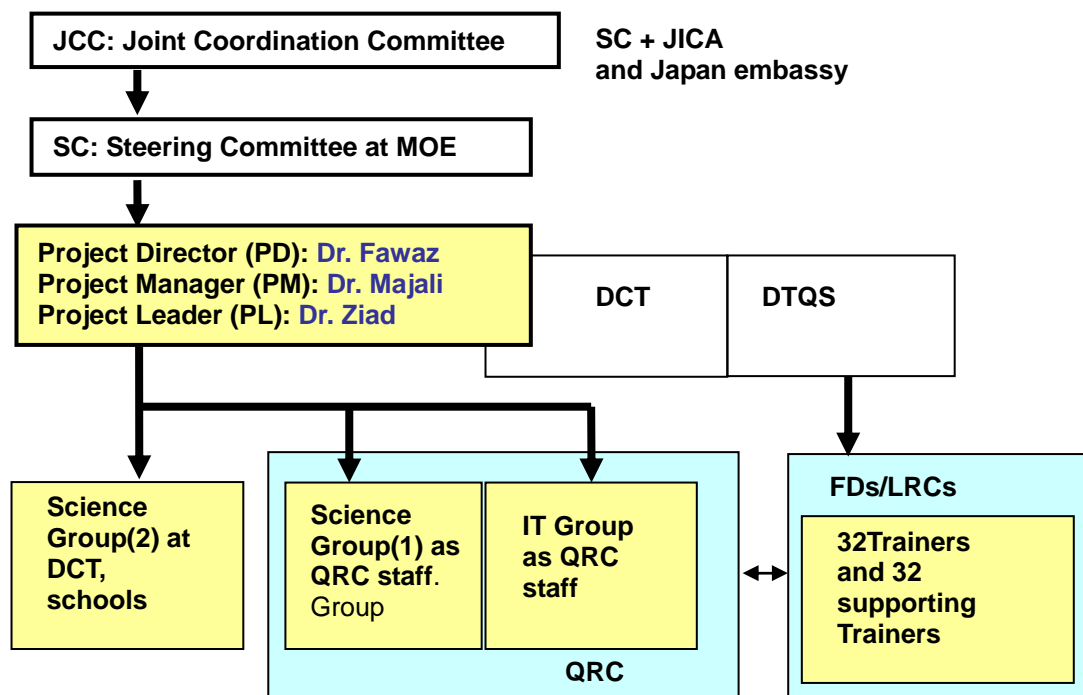
(b) プロジェクト実施体制：フェーズ 2

図 1.1　プロジェクト実施体制

　JCC はプロジェクトの最高意思決定機関である。JCC の議長は教育省の次官が担当した。JCC のメンバーは教育省の関連局の局長レベルと日本側のメンバーであった。SC は教育省側の最高決定機関である。

　ワーキンググループは実行部隊であり、日本人専門家はワーキンググループと QRC において作業を行った。プロジェクトはワーキンググループの要員の選定を 2006 年の 5 月から 8 月に行った。ワーキンググループは次の 3 グループから構成される（実質的にワーキンググループ A と B はほぼ同一のグループとして活動した）。

- ワーキンググループ A：理科教員と QRC の理科要員
- ワーキンググループ B：実験技術士
- ワーキンググループ C：QRC の IT 要員

1.6　　業務の基本方針

　プロジェクトは次のような方針に基づき業務を実施した。方針に関してはプロジェクトの状況に応じて微修正を行っていった。

1) ヨルダン国側の主体性と継続性

　「ヨ」国側の主体性と継続性を考慮し、カウンターパートが主体となった開発、実施を通じて技術移転を行う。また、移転内容は、すでに「ヨ」国側ではテキスト開発などを独自に行う能力があり、これらの既存の方法と十分整合がとれる内容とする。

2) バランスのとれた知識・技術・態度の技術移転

　特に継続性を確保するため、単なる現在の知識だけでなく、新しい知識や新しい研修システムを独自に構築できるような技術や態度についても「ヨ」国側のカウンターパーが習得できるように考慮する。

3) OJT を主体とした技術移転

　実際の教材や研修コースを開発する作業を通じて技術移転を行う。この OJT を支援するため、知識や技術の移転を目的とした講義を随時実施する。

4) 「ヨ」国も他のプロジェクト・リソースの活用

　ヨルダン国には類似する多くのプロジェクトがあり、すでに技術の蓄積が行われている部分もある。これらについては、他のプロジェクトとの連携又は他のプロジェクトからの指導などヨルダン人の間での技術移転をコーディネートする。また JOCV との連携も考慮する。

5) 技術移転内容の普及

　技術移転した内容がカウンターパート内だけにとどまらず、広くヨルダン国に普及するよう作業マニュアルの整備、Web での情報公開などを実施する。

1.7　PDM に基づいた作業工程表 (Plan of Operation)

プロジェクト期間: 2006 年 3 月 10 日から 2009 年 2 月 28 日

活動	詳細活動	スケジュール e（年度: 4 月から 3 月）													投入	成果
		2005	2006(Apr.2006-)				2007(Apr.2007-)				2008(Apr.2008-)					
		(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)		
Establishing Institutional framework of training teachers in science education utilizing ICT	Preparation of implementation structure for the training and assignment of QRC and LRCs														• Japanese experts • C/Ps • Software for development • Software for training	Institutional framework of QRC and LRCs are established to train teachers in science education utilizing ICT
Development of the Teacher Training courses utilizing ICT	Survey of the needs and present conditions														• Japanese experts • C/Ps • Software for development • Software for training	The teacher's training courses about pedagogy of utilizing ICT are developed by QRC.
	Development of curriculum of teacher's training courses															
	Development of course material for LRCs															
Strengthening of the ability to conduct training courses of Counterparts (C/Ps)	Drawing up a plan to transfer the technical skill to QRC														• Japanese experts • C/Ps • Software for development • Software for training	QRC personnel obtain the ability to conduct training courses for pilot LRCs
	Transferring the technical skills to QRC by lectures and practice															
	Monitoring of transference of technical skills and conducting performance examination															
Strengthening of the ability of C/Ps to conduct training courses	Drawing up a plan to transfer the technical skills to pilot LRCs														• Japanese experts • C/Ps • Software for development • Software for training	LRC personnel obtain the ability to conduct training courses for teachers of trial schools
	Transferring the technical skills to pilot LRCs by lectures and practices															
	Monitoring of transference of technical skills and conducting performance examinations															
	Implementation of teacher training for the teachers belonging to trial schools															

■ 初期計画　▨ 実績

図 1-2　PDM に基づいた作業工程表

1.8　　PDM 改訂

　終了時評価チームが指摘しているように、JICA はプロジェクトの事前調査を実施しなかったため、プロジェクトに次のような有利・不利な要素をもたらした。

不利
- プロジェクト開始後、日本人専門家が現状を把握したり、プロジェクトの活動計画を修正するために多くの時間を必要とした。
- カウンターパートチームの形成が遅くなり、研修の開始が遅れた。

有利
- 日本人専門家が現状に対応した適切なプロジェクト計画を作成することができた。
- QRC 改革の進行に合わせて、教育省からの要望に柔軟に対応することができた。

　前述したように、もともとオリジナルのPDM (PDM_0) は教育省の現状に合わせて改定する必要があり、PDMには指標が明確でない、又は現状に合わないことがあった。このため、中間評価調査チームと日本人専門家が下記の示すようなPDMの改定を行った（表 1.1 参照）。改定されたPDM (PDM_1) は「ヨ」国側と日本側の双方確認の上、第 3 回JCC（2007 年 12 月)で合意された（PDM_0とPDM_1は添付資料 1 参照)。

　なお、この JCC において、SEED (Science Equations Enhancement and Development)がプロジェクトの正式なニックネームとして承認された。さらに下記のように活動が ICT の有効活用だけでなく、その基盤となる理科教育全体の活動を前段階として実施することを、「ヨ」国側と日本側とで再確認された。
- 1 年次の教育省の打ち合わせで、大臣から ICT 活用だけでなく、実験の活用を含めた理科教育全体の強化の要請があった。またベースライン調査の結果、日本人専門家は、「ヨ」国理科教師がまだ生徒中心型学習の実施能力を獲得しておらず、まだICT 活用を単独で技術移転できる段階では無いことを認識した。
- 上記の理由により、「教育における ICT 案件」であることを基礎としながらも、理科教育での ICT 活用を実現するために、ICT の有効活用の技術移転のみならず、これを利用する理科教育の授業そのもののありかたの改善・向上に留意し、必要な技術移転や研修を実施することとした。

表 1.1　PDM の改定に関する重要項目（概要）

観点	PDM$_0$	PDM$_1$	理由/コメント
プロジェクト実体の反映	LRCs	LRCs/FDs	通常、地方教育委員会が研修の管理・実施を行っているため
	Grades 7-9	Grades 7-10	理科は9学年以降、化学・物理・生物・地球科学の専門理科科目に分かれるため、9学年だけだと十分な成果が期待できない。
	QRC members	Core trainers	カウンターパートは QRC の要員だけでなく、選出された理科教員も参加するため。
	by QRC	at QRC	
目標・活動・成果の見直し	Overall Goal: Teachers for secondary education perform effective science utilizing ICT Indicators: More than 80% of trial schools which dispatch teachers are satisfied with lectures improved	Overall Goal: Teachers for basic education in the target areas implement effective science education utilizing ICT. Indicators: 1. More than 75% of schools that dispatch teachers to the teacher's training for effective science education are satisfied with their improvement. 2. Students in the target areas show higher interests than other areas.	PDM$_0$ の上位目標はやや大きく曖昧なため。
	Outputs: Indicator: Pass performance examination	（削除）	達成度試験の達成基準があまり明確でなく、設定に困難が伴うため。
	Project Purpose: Indicators: 1. More than 80% of participants of pilot LRCs are satisfied with the training. 2. More than 80% of participants of trial schools are satisfied with the training.	Project Purpose: Indicators: 1. Total number of developed trainers at QRC and pilot LRCs/FDs reaches to more than 70. 2. More than 75% of participants of teacher's training courses for trial schools are satisfied with the training by pilot LRCs/FDs	指標2を活動3の指標とした。そのかわりトレーナーの育成人数を追加した。同様な改定を活動3と4の間でも行った。

観点	PDM$_0$	PDM$_1$	理由/コメント
	Output3: Indicators: 1. QRC staff members pass the performance examination. 2. QRC staff members operate the teacher training courses utilizing ICT to pilot LRC's staff members.	Output3: Indicators: 1. More than 10 teachers and staff are trained as core trainers for effective science education at QRC. 2. More than 75% of participants of training of trainers for pilot LRCs/FDs are satisfied.	
活動の追加	（無し）	digital teaching material, Website and Portal site	教員自身の ICT の活用を強化するため。

2. 投入実績

2.1 序文

多種多様なリソースがプロジェクトの実施には必要であった。この章では JICA および ヨ国教育省双方の要員投入、JICA からの資金と供与機材について、その詳細も含めて示す。

2.2 要員

JICA側

三年間のプロジェクト期間中、12 名の日本人専門家が投入された。総日数は 1499 （49.96 人月）がヨ国現地作業で、86 （2.86 人月）が国内作業である。表 2.1 に示す。

表 2.1　日本人専門家投入実績[1]

ポジション	作業	アサイン	合計日数	年度別日数			
				2006	2007	2008	2009
総括/研修計画	プロジェクトの管理および研修計画	太田　剛	449	9	165	145 (5)	130 (10)
理科教育/コース設計	研修教材と研修コースの開発	杉山 竜一	100	-	100 (10)	-	-
理科教育	モデル授業の開発と研修教材の開発	村山 哲也	60	-	-	60	-
		大原　健治	60	-	-	-	60
コース設計	研修コースの開発と実施 training courses	中野　明子	213	-	-	104 (5)	109 (10)
ICT活用	理科授業でのICT活用の設計と指導。ポータルサイトの開発	荒　優	115	15 (15)	85	15	-
		赤堀　侃司	16	-	16 (8)	-	-
		中田　志郎	290	-	-	145 (10)	145 (10)
教育評価	研修の効果に関する調査の設計と実施	桜井　愛子	3	3 (3)	-	-	-
		田中　伸一郎	19	19	-	-	-
		藤谷　元子	170	-	50	60	60
業務調整	現地での業務支援	坂本　寿太郎	90	-	-	30	60
合計		日数は移動日を含む ()は国内作業	1585 (86)	46 (18)	416 (18)	539 (20)	564 (30)

ヨ国側

教育省側が投入したカウンターパート、トレーナー、受講者およびスタッフの概要ついて表 2.2に示す（カウンターパートのリストは添付資料 3 を参照）。

表 2.2 ヨ国教育省側要員投入実績（受講生含む）

ポジション	人数	勤務形態	開始	終了	コメント
Project Director	1	パートタイム	06 年 3 月	終了時	教育省次官
Project Manager	1	パートタイム	06 年 3 月		カリキュラム・テキスト局局長から QRC 所長
Project Leader	1	パートタイム	06 年 3 月	終了時	
Working Group A, B: 1st phase from school	12	フルタイム	06 年 9 月	08 年 7 月	教育省は別途代替教員を雇用
Working Group A, B: 1st phase from QRC	2	フルタイム	06 年 9 月	08 年 7 月	
Working Group C: 1st and 2nd phases from QRC	5	フルタイム	06 年 9 月	終了時	
Working Group (Science) 2nd phase from school	5	フルタイム	08 年 8 月	終了時	教育省は別途代替教員を雇用
FDs/LRCs coordinators	8	パートタイム	07 年 12 月	終了時	
Trainees of TOT (Science)	65	フルタイム	08 年 2 月	08 年 6 月	教育省は別途代替教員を雇用
Trainees of TOT (IT)	20	パートタイム	08 年 2 月	08 年 6 月	
LRCs/FDs trainers	32	フルタイム	08 年 8 月	08 年 12 月	教育省は別途代替教員を雇用
LRCs/FDs Supporting trainers	32	フルタイム	08 年 8 月	08 年 8 月	教育省は別途代替教員を雇用
Trainees of STT	178	パートタイム（週 2 日）	08 年 8 月	08 年 12 月	教育省は別途代替教員を雇用

2.3 現地業務費

　JICAは、本プロジェクト実施に係り表 2.3の通り費用を拠出した。尚、次表の費用はJICA専門家チーム及び「ヨ」国側カウンターパートの人件費を含まない。2.2 で述べたように教育省はワーキンググループ、トレーナー、受講者のための代替教員を雇用するための多額の費用を負担している。また、教育省からはプロジェクト・オフィス、2 つの理科実験室、研修質、PC教室およびインターネット接続などが提供された。

表 2.3 現地費用（日本円）

項目	2005 年度	2006 年度	2007 年度	2008 年度*
備人費	74,536	921,773	1,260,903	1,267,200
機材保守・管理費	0	0	0	80,451
消耗品費	0	286,896	55,968	166,690
通信運搬費	10,021	80,465	85,213	108,829
資料等作成費	198,762	623,791	391,250	352,610
借料損料	82,983	1,237,537	1,791,657	1,398,152
研修費用	0	785,614	4,771,868	8,688,177
供与機材	16,000	3,514,000	1,317,000	865,384
現地再委託	0	2,383,000	1,122,000	703,000
Total	382,302	9,833,076	10,795,859	13,630,493

（通貨：日本円）*2008 年度については概算

2.4　　　機材供与

　JICA は研修教材開発のための IT 機材、QRC の 3 階の物理的な改修のための事務家具および研修用実験機材・材料などを提供した。例としては以下の通り。

- ワーキンググループ用ノート PC
- 教材作成用のデジタルカメラ、ビデオカメラ、スキャナー
- QRC の 3 階用各事務所、研修室の机・椅子
- 研修で実施する実験の化学薬品など

　プロジェクト終了時の機材供与リストは添付資料 4 に収録する。

3. プロジェクトの活動

3.1 序文

本章では、本プロジェクト期間中に実施された活動の経緯とその結果について述べる。
主な活動は次のものである。

- QRC の研修運営体制整備、必要な人員の配置
- 研修のカリキュラムと教材の開発
- コアトレーナーへの技術移転計画と TOT の実施
- パイロット LRCs/FDs の教員・職員への技術移転モニタリング及び達成度評価と理科教員研修の実施

各活動は相互に関係が深いため、以下各セクション初めに関連した活動の活動実績を示す。

3.2 QRC の研修運営体制整備、必要な人員の配置

PDM成果 1：効果的な理科教育を実施できるトレーナーを育成するQRCの制度的枠組みが確立される。

PDM活動 1
1-1. QRC の研修運営体制整備、必要な人員の配置

PDM 成果 1 は研修を開発・実施するためのワーキンググループを形成することを目的とした。

表 3.1　QRC の研修運営体制整備に関連した活動実績

Event &Activity	2006- 2007.Feb.				2007-2008.Feb				2008-2009.Feb			
	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
Selection of Working Group	■■											
Phase 1 Group activity			■■■■■■■■■■■									
Physical rehabilitation of QRC 3F by ESP, MS and the project				■■								
Discussion of Phase 2 Group										■		
Phase 2 Group activity											■■■	
Discussion of reformation plan of QRC by MOE					■■■■■							
Reformation of QRC by MOE										■■■■		

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Event &Activity	2006- 2007.Feb.				2007-2008.Feb				2008-2009.Feb			
	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
Discussion of new Group after project											▬▬	
Formulation of new comprehensive group at QRC												■

3.2.1　QRC の研修運営体制整備、必要な人員の配置

(1)　ワーキンググループの要員の選定と形成

　RD に記述されたオリジナルの計画においては、ワーキンググループは 6 人の専任者であったが、教育省としては理科教育を強化するため、より多くのコアトレーナーが必要と考え、プロジェクトはアンマン地区の理科教員から 16 名を選定することとした。

　日本人専門家はその選定のための基準と説明会用の資料を作成し、その後、カウンターパートがアンマン 1、2、3、4 の地方教育委員会に募集を呼びかけ選定を実施した。第一回目の選定は 2006 年 6 月に実施したが、候補者が他ドナーのプロジェクトのように、給与外の謝金を要求していたため選定は失敗した。カウンターパートは謝金がでないことを明確にし 2 回目の選定を実施し 16 名の理科教員を選出した。彼らは学校を離れて作業するため、教育省は代替教員の手配に時間が必要であり、学期の区切りのよさから、2006 年9 月からワーキンググループが集まり活動を始めた。

　このあと、教育省は QRC 内のプロジェクト・オフィスと 2 つの実験室を日本人専門家とこのワーキンググループ用に準備し、LRC 研修(TOT)の開発が本格化した。

(2)　理科教員研修時のワーキンググループの再編成

　QRC 改革が進行したことと、プロジェクトの継続性確保の点から、QRC を本来の計画と同様にカウンターパート機関に戻すとともに、ワーキンググループの編成の変更を行い、JCC で正式に承認された。新しいワーキンググループは 19 名の初期要員の内 13 名がそのまま QRC に残って作業することとなった。

　このフェーズ 2 のワーキンググループは理科教員研修を実施すると共に理科ポータルサイトを構築し、プロジェクト後の活動計画を作成した。

<center>表 3.2　ワーキンググループの構成</center>

役割	フェーズ 1		フェーズ 2	
	分類	内訳	分類	内訳
PL	PL	DCT (1 = Dr.Ziad)	PL	QRC (1 = Dr.Ziad)
Science Group	Working Group A Science Teachers	School (10 members)	Science Group(1)	QRC (4 members)
			Science Group(2)	School (4 members)
				DCT (2 members)
		QRC (2 members)	Science Group(1)	QRC (2 members)
	Working Group B Science Lab.	School (2 members)	Science Group(1)	QRC (1 member)
			Science Group(2)	School (1 member)
ITGroup	Working Group C IT Group	QRC (5 members)	IT Group	QRC (5 members)

(3)　QRC の改革

　プロジェクトが開始された時、教育省では QRC と LRC の改革に取り掛かっていたが、当時明確なビジョンはできていなかった。カウンターパートと日本人専門家もまた QRC をどのように改革していくかを検討した。教育省は 2007 年 1 月に QRC 改革委員会を形成し、本プロジェクトもそのメンバーとして参加した。この委員会は、LRC の現状を把握するためプロジェクトのベースライン調査結果も活用した。ESP (USAID) も同様にメンバーになり、カウンターパート、日本人専門家と ESP は協力し QRC の改革案を作成し、委員会に提出した（添付資料 13 参照）。

　現在のプロジェクトマネージャーの Dr.Majali が新しい QRC 所長に就任し、その後 QRC の改革を意欲的に行ってきた。その結果、QRC は教育省内部で正式に局待遇に格上げされると共に、ERfKE2 における重要な組織になり、教育省内において e-learning のセンターとして役割を持つまでにいたった。

　プロジェクトは前述したように QRC の改革案を作成したが、実際の改革にどのように貢献したかについては明確ではない。
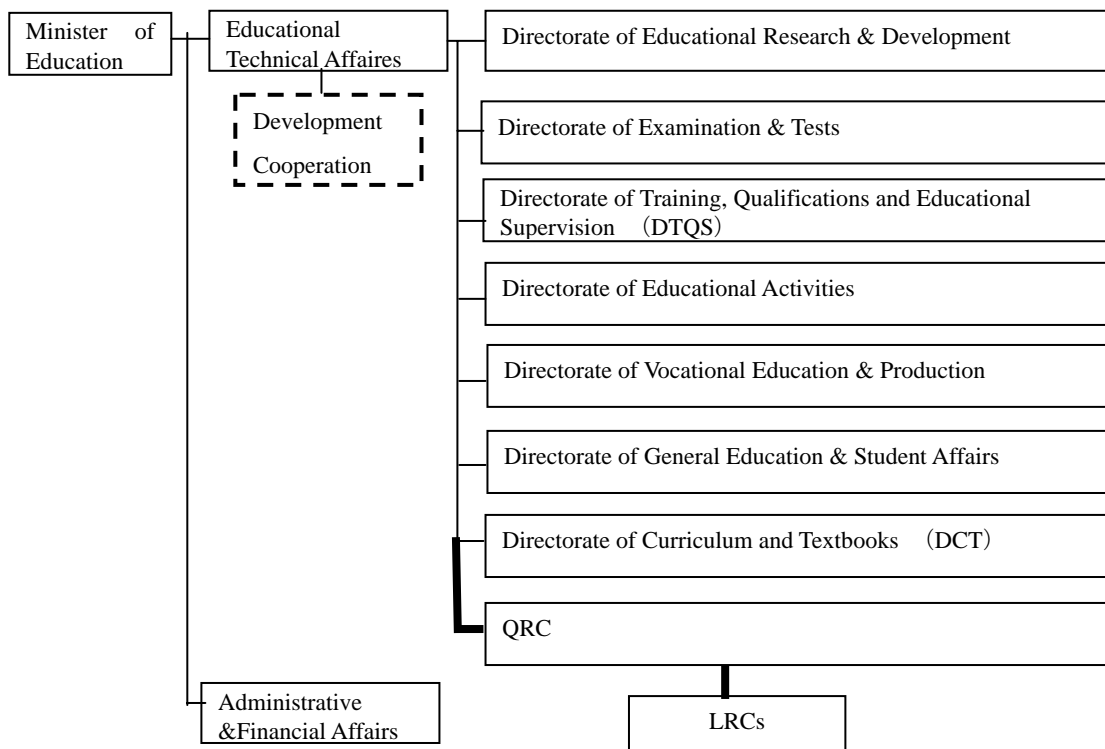
図 3-1 教育省の新体制図 (2008 年 8 月 -)

表 3.3　新 QRC の体制

部	グループ	活動	コメント
e-learning Directorate (Dr.Ziad Jawad:PL of SEED project)	Develop/ e-Contents division:	e-content の管理 e-content の新規開発 特定プロジェクト用デジタル教材の開発	
	edu-web division	edu-web の管理 ポータルサイトの新規 機能などの設計と開発管理	
	Technical support division:	学校への IT 技術支援 授業での ICT 活用支援	
	Equipment (QRC) division	QRC 内部の IT 機材・環境管理	
Educational Renewal Directorate (Dr.Ziad Nssor)	Research division:	教育方法に関する研究	
	Follow up and Coordination division:	教育省・プロジェクト調整 QRC 内部作業調整 新規企画立案・実施 地方教育省との調整 教員能力開発	
	Innovation division:	新しい教育方法の開発	
	LRC division:	LRC の活動支援	

(4)　QRC3 階の物理的な改修

　プロジェクトが開始されたときから、ESP (USAID) とマイクロソフトと本プロジェクトが QRC の 3 階を使用しており、この 3 階を教師のための学習とリソースのための場所とすることを話し合っていた。最終的に、3 階を"Professional Develop Canter for Teachers"として改修することが決まった。ESP は主に部屋や電源、インターネット、水周りなどの改修を行い、本プロジェクトは必要な事務家具を提供し、マイクロソフトはネットワークやサーバーの管理に必要な要員の派遣を行った。すでに ESP とマイクロソフトはプロジェクトが終了し QRC を離れ、本プロジェクトも引き上げるが、QRC はこの 3 階を研修室や図書館・資料室として活用している（写真参照）。

(5)　Teacher's Community の形成を含む LRC の改革

　QRCの改革後、教育省とQRCはLRCの改革を行ってきている。ERfKE2 の一つの政策は地方分権とコミュニティベースであることからも、LCRは個々の地方の教育のセンターとして機能する必要がある。プロジェクトも理科教育強化のための全体のフレームワークを作成したが、新しいLRCの機能としてTeacher's Communityが描かれている（
図 3-2参照）。QRCもこの考え方をLRC改革に採用し、2008 年 12 月からラムザ地区でプリパイロットを開始している。このプリパイロットは理科教員研修の拡大の一部と考えられ、プロジェクトでもサポートしている。

	研修	授業研究	会議/勉強会	ワークショップ	教材開発	ポータルサイト
教育省 QRC	SEED TOT (Expansion) (Science Teacher and IT)	(including Cluster style Training)	MOE/QRC conference /FD leaders meeting	SEED small WS for FD/LRC leader	Material for science Education (Lesson Plan, Lab. Manual and Tips of science education etc)	National Level Portal site, virtual community and Training site
地方教育 委員会 LRC	SEED Science Teacher Training and IT	Scope of Teacher Community	FD/LRC level Community /School leader meeting	SEED small WS	Material for science Education (Lesson Plan, Lab. Manual and Tips of science education etc)	FD/LRC level Portal site, virtual community and Training site
クラスタ /学校	Science Teacher and Lab. Technician , and IT	Lesson Study at Training / Training for Lesson Study at school / Regular Lesson Study	School leader of Science education	Science Teacher and Lab. Technician		Science Teacher and Lab. Technician , and IT

図 3-2　理科教育の強化と開発のためのフレームワーク

(6)　プロジェクト後の新理科グループの形成

　プロジェクトの活動を継続・拡大するため、日本人専門家とカウンターパートは新しい理科グループの組織について検討した。その結果、すでにある QRC の理科実験グループとワーキンググループを一緒にして、新しい総合的な理科グループを形成するという案が出てきた。この新しいグループは 6 名のワーキンググループと 1 名の理科教員研修(STT)トレーナーを含み、主に拡大研修の立案を行い、Teacher's Communitiy や理科ポータルサイトの支援をすることになる。詳細の今後の活動については、添付資料 10 を参照のこと。

3.3　　　研修のカリキュラムと教材の開発

<div style="border:1px solid">

PDM成果 2: QRC においてICT を活用した理科教育についての教員研修が開発・更新される。

PDM活動 2

　2-1. 教員のニーズ、実態調査の実施
　2-2. 教員研修のカリキュラム開発
　2-3. 教員研修用教材と講師用指導マニュアルの開発
　2-4. デジタル教材の開発
　2-5. 研修用ウェブサイトの開発
　2-6. 理科教員のためのウェブサイトの開発.

</div>

　PDM 成果 2 は ICT 活用と理科実験を含んだ新しい理科研修コースの開発とカリキュラムや教材が、適切な調査や改定により毎年改良されることを目的としている。

3.3.1　　教員のニーズ、実態調査の実施

(1)　調査の概要

　プロジェクトは幾つかの調査を実施し、その目的を以下に示す（調査の概要は表 3.4、表 3.5を参照）
- JICA は事前調査を実施していなかったため、プロジェクトを実施するための初期状態を把握する。
- 理科研修に対するニーズと、理科教員の現状の能力について明確にする。
- 開発したカリキュラム、教材や研修方法の評価を行い、それらを改善するための情報を収集する。
- 研修の効果と効率を測定する。
- QRC と LRC に対するニーズを調査する。

　調査の特筆すべき点はいろいろな方法を組み合わせて使用していることにある。例えば客観的に研修を評価するため、生徒に対して質問紙の調査を実施し、これは上位目標の「ターゲット地域の基礎教育の教員が ICT を活用した効果的な理科教育を展開している」に対応している。

表 3.4　調査の活動実績

活動内容	2006- 2007.Feb.				2007-2008.Feb				2008-2009.Feb			
	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
Baseline survey	███	███	███									
Baseline survey report				▲								
Preparation of Survey for TOT						███	███					
Conducting pre-survey for TOT								▪				
Preparation of post-survey for TOT									▪			
Conducting post-survey for TOT										▪		
Preparation and conducting of achievement exam. for STT									▪			
Preparation of pre-survey for STT									▪			
Conducting pre-survey for STT										▪		
Preparation of post-survey for STT											▪	
Conducting post-survey for STT												▪
Preparation and conducting of achievement exam for STT											▪	
Endline survey											▪	▪

表 3.5　調査の実施方法

	分類	目的	対象	方法	活動区分	コメント
00	ベースライン調査	現状把握、研修に対するニーズ調査	教育省、学習教材、関連研修	面談、LRC に対する質問紙、文献調査	2.1	事前調査相当の項目を含む
01	研修評価調査 A	1.受講者の背景となる情報や授業での活動、評価などについて把握する。	LRC 研修 (TOT) 受講者	事前調査 質問紙	3.4	
02			LRC 研修 (TOT) 受講者	事後調査 質問紙	3.4	
03		2. LRC 研修の計画・方法・内容への評価、研修で与えた知識・技術のレベル、研修で与えた知識・技術の有用性、波及効果等について把握する	理科教育研修 (STT) 受講者	事前調査 質問紙	4.4	IT 環境に関する質問を含む
04			理科教育研修 (STT) 受講者	事後調査 質問紙	4.4	調査 D を統合

	分類	目的	対象	方法	活動区分	コメント
05	研修評価調査 B	受講者の実験・観察・ICT を活用した生徒中心の理科授業に対する興味・関心の程度を測定し、研修受講後の興味・関心の程度との比較を行なう。	LRC 研修 (TOT) 受講者	事前調査　質問紙	3.4	
06			LRC 研修 (TOT) 受講者	事後調査　質問紙	3.4	
07			理科教育研修 (STT) 受講者	事前調査　質問紙	4.4	
08			理科教育研修 (STT) 受講者	事後調査　質問紙	4.4	
09	研修評価調査 C	受講者に対する生徒の授業評価、及び生徒の学習態度に関する自己評価を調査し、研修受講後の生徒の授業評価及び自己評価との比較を行なう。	LRC 研修 (TOT) 受講者の生徒	事前調査　質問紙	3.4	
10			LRC 研修 (TOT) 受講者の生徒	事後調査　質問紙	3.4	
11			理科教育研修 (STT) 受講者の生徒	事前調査　質問紙	4.4	
12			理科教育研修 (STT) 受講者の生徒	事後調査　質問紙	4.4	
13	研修評価調査 D	主に研修の実施方法や教材などの実施方法に関しての改善の資料とするため、受講者の意見を簡易的にに把握する。（期間、方法、教材など）。将来的な研修の要望を把握する。	LRC 研修 (TOT) 受講者	事後調査　質問紙	3.4	
14			理科教育研修 (STT) 受講者	（調査 A に統合）	4.4	
15	到達度確認試験	研修内容の習得度を試験により確認する。	LRC 研修 (TOT) 受講者	事後試験	3.4	
16			理科教育研修 (STT) 受講者	事後試験	4.4	
17	ニーズ・実態調査 A（エンドライン調査）	主に本プロジェクトの成果を管理者レベルに確認する。（各学校での教師の授業改善に関する活動　理科教育全般に関する教員研修・指導の変化)	学校長、スーパーバイザー　LRC 研修受講者	事後調査　質問紙	2.1	
18	ニーズ・実態調査 B（エンドライン調査）	主にプロジェクトに対する要求や背景の変化について確認する。（TOT および教員研修を実施したことによる状況やニーズの変化　教師の QRC および LCR に対する要望の変化・追加)	理科教育研修 (STT) 受講者	事後調査　質問紙	2.1	

(2)　ベースライン調査

　すでに述べたように、事前調査が無かったため、ベースライン調査の重要性はより高まっていた。このため調査期間は長く、2007 年 2 月に調査報告書が作成された。表 3.6に示した方法により実施され、次のような知見が得られた。

- カリキュラム・テキスト局はすでに新しい教科書と教師用指導書を作成済みであった。それらは生徒中心型学習などの新しい教育方法に対応し、優れた物であった。トレーニング局とカリキュラム・テキスト局は、これら新しいカリキュラムや教科書に対応した全国的な教員研修を開発・実施していた。しかしながら、多くの教員は新しい考え方や知識に対して完全に理解できていないようだった。

- 教育省は 7 教科の 1 学年から 12 学年までのすべての授業に対応したデジタル教材を開発した。それらの品質は高く、「ヨ」国は高品質で大規模なデジタル教材を整備したトップレベルの国であると言える。教育省はディスカバリースクールと名づけられた 108 校を選定し、十分なノート PC とプロジェクターを配布し、e-contents (「ヨ」国でのデジタル教材の総称)の活用のパイロットを開始していた。また Edu-web という e-contents 用の教材管理システム(LCMS)の開発も行った。

- トレーニング局では、ERfKE での新しい教授法 (生徒中心型学習、問題解決、クリティカルシンキング、新しい評価方法など)に関する研修を全国展開していた。しかしながら多くの教師は、その研修が理論中心であり、あまり授業に利用できることがないことから研修はあまり役立つものではなかったと考えていた。また、彼らはカスケード型研修の 2 レベル目のトレーナーの質に問題があることも指摘していた。

- 教育省では ICT を利用するためにインテルプログラムと基本的な PC 操作を習得するための ICDL (International Computer Driving License) の研修を実施していた。

- 教育省はすべての学校にパソコン教室を設置し、インターネットコネクションを提供していた。

- LRC の機能と役割についてはあまり明確ではなかった。個々の LRC によって機能や活動が異なっていた。また教育省があまりにも ICT の活用推進を行ってきたため、実験に関する研修や、学校モニタリングなどの LRC の他の活動は弱体化していた。

- タウジヒと呼ばれる「ヨ」国の統一大学入試試験は、生徒に対して主に教科書の隅々の記述を確認するような記憶重視のものである。このため教師は生徒中心型学習に移行することが難しいと考えていた。

表 3.6　ベースライン調査の方法

調査分類	調査項目	方法		
		資料収集	視察とインタビュー	質問紙
理科教育に関しての教育省の組織体系とその役割	教育省の組織体系とその役割		○	
	RCの現状		○	
	LRCの現状	○	○	○
学習リソース	教科書の開発方法			
	教科書の内容	○	○	
	教員用のリソース		○	
	e-science（MOEが開発したデジタル教材）	○	○	
現状の教員研修	教育研修の開発・実施方法		○	
	教員研修の状況		○	
教師のニーズを含む、学校や教師の状況	授業スタイル		○	
	試験・評価方法		○	
	教員の状況および要望等		○	
	理科実験室の状況		○	
関連する他のプロジェクト	関連する他のプロジェクト		○	

補足: 教材の分析には赤堀教授（元日本教育工学会会長）が教育工学の専門家とし参加した。

3.3.2　教員研修のカリキュラム開発

　理科教員の開発はその研修のカリキュラム内容自体と、実施期間・対象者などの実施方法計画の二つが対象となった。そしてカリキュラム自体が次のような技術移転の一貫として開発された（詳細の活動実績は表 3.7を参照）。

- コアトレーナーへの技術移転は OJT 形式で、その中で教員研修のカリキュラムとその教材の開発が開発された。
- パイロット LRC 職員及び地方教育委員会職員に対する技術移転は理科教員研修のLRC 研修(TOT)の中で実施された。

表 3.7　教員研修のカリキュラム開発に関する活動実績

活動	内容	2006-2007		2007-2008.Feb				2008-2009,Feb.			
		Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
2.2	Course Design	▬									
3.1	Technical Transfer Plan to QRC	▬	▬								
3.2	Implementation Plan of TOT		▬	▬	▬	▬					
4.1	Technical Transfer Plan to LRC			▬	▬						
3.2	Design of Detailed syllabus of TOT					▬	▬				
4.2	Implementation Plan of STT		▬	▬	▬	▬	▬	▬			
4.2	Design of Detailed syllabus of STT							▬	▬		

活動	内容	2006-2007		2007-2008.Feb				2008-2009,Feb.			
		Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
3.1 4.1	Design of Teacher's Community							███	███		
3.2	Discussion of Expansion Plan								███	███	█
3.3 2.5,6	Implementation Plan of TOT (IT)				███						
4.1 2.5,6	Design of Detailed syllabus of TOT (IT)					███					
4.1 2.5,6	Implementation Plan of TOT (IT)							███			

(1)　教育研修の方針と内容

　ベースライン調査の結果をもとに、日本人専門家は、まず次のような研修方針を決定した。

- 理科という教科に特化
- 授業を開発・実施するという教師に最も重要な仕事を中心
- 実践的な内容
- 講義ではなく、参加者の共同作業を含む実習中心
- ヨルダン人による研修の開発
- ICT の活用が目的でなく、いろいろなリソースの中で ICT をどのような活動で使用するかというブレンディドな考え方
- JICA が多くの国の教育案件で普及を行っている授業研究の利用

　これらの方針に基づき研修教材は開発されて、教員研修は実施された。これらの方針は ERfKE のプロジェクトの中でも独特ものであり、実際、有効であった。このような理由により教育省では、これら方針を ERfKE2 において研修や他のプロジェクトに採用することを考えている。

　日本人専門家は、また理科カリキュラムと教材を分析し、8 つの研修モジュールを定義した。そして教材やシラバスはこれらのモジュールを基本として設計された（表 3.8参照）。

表 3.8　理科教育研修のモジュール一覧

モジュール	概要
M1	What is ERfKE?　Why should the teacher change science education?
M2	What does the student learn in a science lesson?　What role does the teacher have in a science lesson?
M3	How does the teacher apply new methods such as Student-Centered Learning, Problem-solving, Collaboration, Critical thinking and ….. in their science lesson?
M4	How does the teacher utilize real experiments and observation in their science lesson?
M5	How does the teacher utilize ICT including e-science in their science lesson?
M6	How does the teacher design, implement and improve a good science lesson?
M7	How does the teacher cooperate with other teachers to improve science education?
M8	How does the teacher evaluate and assess students in their science lesson?

(2)　実施計画

　カウンターパートの増員と同様に、教育省から、教員研修の規模や機関についても拡大するように、要求が出てきた。教育省としては、明確な成果にはそれなりの投資が必要でかることを認識しており、事実、トレーナーや受講者が学校を離れている間の代替教員提供という多大なコストを負担した。カウンターパート、SCおよび日本人専門家はこのテーマについて時間をかけて協議し、表 3.9に示すように研修の大幅な拡大を決定した。この拡大案はPDMの改定にも反映された。規模としては前述したように初期計画から 3-4 倍程度と考えられる。

表 3.9　研修実施計画における RD と実績の差異

項目	RD での記述	実際	コメント（理由）
Num of C/P at QRC for science	Full (6) Assistant and Administrative (6)	Full -time (19)	ワーキンググループメンバーが相当する
Num of C/P at QRC for IT	（記述なし）	Part -time (6)	ICT の活用に IT 要員の協力が必要
Num of staff at FD/LRC for science	Assistant (3), Trainer was not mentioned	Coordinators (8), Trainers (64) of STT = Trainees of TOT	研修規模の拡大
Num of staff at FD/LRC for IT	（記述なし）	Trainers (20)	ICT の活用に IT 要員の協力が必要
Period of TOT	（明確な記述なし）	6 month	
Num of Trial schools	8 schools (2 for 4 pilot LRC)	Over 30	研修規模の拡大
Num of Trainees of STT	（明確な記述なし、約 30-40 名と推測）	178	推測値根拠: 4-5 名 x8 パイロット学校
TOT for IT	（記述なし）	Done same as science	
Teacher's community	（記述なし）	Done, about 30 schools joined in Ramtha as pre-pilot	
Trainings for Teacher's community	（記述なし）	Done for member of teacher's community committee and IT engineers	

　長期の研修期間のため、教育省が代替教員を準備する必要があり、TOT は 2 月期の開始である 2007 年の 2 月中旬から、理科教員研修は 1 学期の開始である 2008 年の 8 月中旬から開始された。

(3)　研修カリキュラムと詳細シラバスの設計と改良

　実施計画の協議の後、日本人専門家は研修計画を作成した（表 3.10に示す、添付資料 5 参照）。

表 3.10　教員研修の概要(計画)

研修の 名称	研修タイプ	対象者	期間	研修内容
SEED LRC 研修 (TOT)	コア・トレーニング	トレーナー候補（パイロット LRC 職員及び地方教育委員会職員・理科教員）	9 週 （45 日）	New science education method
				Development model lesson
				Teacher's collaboration to improve lessons and share ideas and resources
		LRC IT 要員	9 週 （45 日）	Development of digital lab. manual and lesson plans
				Development and management of local science portal site.
				Development and management of Virtual Training Room for SEED Science Teacher Training
	フォローアップ・トレーニング	トレーナー候補（パイロット LRC 職員及び地方教育委員会職員・理科教員）	3 カ月	Orientation for FD and LRC's
		LRC IT 要員		Development of local materials including model lesson and digital lab. Manual
				Development of local portal site
				Conducting small lab. workshop
				Conducting science teacher's community
SEED 理科教員研修 (STT)	コア・トレーニング	理科教員	3 カ月 （30 日）	New science education method
				Development of model lessons
				Teacher's collaboration to improve lessons and share ides and recourse
	フォローアップ SBT (School Based Training)		1 ヵ月	SBT (School Based Training) by conducting lesson demonstration and review meeting

　始めに、日本人専門家の手により詳細の TOT のシラバスが設計された。このシラバスは次のような特徴を持つ。
- TOT は受講者によるモデル授業の開発とその改良に多くの時間を使う。
- TOT は実際の学校環境での授業研究を含む。

- TOT はデジタル教材の作成を含み、それらはデジタル実験マニュアルとデジタル授業案（授業を記録したビデオ)であり、理科教員と IT 要員の共同作業によって開発される）。

　その後、STT のシラバスに関しては、技術移転の一貫としてワーキンググループが設計した（添付資料 7 参照）。この STT のシラバスは調査 D（TOT の事後調査）の結果を反映して改修された。主な改修点を次に示す。
- 授業案の作成により多くの時間を使うようにした。.
- 将来的な研修のパッケージ化も考慮して研修を 3 つの部分に明確に分け、それはコア・トレーニング（理論的な段階）、ノンコア・レーニング（実践的な段階）、フォローアップ（授業研究段階）である。
- 教師があまり評価の理論に興味がないことから、評価に関する時間を削減した。
- 授業研究に重点をおくようにした。
- トレーニング期間中に QRC でトレーナーの打ち合わせ会議を設定した。

(4)　教育省により研修拡大のための将来的な改良

　STT の後、日本人専門家とワーキンググループは現在の教員研修方法のシラバスなどについて見直すための協議を行った。下記の推奨内容は、今後教育省が研修を拡大実施していくときの改修に役立つであろう。
- より多くの時間を理論的な内容より、実習に使用すべきである。特に実験の準備と学校で授業研究により多くの時間が必要である。
- トレーナーと受講者にとって、ビデオを撮影したり、ビデオを編集したりするために ICT に関する時間を増やしたほうがいいかもしれない。
- 研修期間は限りがあるため、例えば 1 日程度のワークショップなどで、授業案をレビューしたりする追加の機会が必要である。
- 後述するが、STT の研修の管理は各パイロット地方教育委員レベルではコーディネータを中心にして実施した。実際コーディネータの作業は多忙を極め、適切な事前の作業指示と時間の余裕が必要である。

3.3.3　教員研修用教材とトレーナー用指導マニュアルの開発

　プロジェクトは教員研修用テキストとして理科教員ハンドブックとデジタル理科教員ハンドブック（これらは補助的な教材として使用）、トレーナー用指導マニュアルとしてPowerPointスライドやワークシートおよび授業ビデオを開発した。これらの教材はすべて表 3.8に示した 8 個のモジュールをもとに開発された。この開発と改定の実績を表 3.11に示す。

表 3.11　教員研修用教材と講師用指導マニュアルの開発に関する活動実績

活動	内容	2006-2007		2007-2008.Feb				2008-2009,Feb.			
		Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
2.2	Course Design	■									
3.1	Technical Transfer Plan to QRC	■	■								
3.2 2.3,4	Development of model lesson	■	■	■	■	■					
2.3	Development of Training Manual (Handbook) Ver.1		■	■							
2.4	Development of digital Material Ver.1		■	■							
2.3 2.4	Review of Ver.1			■							
2.3	Development of Training Manual (Handbook) Ver.2				■	■					
2.4	Development of digital Materials Ver.2				■	■	■				
2.3	Development of Trainer's materials for TOT					■	■				
2.3	Development of Trainer's Materials for STT								■		
2.3 2.4	Review of Ver.2 for approval by MOE							■			
2.3	Development of Training Manual (Handbook) Ver.3							■	■		
2.4	Development of digital Materials Ver.3								■		
2.3	Final editing and Printing similar to MOE quality									■	■

(1)　教育研修用教材の開発（理科教員ハンドブック）

　ワーキンググループA、Bは化学、物理、生物、地球科学の科目ごとに 4 つのサブグループに分けられ、それぞれのサブグループが各 2 モジュールの印刷版とデジタル版の理科教員ハンドブックの開発を担当した。この開発はPlan-Do-Seeのサイクルで図 3-3に示すような手順で技術移転のOJTとして作業が進められた。教育省は研修教材に関してその品質を保つことに非常に厳格であり、教育省も教材のレビューと確認を行い、最終的な教育省教材として承認した。またカリキュラム・テキスト局も最終的な編集に協力し、教育省発行のテキストと同様な体裁の原稿が完成し、プロジェクトは必要部数を印刷した。

　また、日本人専門家はワーキンググループに対してモデル授業案開発とその授業を実際の学校で実施することを指導した。これはモデル授業案開発が教員研修の主な内容であることと、この開発過程がワーキンググループとって実践的な知識や技術を習得する最適な技術移転の場であると考えたからである。

研修コース設計	日本人専門家が 8 モジュールを定義した。

↓

研修教材開発（理科教員ハンドブック）Ver.1	日本人専門家がハンドブックを作成するために必要な知識や技術を主に講義を通じて技術移転した。ワーキンググループはドラフト版ハンドブックを作成するとともに、モデル授業を学校で実施した。

↓

Ver.1 のレビュー	日本人専門家が授業案を詳細にレビューした

↓

研修教材開発（理科教員ハンドブック）Ver.2	ワーキンググループはハンドブックを改定し、改善したモデル授業を再度学校で実施した。

↓

教育省によるVer2 のレビュー	教育省の教材として承認するため、教育省がレビューを実施した。

↓

研修教材開発（理科教員ハンドブック）Ver.3	ワーキンググループはハンドブックを教育省のレビュー結果とTOT の実施結果をもとにレビューした。また TOT の成果物を追加した。

↓

と教育省品質の最終編集と最終印刷	カリキュラム・テキスト局が教育省の標準品質と同様に最終編集を行ったあと、プロジェクトがカラー版として印刷した（約 200 ページ）。

図 3-3　理科教員ハンドブックの開発手順
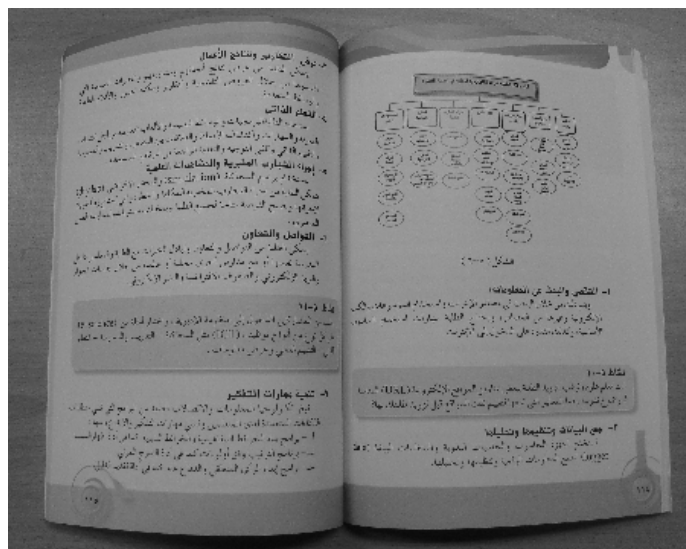
図 3-4　印刷版理科教員ハンドブック

図 3-5　印刷版理科教員ハンドブック(続き)

(2)　デジタル教材の開発（デジタル理科教員ハンドブック）

　　デジタル版理科教員ハンドブックの開発の流れも、印刷版とほぼ同じである。但し、手法は異なり、教育省ではすでに多くのe-contentsを開発済みであり、その標準的な開発手法を確立していた。これらはJICAが 2002-2003 年に実施した開発調査で技術移転したものをベースとしている。日本人専門家は教育省のデジタル教材の開発手順（図 3-5参照）をワーキンググループへ指導するとともに、プロジェクトとして開発を行う「ヨ」国内のIT企業の入札を実施した。教育省は「ヨ」国内のいくつかのIT企業とe-contentsの開発を行っていて、これらの企業は他の先進国と同様なデジタル教材の開発技術を獲得していた。
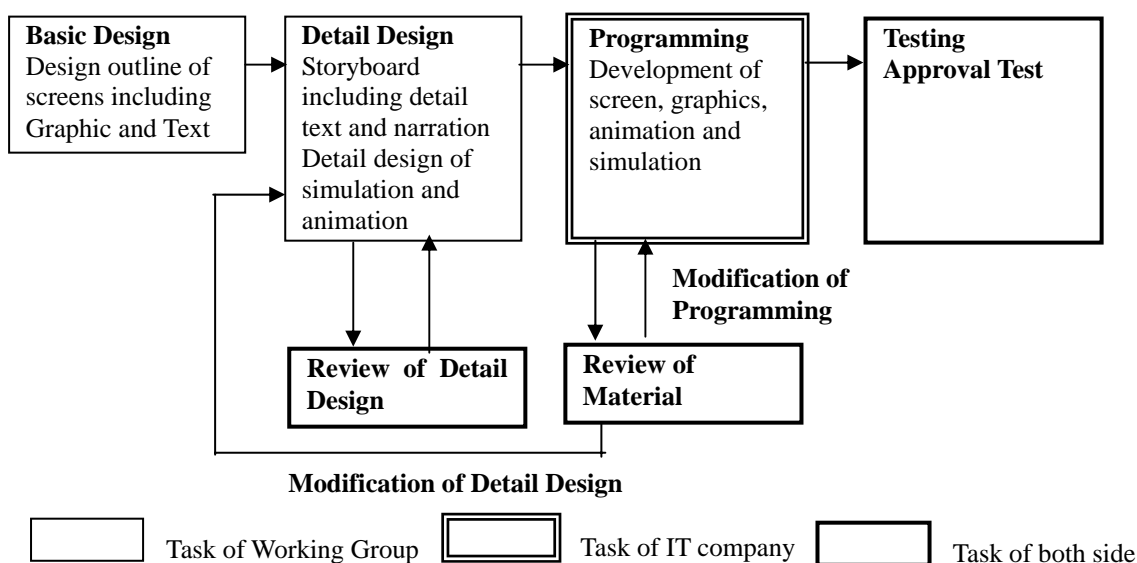
図 3-5　教育省のデジタル教材の標準開発手順

　日本人専門家は個々のモジュールの基本フレームをデザインして、ワーキンググループが設計しやすいようにした。このため個々のデジタル理科教員ハンドブック内の各モジュールは同様の教材構造となっている（図 3-6参照）。
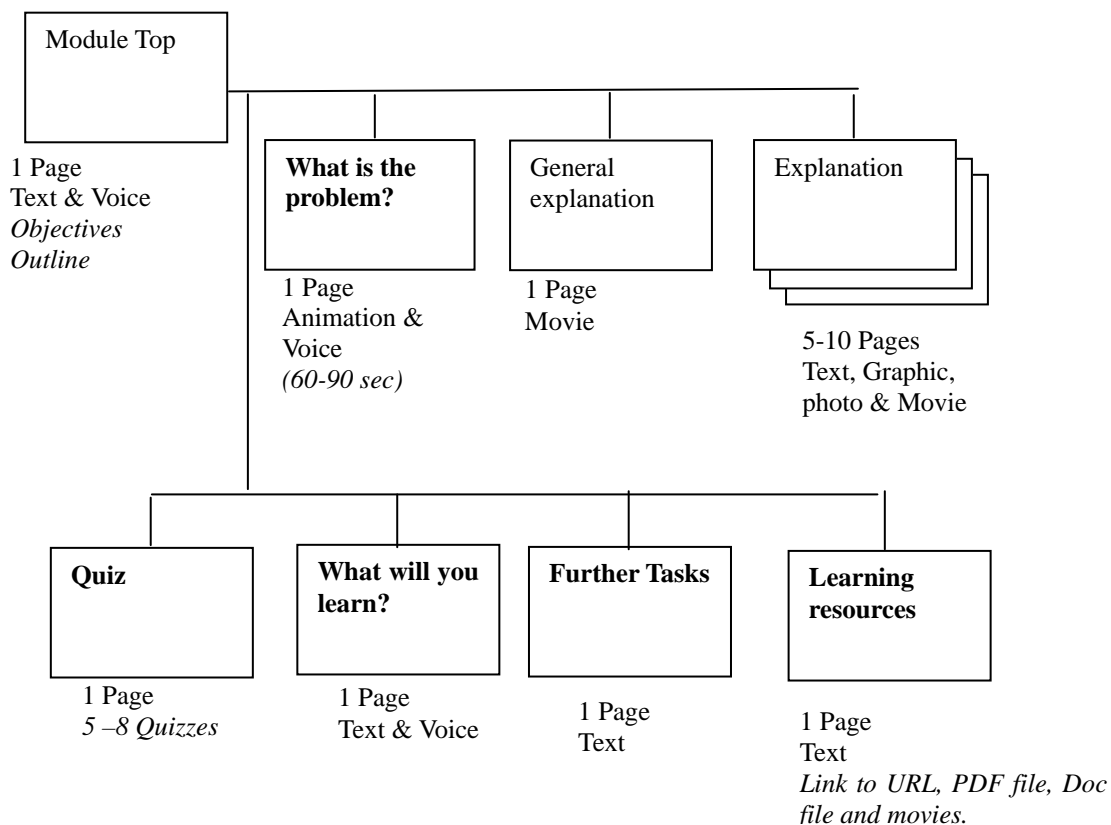
図 3-6　デジタル理科教員バンドブックの基本フレーム（各モジュール）

表 3.12　デジタル理科教員ハンドブックの画面

表 3.13　デジタル理科教育ハンドブック内のコンテンツ

コンテンツの分類	数量	コメント
アニメーション	8	各 2-3 分
説明画面	140	グラフィクと写真を含む
問題画面	30	
実写映像	4	

(3)　トレーナー用教材(指導マニュアル)の開発

　ワーキンググループは研修用の PowerPoint スライドとワークシートを TOT の受講者用に開発し、日本人専門家のレビューの後、改定している。このスライドとワークシートが基本的に指導マニュアルであり、これらの教材を使用することにより研修ができるようになっている。また、STT 用の教材はこの TOT 用の教材を大幅に改良し、次のようなアプローチで開発された。

- パイロット LRC 職員及び地方教育委員会職員であるトレーナーが STT 用の教材の改定を行った。ワーキンググループはその改定と準備を指導および監督してきた。このアプローチは ERfKE、ERfKE2 で目指している教員研修の地方分権化とも一致している。
- 教材には TOT のアウトプットである多くの写真や映像が追加された。これらは受講者の理解を助けるとともに、具体的な事例を提示することができる。
- 各パイロット LRC および地方教育委員会から集められた最終教材は、各パイロット LRC および地方教育委員会に再配布されて、そこで個別に説明会が行われ理科教員研修を担当するトレーナー間で共有された。

(4)　IT 研修のトレーナー用教材の開発

　日本人専門家とワーキンググループCもまた、表 3.14に示す 5 個のモジュールを決め、それをもとにPowerPointのスライドとワークシートをTOT用に作成した。

表 3.14　IT 要員研修のモジュール

モジュール	概要 e
IT-M1	Movie development for Digital Lab Manual and Digital Model Lesson: -Video shooting, editing and authorizing
IT-M2	Web site development: -HTML/Java Script, FrontPage, Flash
IT-M3	CMS / Portal Package: -Moodle, SharePoint Server
IT-M4	Web Based Questionnaire
IT-M5	Education and ICT: -Basic concepts of science education utilizing ICT and Lab -How teachers can use ICT in teaching

3.3.4　　研修用ウェブサイトの開発と理科教員のためのウェブサイトの開発

　前述したように研修用ウェブサイトと理科教員用ウェブサイト(ポータルサイト)の開発はRDの初期計画から追加された活動である。これは日本人専門家が単に授業でICTを活用するだけでなく、教師自身の能力開発にもICTを活用すべきであると考えたからである。しかしながら、教育省はすでに教育ポータルサイトとしてEdu-webを開発済みであり、新しいポータルサイトの使用に関して教育省と長い協議が必要だった。このセクションに関連する活動を表 3.15に示す。

表 3.15 研修用ウェブサイトと理科教員のためのウェブサイトの開発に関する活動実績

活動	内容	2006-2007		2007-2008.Feb				2008-2009.Feb			
		Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.
2.2	Course Design	■									
3.1	Technical Transfer Plan to QRC	■	■								
2.5 2.6	Negotiation with MOE about science portal site		■	■	■	■	■				
3.3 2.5,6	Implementation Plan of TOT (IT)				■	■					
3.3 2.4.6	Design of Detailed syllabus of TOT (IT)					■					
3.3 2.5,6	Implementation Plan of TOT (IT)					■	■				
2.3 2,5,6	Development of Training Materials for TOT (IT)					■	■				
3.1 4.1	Design of Teacher's Community							■	■		
4.3	Implementation of Training for Teacher's Community									■	
2.5 2.6	Implementation of Training for Teacher's Community (IT)									■	
2.6 2.5	Development science portal site and Training Web site										■

(1)　　理科教員のためのウェブサイトに関する教育省との協議

　日本人専門家は研修と理科教員のためのウェブサイトを設計し、その作成・運用方法を研修に入れると共にQRCへの技術移転計画に盛り込んだ。しかしながら、教育省はすでに二つのポータルサイトを使用中であり、新規のポータルサイトを追加することは望まなかった（表 3.16参照）。この時期、ESP (USAID)も同様な考えを持っていることがわかったため、プロジェクトとESPは共同して教科に特化したポータルサイトの開発計画を策定し、教育省との交渉を開始した。長い交渉の末、教育省は新しいポータルサイトの必要性を理解し、QRCとマザール、ラムザにプレパイロットとしてサーバー機材を 2008 年 12 月に供与した。

　これはすでに、教員研修の終了後であったが、QRC とラムザ LRC/地方教育委員はプロジェクトのポータルサイトを Teacher's Community の一つの活動として 2009 年 1 月より開発を開始している。

<p align="center">表 3.16　教育省とプロジェクトのポータルサイトの比較</p>

ポータル	開発者	長所	短所
Edu-Web	教育省	• e-science 用に開発された LMS • 生徒の教室での協働作業用の機能が豊富 • 生徒の成績を管理する機能を持つ	• 改定が難しい。外注しているため費用が高い • 教師の協働作業には不向きである。（ERfKE 中、少数の教師授業で使用）
ITN (Innovative Teachers Network)	Microsoft	• 世界的な教師のネットワーク • 教師の協働作業用の機能が豊富	• 改定は難しい • 操作が難しい • 研修向きでない • 1 国に 1 つのサイトで、すべての教科が共有する。
SEED 理科教員ポータルサイト	プロジェクト（QRC と LRC の IT 要員により moodle で開発）	• 世界標準の LMS • カスタマイズが容易 • 操作が簡単 • 昨日が単純 • LRC ごとのポータルの構築が可能 • 研修やコンテンツの共有に向いている • フリーソフト	• フリーソフトのためユーザ責任で開発・運営 • コンテンツの管理機能は弱い • 高度な機能の追加はプログラム開発が必要

(2)　研修用ウェブサイトと理科教員のためのウェブサイトのための設計とデザイン

　教育省と交渉の間、3.3.3で述べたように日本人専門家とワーキンググループCはポータルサイトを構築するために、その設計と研修の準備を進めていた。図 3-7はその画面と添付資料 11 は研修用ウェブサイトの基本機能を示す。
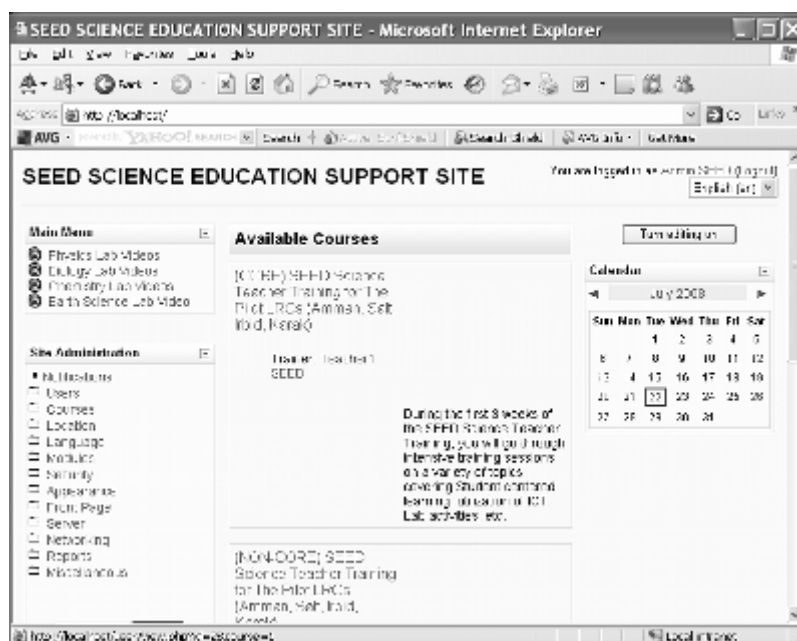
図 3-7　研修用ウェブサイトのプロトタイプ画面

(3)　Teacher's Community における理科教員のためのウェブサイトの開発

　教育省がサーバー機材を供与した後、カウンターパートは 4 日間のウェブサイト開発のための追加ワークショップをラムザLRC/地方教育委員のIT要員に対して実施した。ラムザのTeacher's Communityのメンバーはウェブサイトの開発を開始するとともにワーキンググループもQRCの理科教員用ポータルサイトの構築と研修用教材や授業案などの成果物のアップロードを開始した。表 3.17にはQRC理科教員用ポータルサイトのコンテンツの分類設定を示す。

表 3.17 QRC 理科教員用ポータルサイトのコンテンツの分類

分類	トピック名
SEED	SEED Science Training
General Science	General Science – Grade 7
	General Science – Grade 8
Physics	Physics – Grade 9
	Physics – Grade 10
Chemistry	Chemistry – Grade 9
	Chemistry – Grade 10
Biology	Biology – Grade 9
	Biology – Grade 10
Earth Science	Earth Science – Grade 9
	Earth Science – Grade 10

Note: Current category is corresponding to the Project target to upload the output of the training. QRC will gradually increase the categories after other materials are developed.

3.4　　　コアトレーナーへの技術移転と LRC 研修(TOT)の実施

> **PDM成果 3: QRC** においてコアトレーナーが、**ICT** を活用した理科教育についての教員研修を指導するのに必要な技能を修得する
>
> **PDM活動 3**
>
> 3-1．コアトレーナーへの技術移転計画の策定
> 3-2．講義と実習を通じたコアトレーナーへの技術移転の実施
> 3-3．コアトレーナーによる教員研修の実施
> 3-4．コアトレーナーへの技術移転モニタリング及び達成度評価

　　PDM成果 3 はQRCのコアトレーナーの能力開発を目的としている。明示された目標としてQRCを「ヨ」国における教育工学のセンターとして強化することがある。技術移転は主に講義とOJTの方法により実施された。OJTは表 3.18に示されたいろいろな活動場面で行われた。

表 3.18　コアトレーナーへの技術移転と LRC 研修 (TOT) の実施に関する活動実績

活動	内容	2006-2007		2007-2008.Feb				2008-2009.Feb.			
		Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.
3.1	Technical Transfer Plan to QRC	■	■								
3.2 2.3,4	Development of model lesson	■	■	■	■	■					
2.2	Design of Detailed syllabus of TOT					■	■				
3.3 3.4	Implementation of TOT							■			
3.4	Preparation and conducting of achievement exam for TOT								■		
2.2	Implementation Plan of STT			■	■	■	■	■	■		
2.2	Design of Detailed syllabus of STT							■	■		
4.3 4.4	Implementation of STT									■	
4.4	Preparation and conducting of achievement exam for STT										■
2.2	Implementation Plan of TOT (IT)				■						
2.2	Design of Detailed syllabus of TOT (IT)					■					
3.3	Implementation of TOT (IT)							■			
2.2 2.5,6	Development of Training Material for TOT (IT)					■					
4.3	Implementation of Training for Teacher's Community									■	
4.3 2.5,6	Implementation of Training for Teacher's Community (IT)									■	
2.5,6	Development science portal site and Training Website										■

活動	内容	2006-2007		2007-2008.Feb				2008-2009.Feb			
		Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
2.3	Development of Training Manual (Handbook) Ver.1		■	■							
2.4	Development of Digital Material Ver.1		■	■							
2.3 2.4	Review of Ver.1			■							
2.3	Development of Training Manual (Handbook) Ver.2				■	■					
2.4	Development of Digital Material Ver.2				■	■	■				
2.3	Development of Trainer's Materials for TOT					■	■				
2.3	Development of Trainer's Materials for STT								■		
2.3 2.4	Review of Ver.2 for approval by MOE							■			
2.3	Development of Training Manual (Handbook) Ver.3							■	■		
2.4	Development of Digital Material Ver.3								■	■	

3.4.1　　コアトレーナーへの技術移転計画の策定

　ベースラインサーベイの結果をもとに日本人専門家は研修コースの設計と技術移転計画を作成し、QRC への技術移転計画書は 2007 年 2 月に提出された。

(1)　　コアトレーナーとパイロット LRC　職員及び地方教育委員会職員に対する方針と方法

技術移転の方針を表　3.19に示す。

表　3.19　技術移転方法の概要

名称	対象者	概要
OJT	コアトレーナー	各活動を通じて技術移転を行う。
講義	コアトレーナー	日本人専門家が講義を実施する。
本邦研修	カウンターパート	本邦研修において、日本の最新事例や施策などについて習得する。
LRC研修（TOT）	コアトレーナー、LRCおよび地方教育委員会職員	TOTにおいてコアトレーナーが習得した技術をLRCの職員や地方教育委員会のスーパーバイザーに技術移転する。
理科教員研修（STT）	コアトレーナー、LRCおよび地方教育委員会職員	STTにおいてLRCの職員や地方教育委員会のスーパーバイザーが習得した技術を理科教員に技術移転する。LRCの職員や地方教育委員会のスーパーバイザーにとってのOJTの場である。
理科ポータルサイト	コアトレーナー、LRCおよび地方教育委員会	理科ポータルサイトにより、プロジェトクの技術内容をMOE関係者や各教員に紹介する。

(2)　技術移転の対象とする知識・技術について

　ベースライン調査の結果や日々のワーキンググループに対する観察から、日本人専門家は技術移転の対象とする知識・技術について決定した。教育学や教育工学の観点から日本人専門家は非常に詳細な教育技法、例えば、板書の仕方、問題の作成方法、生徒のほめ方など、は対象としないで、授業案の開発方法に集中することとした(表 3.20参照)。

表 3.20　コアグループに対する技術移転における対象技術・知識の概要

分類	コアトレーナー内のターゲット	技術移転の内容
教育学および教育工学	ワーキンググループ A,B	Teaching method using student-centred learning for science education
	ワーキンググループ A,B,C	Utilizing ICT in science education
	ワーキンググループ A,B	Utilizing real Lab. activity including traditional experiment and new styles (using local materials)
	ワーキンググループ A,B	How to develop lesson plan
	ワーキンググループ A,B	How to cooperate for development of lesson plans
	ワーキンググループ A,B	How to conduct good real experiments
教材開発	ワーキンググループ A,B	How to make training textbooks
	ワーキンググループ A,B,C	How to make training materials such as Power Point slides
	ワーキンググループ A,B	How to make examinations
	ワーキンググループ A,B,C	How to develop digital materials
	ワーキンググループ A,B,C	How to develop digital Lab. manual and digital lesson plans
研修実施	ワーキンググループ A,B,C	How to design training syllabus
	ワーキンググループ A,B,C	How to monitor the training
	ワーキンググループ A,B,C	Preparation and implementation of training
Web 技術	ワーキンググループ A,B,C	How to use the portal site
	ワーキンググループ C	How to program the portal site
	ワーキンググループ C	How to install and manage the portal site
プロジェクト管理	ワーキンググループ A,B,C	Progress management
	ワーキンググループ A,B	Evaluation of the project

3.4.2　講義と実習を通じたコアトレーナーへの技術移転の実施

(1)　OJT と講義

　日本人専門家は 2 年半にわたりコアトレーナーに対して技術移転を行ってきた。この期間は大きく表 3.21に示すようにプロジェクトの進行とコアトレーナーの能力開発に対応して 5 つの段階に分けることができる。すでに3.3.3述べたように、ワーキンググループは 4 つの科目ごとのサブグループに分かれて教材の開発を行ったが、日本人専門家はしばしば個々のサブグループごとに教材のレビューを実施した。

表 3.21　コアトレーナーに対する技術移転の段階

段階	概要	日本人専門家の活動
Stage 1: 2006 年 9 月 - 2007 年 4 月	日本人専門家は主に実習を伴う講義を通じて技術移転を実施。コアトレーナーは研修教材のドラフト版を作成	日本人専門家は約 30 回の講義と約 20 回のハンドブックのレビュー打ち合わせを実施
Stage 2: 2007 年 5 月 - 2008 年 1 月	日本人専門家は教材とモデル授業案のレビューを実施	日本人専門家は約 30 回の講義と約 60 回のモデル授業案とハンドブックのレビュー打ち合わせを実施
Stage 3 2008 年 2 月 - 2008 年 6 月	日本人専門家の支援でコアトレーナーが TOT を実施	日本人専門家が研修の実施、調査、試験を支援
Stage 4: 2008 年 7 月 - 2008 年 11 月	コアトレーナーが STT の計画と準備を日本人専門家の支援で実施	日本人専門家がコアトレーナーの作成した教材、シラバスをレビュー。モニタリングと試験の支援を実施
Stage 5: 2008 年 12 月 - 2009 年 2 月	カウンターパートが理科ポータルサイトを含む teacher's community の活動を計画・実施 日本人専門家は終了時評価で指摘された追加的な技術移転を実施	日本人専門は teacher's community に関する助言を実施。 追加的な技術移転の内容は評価と ICT 活用に関して

(2)　モデル授業の開発と学校での授業の実施

　モデル授業の開発は技術移転と研修教材として最も重要な活動であった。コアトレーナーは 2006 年の 10 月よりモデル授業の開発を開始し、2006 年 12 月に学校で 4 つのモデル授業を実施した。日本人専門家がその授業案や授業をレビューした結果、次のような弱点が明らかになった。

- コアトレーナーは正確な実験手順を行うことに慣れていない。
- コアトレーナーは生徒に考える機会や時間を与えていない。
- コアトレーナーは適切な用途・時間に ICT を活用していない。
- コアトレーナーは理科教育に向いた授業の流れを理解していない。

　ここにおいて、日本人専門家は技術移転計画を見直し、モデル授業の開発を強化することとした。次に実際に日本人専門家によって実施された対応を示す。

- 図 3-8に示す、構成主義に基づく授業の方略と流れを明確にし、これに沿って授業を設計するようにコアトレーナーを指導した（添付資料 12 参照）；
- 図 3-9に示す授業開発手順を明確化した。これには予備実験やマイクロティーチングなどを含む（添付資料 12 参照）；

- 授業案、予備実験、マイクロティーチングなどを繰り返し実施し、レビューを行い授業の改良を繰り返した。

これらの方法は理科教育方法論とインストラクショナルデザインの考え方をベースにしていて、コアトレーナーにとって新しく役立つもので、数多くのレビューと改良の作業の後、コアトレーナーは 15 のモデル授業を完成させた（表 3.22参照）。これらのモデル授業と、この開発方法が研修とその教材の基礎となった。

Making Hypothesis	Making Hypothesis	Development of Idea	Development of Idea
Finding by experiment or observation	Finding by observation or experiment	Confirmation by experiment or observation	Confirmation by activity
Explanation / conclusion	Explanation / conclusion	Explanation / conclusion	Explanation / conclusion
Expanding	Expanding	Expanding	Expanding
1. Hypothesis – Finding (Primary science method of SEED project for science education)	2. Finding (Discovery)	3. Development of Idea - Confirmation	4. Development of Idea – Confirmation without observation or experiment

図 3-8　構成主義に基づく理科授業の基本的な流れ

教材の収集と分析

↓

学習目標のコンセプトマップの作成

↓

複数の授業フローチャート案の作成

↓

授業フローチャートの選定

↓

事前実験の実施

↓

授業案の作成

↓

マイクロティーチングの実施と授業案の改定

↓

授業公開/授業研究の実施

↓

授業案の確定
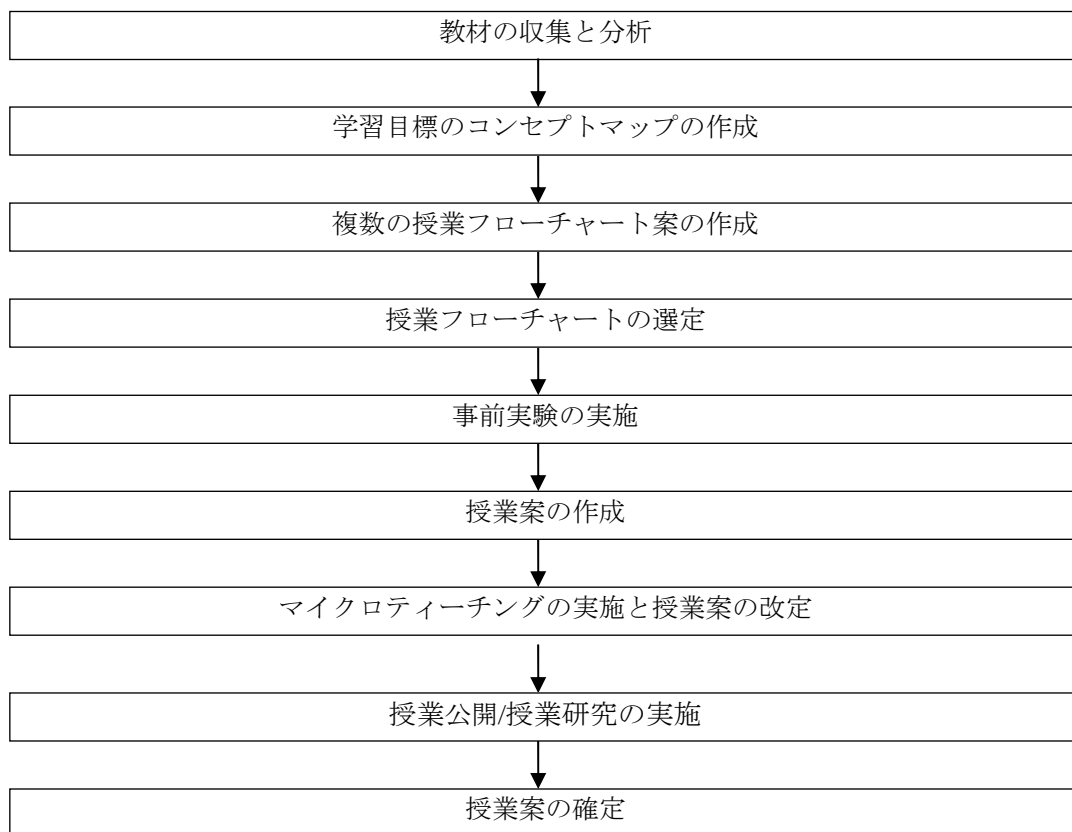
図 3-9　授業開発手順

表 3.22　コアトレーナーの開発したモデル授業

科目	内容
化学	Chemical reactivity
	Acid and metal
	Acid-Base
	Acid rain
物理	Simple machine
	Concave miller
	Liner expansion
生物	Digestive system
	Vitamin
	Diffusion and Plasma membrane
	Photosynthesis
地球科学	Mineral
	Galaxy and Solar system
	Plate tectonics

(3) ICT 活用の方針

　2006 年 12 月にモデル授業が開発された後、日本人専門家は ICT の活用方針についても見直しを行った。ワーキンググループがモデル授業を開発するときに次のような点について指導を行った。

- 教師はデジタル教材の開発を行わない。教師はインターネットや教育省の開発した e-contents から適切なデジタル教材を探すべきであり、教師はそれらを PowerPoint を使用して見せることができるようにすべきである。
- 教師は ICT を使うことや PowerPoint のスライドを作成することに集中すべきではない。教師はブレンデッドな学習に集中すべきである。これは、教師は授業の流れの中で必要な時に、必要な目的において ICT を使うことを、意味している。
- 教師はプロジェクターの利用方法を知るべきである。プロジェクターの利用は単に説明を映すだけでなく、実験の手順を映像で見せたり、問題やワークシートを生徒に提示することもできる。
- 教師はプロジェクターだけを使うべきではない。教師は黒板とプロジェクターを同時に使用するべきである。
- もし教師がデジタル教材を開発するならば、それらは写真や映像であるべきだ。これらは作成が簡単で、e-sicence には、実物の写真や映像が無いからである。これらの理由から TOT では授業の映像の撮影やデジタル実験マニュアルの開発を教えている。

(4) 本邦研修

　プロジェクトはカウンターパートの能力開発のため JICA の管轄で本邦研修を実施した。研修の概要については以下を参照。

表 3.23　2 年次の本邦研修

項目	内容
研修の目的	日本におけるICTや理科実験を効果的に活用した理科教育の実践事例について、行政、研究機関、実施機関（学校）等関連機関の視察を通じて実地で学び、ヨルダンの教育現場でのICTや理科実験の活用を推進する。
実施時期	2007 年 2 月 28 日～3 月 16 日
研修生	2 名 Dr. Mwafaq Al Zoubi Mr. Abdel Rahman Abbadi
研修機関	各教育行政、教育機関 小学校・中学校 情報教育推進機関 科学館、博物館 ICT活用教育イベント ICT・理科教育教材制作会社

表 3.24　3 年次の本邦研修

項目	内容
研修の目的	中学校教員を対象とした現職教員研修で活かされている「ICTを活用した理科教育」と「教育情報センターの運用」を、日本の経験から学ぶことによって、ヨルダンの教育現場でのICTの活用を推進する。
実施時期	2007 年 11 月 6 日〜24 日
研修生	本年度 4 名　研修生 　Ms. Wafa Kharaisat 　Ms. Samira Shannak 　Mr. Nader Salen 　Mr. Hazem Ahmad
研修機関	小・中・高等学校理科授業、実験機材、ICT活用授業・手法の視察 県教育委員会（情報教育推進担当） 情報教育推進機関（NIME、CEC等） 学会視察 教員・教育関係者とのディスカッション 講義（日本の教育史、教育制度・政策、理数科教育及びICTの教育利用について）

表 3.25　4 年次の本邦研修

項目	内容
研修の目的	中学校教員を対象とした現職教員研修で活かされている「ICTを活用した理科教育」と「教育情報センターの運用」を、日本の経験から学ぶことによって、ヨルダンの教育現場でのICTの活用を推進する。 日本のICTを活用した理科教育の普及についての施策を視察・理解することにより、今後のQRCの活動の参考とする。
実施時期	2008 年 10 月 5 日〜23 日
研修生	本年度 6 名　研修生 　Dr. Ziad AbdlJawad 　Mr. Adnan Abu Hilewa 　Mr. Hisham Alaween 　Mr. Tayseer Akal 　Mr. Emad AlAkhras 　Mr. Tyseer Bishbish
研修機関	小・中・高等学校理科授業、実験機材、ICT活用授業・手法の視察 情報教育推進機関（NIME、CEC等） 科学館の視察 教員・教育関係者とのディスカッション 講義（理数科教育及びICTの教育利用について）

本邦研修において、カウンターパートは理科教育における新しいアイデアや役に立つ情報を習得してきた。一例としてNIMEの堀田教授より実物投影機（教材提示装置）で生徒に提示したり、映像を記録することを教えられた後、ワーキンググループのメンバーはWebカメラを使用した安価なPCに接続できる実物投影機を手作りした。クロージング・ワークショップにおいて、その機材と使用方法が発表され、多くの参加者の関心を誘っていた（図 3-10参照）。
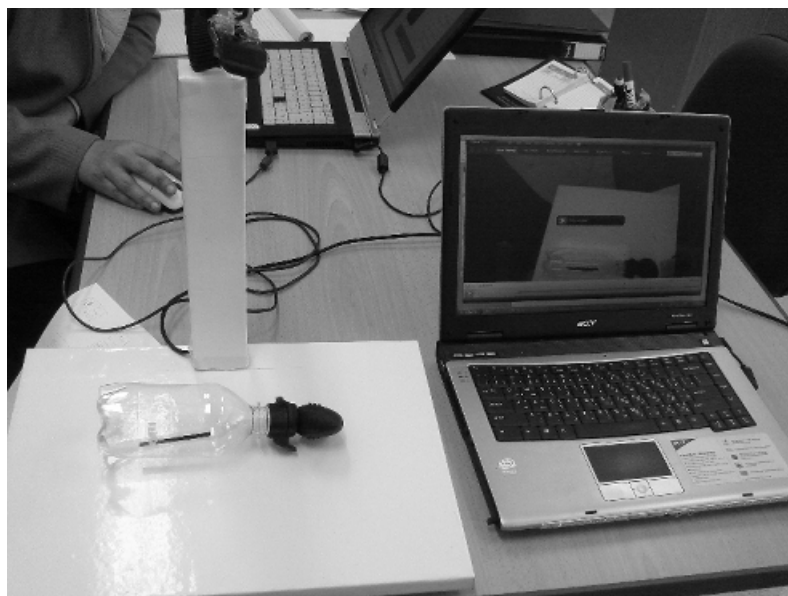

図 3-10　手作り実物投影機（教材提示装置）

3.4.3　コアトレーナーによる教員研修の実施

(1)　LRC 研修 (TOT) の準備

すでに教育省は研修を実施することに慣れているため、カウンターパート、カリキュラム・テキスト局およびトレーニング局から地方教育委員会に対して TOT の実施と、その準備をするように連絡が出された。受講者の選定に関しては、まず地方教育委員会が候補者の選定を行い。カリキュラム・テキスト局とトレーニング局が最終選定を行った。この選定において女性教員が多くなるという問題が発生したが、これは代替教員に関して女性の方が見つけやすいという原因による。

表 3.26　LRC 研修 (TOT) の準備

Task	Action	Assignment	Due date
Planning and notification to LRCs/FDs	Plan for SEED Science TOT for LRC Regions	The Project	Nov,. 20
	Revise and reach agreement among DCT, DTQS and the Project	DCT, DTQS, the Project	Nov,. 25
	Explain the plan to Pilot LRCs and FDs	DCT, DTQS, the Project	Nov, 30
	Plan the detailed schedule for each pilot LRC	FD,LRC	Jan, 30

Task	Action	Assignment	Due date
Preparation of the Material	Develop training materials	The Project	Feb., 15
	Print and copy training materials and deliver them	The Project	Feb., 8
Preparation at LRC regions	Select candidate trainees	FD, LRC	Jan, 30
	Select　final trainees and setup orientation for trainees	DCT, DTQS	Feb, 10
	Prepare rooms at QRC and equipment	The project	Feb, 14
	Prepare rooms and equipment	LRCs/FDs	Feb, 14

(2)　LRC 研修 (TOT) の実施

　TOT は 2008 年 2 月 14 日のオープニング・ワークショップで開始された。計画に比べて研修期間が 2008 年の 6 月まで延長された。これは教育省が受講者により多くの時間が必要と考えたからである。この延長期間の間、受講者は習得した知識や技術をもとにより多くの授業案を開発した。

表 3.27　LRC 研修 (TOT) の実績

研修の名称	タイプ	対象	期間	概要
SEED LRC 研修 (TOT) 理科教員	コア・トレーニング（プロジェクトで実施）	トレーナー候補（パイロット LRC 職員及び地方教育委員会職員・理科教員）（70 名）	Feb. 14, 2008 - Apr. 5 (45 days)	フルタイムでの研修（週 5 日）
	フォローアップ・トレーニング（教育省で実施）		Apr. 6, 2008 - Jun. 20, 2008	
SEED LRC 研修 (TOT) IT	コア・トレーニング（プロジェクトで実施）	LRC IT 要員(20 名)	Feb.14, 2008 - Apr. 5 (45 days)	パートタイムで研修に参加
	フォローアップ・トレーニング（教育省で実施）		Feb.14, 2008 - Apr. 5 (45 days)	

　実施にあたってプロジェクトはそれぞれの地方教育委員会ごとに 1 名のコーディネータを選出し、日本人専門家とコアトレーナーはこのコーディネータと緊密に連絡をとり TOT を実施した。このコーディネータの役割は TOT の実施において重要かつ有効だった。

　TOTの後，コアトレーナーは受講者達の成果物を収集し、それらを研修教材の改善に利用するとともに、QRCのポータルサイトに 2009 年 2 月よりアップロードを開始した（表 3.28参照）。

表 3.28　LRC 研修 (TOT) の成果物

タイプ	成果物数
授業案	160
デジタル実験マニュアル	50
デジタル授業案（授業映像）	30

3.4.4　　コアトレーナーへの技術移転モニタリング及び達成度評価

(1)　LRC 研修(TOT)のモニタリングと評価

3.3.1で述べたように、プロジェクトは 4 種類の調査（A、B、C、D）を実施した、事前調査はオープニング・ワークショップにおいて実施され、事後調査はクロージング・ワークショップにおいて実施された。日本人専門家が分析を行い、そこから得られた知見はSTTのシラバスと教材の改良に利用された。受講者の満足度など高く、詳細の調査結果については、4.2で述べる。

(2)　達成度試験の準備と実施

　コアトレーナーへの技術移転が十分であったかどうか判断するため、TOT の受講者に対して達成度試験が実施された。もしこの成績が良ければ技術移転はうまくいったと考えられる。

　始めに日本人専門家は選択肢問題で試験を作るようにコアトレーナーに指示したが、コアトレーナー自体が試験形式を変更した。試験の結果については、概ね受講者は知識・技能を獲得したと判断され、詳細については4.2で述べる。

3.5　　パイロット LRCs/FDs の教員・職員への技術移転モニタリング及び達成度評価と理科教員研修の実施 (STT)

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PDM成果 4：パイロットLRCs/FDs教員・職員が、トライアル校の教員に対しICTを活用した理科教育についての教員研修を実施するのに必要な技能を修得する

PDM活動 4

4-1. パイロット LRCs/FDs の教員・職員への技術移転計画の策定
4-2. 講義と実習を通じたパイロット LRCs/FDs の教員・職員への技術移転の実施
4-3. パイロット LRCs/FDs の教員・職員によるトライアル校教師への教員研修の実施
4-4. パイロット LRCs/FDs の教員・職員への技術移転モニタリング及び達成度評価

</div>

　PDM活動 4 の目的はパイロットLRC 職員及び地方教育委員会職員の能力開発である。この技術移転は前述しているようにTOTで実施された。このTOTの後、パイロットLRC 職員及び地方教育委員会職員はSTTのトレーナーになりSTTを実施することにより彼らの新しい知識や技能を確実なものとした（表 3.29参照）。

表 3.29　パイロット LRCs/FDs の教員・職員への技術移転と
理科教員研修の実施 (STT) に関する活動実績

活動	内容	2006-2007		2007-2008.Feb				2008-2009,Feb.			
		Sep.	Dec.	Mar.	Jun	Sep.	Dec.	Mar.	Jun	Sep.	Dec.
4.1	Technical Transfer Plan to LRC			■	■						
4.4	Preparation of pre-survey for STT								■		
4.4	Conducting pre-survey for STT									■	
4.4	Preparation of post-survey for STT										■
4.4	Conducting post-survey for STT										■
4.4	Preparation and conducting of achievement exam for STT									■	■
2.2	Implementation Plan of STT			■	■	■	■	■			
2.2	Design of Detailed syllabus of STT							■	■		
2.3	Development of Trainer's Materials for STT							■			
4.3 4.4	Implementation of STT								■	■	

3.5.1　パイロット LRCs/FDs の教員・職員への技術移転計画の策定

　日本人専門家はTOTを技術移転の場として設計し、「LRCへの技術移転計画書」を提出した。方針と方法については、コアトレーナーのもとのほぼ同じであるが、対象となる知識と技術は、コアトレーナーのサブセットとした（表 3.30参照）。

表 3.30　パイロット LRC 職員及び地方教育委員会職員に対する
技術移転における対象技術・知識の概要

分類	技術移転内容
教育学および教育工学	Teaching method using student-centered learning for science education
	Utilizing ICT in science education
	Utilizing real Lab. activities including traditional experiments and new styles (using local materials)
	How to develop lesson plan
	How to cooperate for development of lesson plan
	How to conduct good real experiments
教材開発	How to make training materials such as Power Point slides
	How to develop digital lab. manual and digital lesson plans
研修実施	Preparation and implementation of training
Web 技術	How to use portal site
	How to program portal site
	How to install and manage portal site

3.5.2　　講義と実習を通じたパイロット LRCs/FDs の教員・職員への技術移転の実施

　コアトレーナーはTOTを通じてパイロットLRC 職員及び地方教育委員会職員に対して技術移転を行った。また教育省は、教育省の標準的な研修のトレーナーとしての必要な技能を教える研修コースをすでに持っていた。このため、教育省側として表 3.31に示す追加研修を実施し、その中で日本人専門家も授業研究に関する追加講義を実施した。

表 3.31　パイロット LRC 職員及び地方教育委員会職員に対する追加研修

日程	内容	担当トレーナー	詳細
July 21, 2008 (Mon.)	Using Lesson Study to Improve Science Lessons	DTQS	1. Session on How to Improve Science Lessons Using Lesson Study
July 22, 2008 (Tues.)	Communication Skills	DTQS	1. Session on Effective Communication Skills - How to ask questions - How to facilitate discussions
July 23, 2008 (Wed.)	Characteristics and Attitudes of a Trainer	DTQS	1. Session on Characteristics and Attitudes of a Trainer: - How to treat trainees
July 24, 2008 (Thu.)	How to Conduct a Training Session	DTQS	1. Session on How to Conduct a Training Session: - How to open and close sessions - How to facilitate group work
July 25, 2008 (Fri.)	Final Training Preparation	Core trainer/ Japanese expert	1. Final Training Session: Curriculum of SEED Science Teacher Training

　TOT の後 STT 用に研修教材を改修するとに、コアトレーナーはその作業にパイロットLRC 職員及び地方教育委員会職員も参加するように指示した。始めは、共通な標準的な教材を作成し、その後、個々の LRC/地方教育委員会ごとに、地方ごとにニーズに対応して教材を作成した。しばしばパイロット LRC 職員及び地方教育委員会職員は自分自身の授業案や授業の映像を採用した。

3.5.3　　パイロット LRCs/FDs の教員・職員によるトライアル校教師への教員研修の実施

　トレーナーの質を確保するため、カウンターパートは TOT の 70 名の受講者中から、39名の STT トレーナーを選出した。選ばれなかった人の内、25 名の受講者はサポート・トレーナーとなった。STT トレーナーは STT の全期間担当し、サポート・トレーナーは夏休み期間に実施したコア・トレーニング（理論的な段階）にのみ参加した。これは STT においてトレーナーや受講生の人数が多かったため、教育省として STT トレーナーと受講者のみ学校を離れて参加させることを決めたからである。とにかく、STT トレーナーおよびサポート・トレーナーは全員、STT において何らかの形で講義を担当した。

　STT は 2009 年 8 月 3 日のオープニング・ワークショップから開始した。研修の期間はTOT を延長したように 2008 月 12 月まで延長された。トレーニングは LRC 又はパイロット LRC/地方教育委員会地域の学校を講習会場として実施された。またプロジェクトは 3 回のトレーナー会議を QRC で実施し、研修の進捗や成果物の紹介などを行ってきた。

表 3.32　理科教員研修 (STT) の実績

Type	Target	期間	Summary
コア・トレーニング（理論フェーズ）	理科教員（合計約 200 名）＊	3rd Aug. - 19th Aug in school summer holiday (13 days)	フルタイムでの研修（週 5 日）
ノン・コア・トレーニング（実践フェーズ:授業案の作成）	理科教員（合計178 名）	25th Aug. - 15th Oct (15days)	パートタイムでの研修（平日週2 日）
フォローアップ・トレーニング（学校での授業研究）		15th Oct - 20th Dec (Original - 26th Nov) (18 days)	

＊ この期間は夏休みのため、正規の受講者以外の理科教員も参加したため

表 3.33　STT トレーナー会議の実績

実施月	日付	主な話題	発表者
Aug	10 Aug 08	- Student-centered learning - Current situation of the training	Japanese Expert STT trainers
Sep	N/A	No trainer's meeting due to Ramadan Holiday	N/A
Oct	8 Oct 08	- Demonstration of how to use Moodle portal - Examples of lesson demonstration utilizing ICT	Core Trainer STT trainers
Nov	10 Nov 08	- How to apply knowledge and skills learned in Japan - Presentation about the best lessons	Core Trainer STT trainers

表 3.34　理科教員研修 (TOT) の成果物

タイプ	成果物数
授業案	600

3.5.4　パイロット LRCs/FDs の教員・職員への技術移転モニタリング及び達成度評価

(1)　理科教員研修 (STT) のモニタリングと評価

STTもTOTと類似した 3 種類の調査（A、B、C）を実施した。日本人専門家が分析し、教育省の拡大研修に対する提言を導きだした。調査結果からは受講者の満足度も高く、生徒による授業の客観的評価も理科教員が授業を改善していることを示している。詳細の調査結果については、4.2で述べる。

日本人専門家とコアトレーナーはトレーニングサイトをモニタリングのため訪問し、授業研究に参加しアドバイスをしたり、研修の運営方法を支援した。また、モニタリングを標準化するため授業研究の評価シートを作成した。モニタリングにおいて日本人専門家とコアトレーナーはトレーナーの能力や研修の運営について幾つかの問題点を見つけた。具体的な問題と実際に行われた対応策について示す。

- 受講者間の討議がもっと組織的に、より体系付けて行う必要があった。また、多くの受講生の授業案が概要的でもっと詳細を記述する必要があった。

- 討議の時間が短かった。討議は如何に授業案を改良するかに焦点をあてるべきである。特に次の点を討議する: 導入部分、仮説作成、実習内容、実験結果の分析、結果の解説。
- トレーナーは討議にもっとも積極的に参加する必要がある。特に受講者は ICT を使うことと、ICT を活用することに区別がついていないことが多い。
- 授業案を実施する場合に、より適切な教材を選択する必要がある。
- 設備の不足から、マイクロティーチングを実施するのが困難な場合がある。
- 評価の道具と方法の活用は評価の理解に必要である。

(2)　達成度確認試験の準備と実施

　パイロット LRC 職員及び地方教育委員会職員への技術移転が十分であったかどうか判断するため、STT の受講者に対して達成度確認試験が実施された。TOT での達成度確認試験の反省を教訓に、日本人専門家とコアトレーナーは選択肢問題を作成した。概ね受講者は知識・技能を獲得したと判断され、詳細については 4.2 で述べる

4. プロジェクトの成果

4.1 序文

　この章では、いくつかの観点からプロジェクの主要成果について述べる。始めに調査と達成度試験の結果を説明し、その次に PDM の目標の達成について説明する。また最後に評価団の評価結果について記述する。

　他の達成については、例えば STT の受講者数や研修教材の開発の成果などについては第3章で述べている。

4.2 調査と試験結果

　プロジェクトは3.3.1で述べたようにいつくかの調査を実施してきた。このセクションではPDMの指標に関連したものや、特筆すべき結果について述べていく。

4.2.1 受講者による研修方法やトレーナーの評価

　調査 A の STT の事後調査および調査 D の TOT の事後調査は、受講者に印象や意見を尋ねることにより研修やトレーナーの効果や妥当性について評価するように設計された。これらの結果は PDM のプロジェクト目標とプロジェクト成果3の指標に関連している。

(1) TOT の研修方法とトレーナーの評価

調査計画

表 4.1　TOT 事後調査 D の調査計画

項目	内容	コメント
目的	研修とトレーナーに対する印象や考えを測定する	
実施時期	TOT 事項	
対象者	TOT 受講者（有効データ数 65）	
方法	Questionnaire (five point rating -scale)	
質問紙の内容	General satisfaction(2)	
	Trainer (1)	
	Training detail (5)	
	Training material (1)	
	Suggestions for further training (3)	記述指揮
分析方法	グラフ	

結果と所見

一般的な満足度

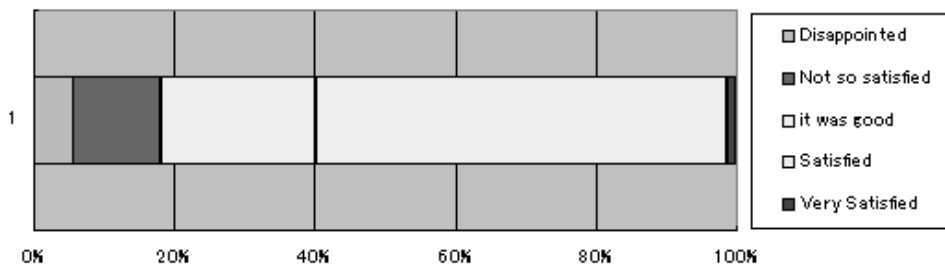　全体的な満足度については、81%の受講者が "it was good" またはより良い回答をしている。

図 4-1　質問 'Overall are you satisfied with the training?' の結果

トレーナーの知識と技術（コアトレーナー）

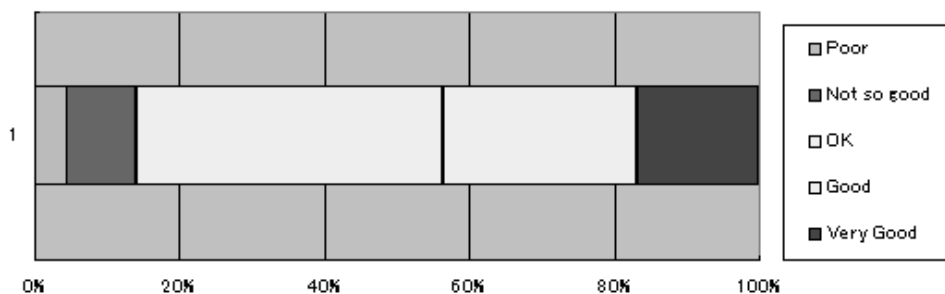　コアトレーナーの知識と技術については、受講者の 40%が「Very good」、合計で 80%で "OK" 以上の回答をしている。

図 4-2　質問 'How do you think about the training skills of the trainers?'の結果

研修教材

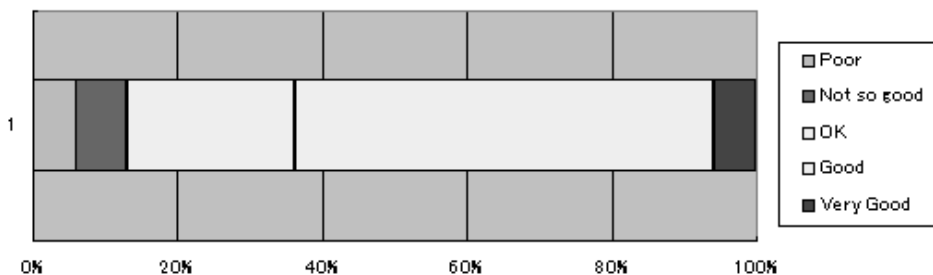　研修教材については受講者の受講者の 60%が「Very good」以上、合計で 90%が "OK" 以上の回答をしている。

図 4-3　質問 'How do you think about training materials (textbook and Power Point)?' の結果
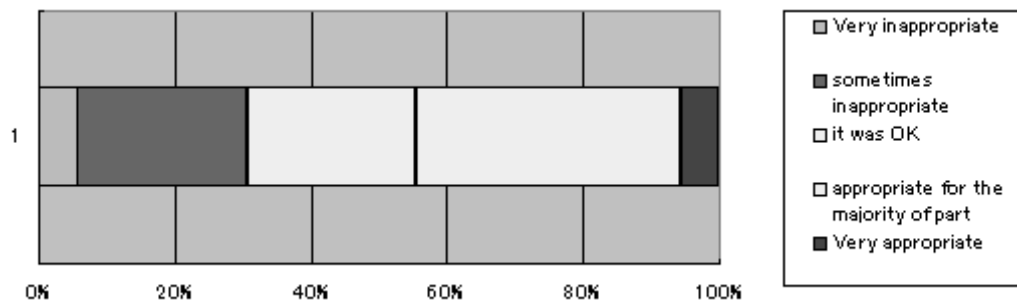
研修時間

研修時間に関しては、受講者の 30%が問題があると指摘している。

**図 4-4　質問 'Was the time allocation (schedule)
for each topic in the training appropriate?' の結果**

この点について、より詳細な分析を行った結果、受講者の半数近くが授業案の開発により多くの時間が必要であると指摘していることがわかった。
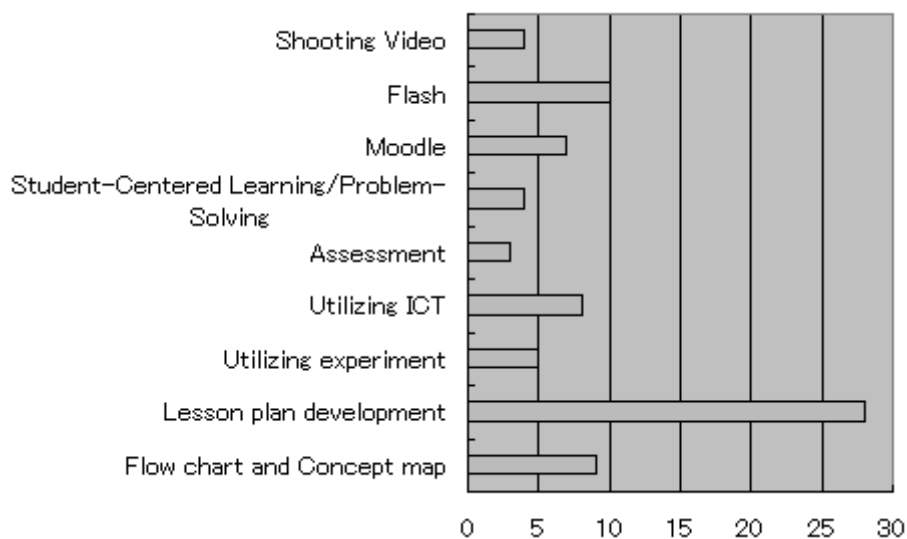

**図 4-5　質問 'For which topics or activities do you think
you wanted to have more time?'の結果**

(2)　TOT の研修方法とトレーナーの評価

調査計画

表 4.2　STT 事後調査 A の調査計画

項目	内容	コメント
目的	To measure: - Impressions and opinions of Training and Trainers - Level of knowledge and skills trainees acquired - Effect on trainees - Technical transfer to other teachers	
実施時期	STT 事後	
対象者	TOT 受講者（有効データ数 141）	
方法	質問紙（5 段階評価）	
質問紙の内容	General satisfaction (1)	
	Level of knowledge and skills trainees acquired (3)	
	Participants and collaboration (3)	
	Time management (6)	
	Trainer (5)	
	Acquisition of New knowledge and skill (13)	
	Transfer of skills to others (2)	
	Benefit to Participants (5)	
分析方法	グラフ	

結果と所見

一般的な満足度

　一般的な満足度については、受講者は "I am satisfied with the contents of the training?" という質問に対して、81%以上が "Agree" 以上の回答をしている。
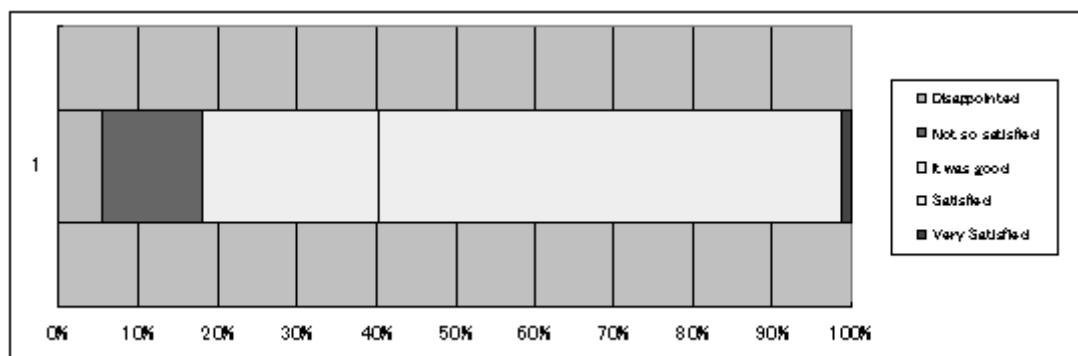
図 4-6　質問 'I am satisfied with the contents of the training?'の結果

トレーナーの知識と技術

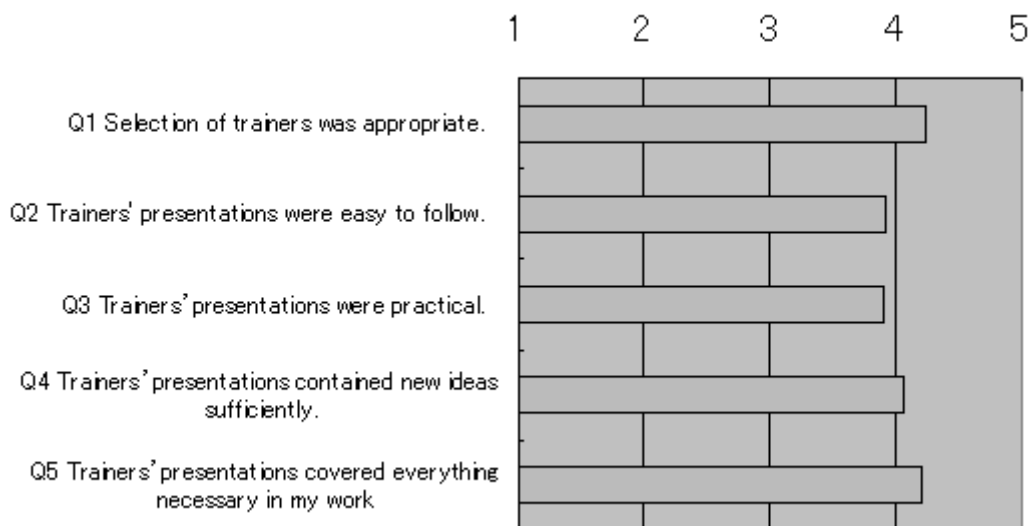　トレーナーの知識と技術については,に示す関連した項目の平均はほぼ‘Agree’（スコア 4.0 近辺）であった。

図 4-7　トレーナーの知識と技術に関する質問の結果

研修時間

　研修時間につては、マイクロティーチング、授業研究や評価などに関してより多くの研修時間が必要であると考えている（図 4-8参照）。
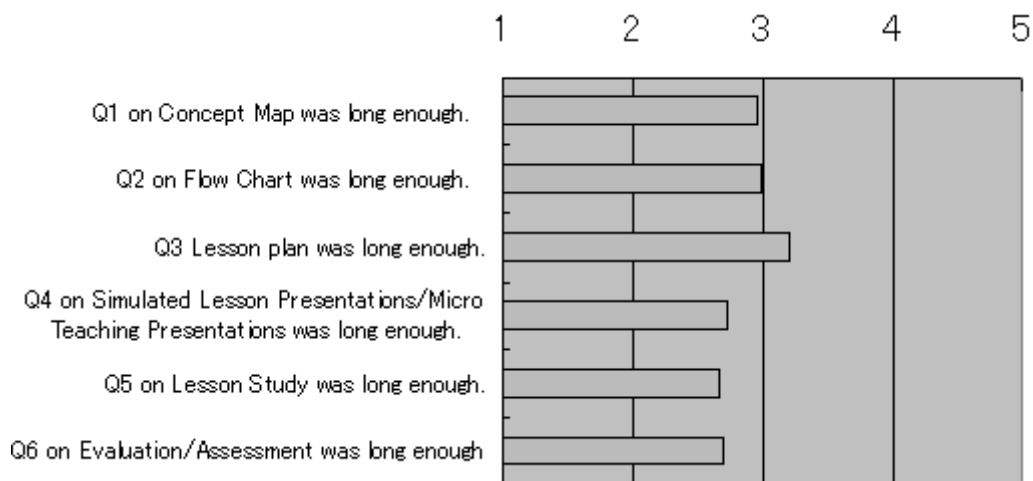
図 4-8　研修時間に関する質目

<u>受講者が獲得した知識と技能</u>

　受講者は以前に比べてより高度な知識と技術獲得したと考えると共に、その有効性は今後とも保持されると考えている（図 4-9参照）。
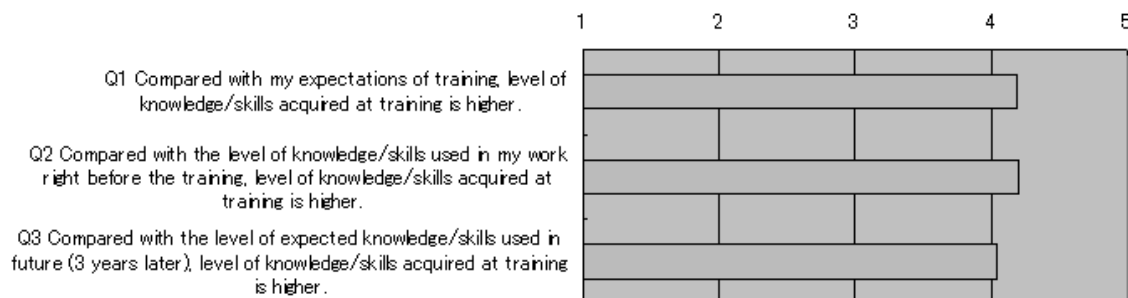
図 4-9　受講者が獲得した知識と技術に関する質目

(3)　結論と考察

- TOT と STT の受講者は研修に満足すると共に、トレーナーも適切だったと考えている。
- 受講者は、授業案の開発や授業研究やマイクロティーチングの実施により多くの時間が必要だと考えている。プロジェクトの TOT の結果から STT でこれらの内容の時間を増やしたが、STT おいてもまだ不足していた。
- 研修内容は理科教育にとって新しく高度なものと考えられる。

4.2.2　研修の客観的評価：生徒による授業評価

　TOT と STT の調査 C は研修の効果と妥当性について客観的に測定するために、研修の前後で受講者が実施する授業を生徒が評価し、それを比較する設計である。この結果は PDM の上位目標の指標と関連している。

(1)　生徒の評価による TOT の客観的評価

調査計画

表 4.3　TOT の調査 C の調査計画

項目	内容	コメント
目的	Measure student's evaluation of lesson - Student's attitude - Student's impressions of lessons	
実施時期	TOT 事前、事後	
対象者	Pre: Girls' students Grade 9 (valid data 70) Boys' students Grade 7 and 9 (valid data 61) Post: Girls' students Grade 9 (valid data 27)	
方法	質問紙（5 段階評価）	

項目	内容	コメント
質問紙の内容	Student's attitude (12)	
	Student's general impression of trainees' lessons (6)	
	Student's detailed impression of trainees' lessons (22)	
分析方法	グラフ（平均値）、t 検定	

Results and findings

生徒の態度の比較

　生徒の理科や理科の授業に対する態度についてはすべての質問項目において有意な差は見られなかった。

Q1 I make a preparation of science lessons.
Q2 I review science lessons.
Q3 I ask questions in science lessons.
Q4 I participate in experimental activities in science lessons.
Q7 I take notes of important points on science lessons.
Q9 I listen to friends' opinions in science lessons.
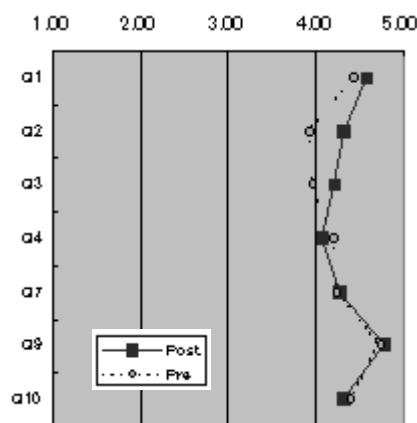Q10 I have an interest in learning science lessons.

図 4-10　TOT での生徒の態度の変化（比較）

生徒の受講者の授業に対する印象の比較

　結果としては t 検定の結果、Q30、Q31、Q33、Q35 に 1%水準の有意な差、Q14、Q27、Q32 で 5%水準の有意な差が見られた。これらの結果は、生徒は研修後の授業をより好ましいと考えているし、また次のような授業の変化があると考えられる: 教師は適切な実験機材を生徒のために用意している。コンピュータをより利用している。生徒はより実験に参加し、ワークシートなどを作成する時間も十分に与え競れている。これらは生徒中心型学習への好ましい変化が見られたと言える。

Q13 I understand this science lesson better in comparison with other science lessons.
* Q14 I like this science lesson more in comparison with other science lessons.
Q19 This science lesson is a new type.
Q20 The teacher explains the purpose of lesson at the beginning of this science lesson.
Q23 The teacher checks the comprehension of students at each step in this science lesson.
* Q27 The teacher gives us time to consider and to take notes in this science lesson.
** Q30 Every student has each equipment in this science lesson.
** Q31 I participate in experimental activities in this science lesson.
* Q32 The worksheet which teacher gives me helps me to understand this science lesson.
** Q33 The teacher gives us enough time to do tasks in the worksheet in this science lesson.
** Q35 Computer is used in this science lesson.
Q40 The teacher keeps schedules of times in this science lesson.
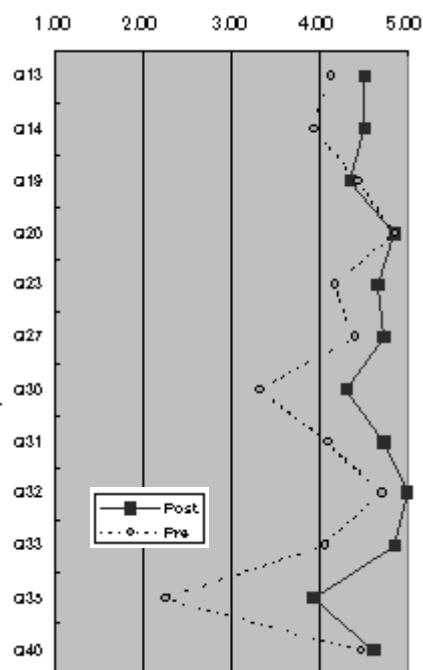
図 4-11　TOT での生徒の授業の印象の変化（比較）

(2)　　生徒の評価による TOT の客観的評価

調査計画

表 4.4　STT の調査 C の調査計画

項目	内容	コメント
目的	Measure student's evaluation of lesson - Student's attitude - Student's impression of lessons	
実施時期	STT 事前・事後	
対象者	事前：生徒（有効データ数 178） 事後：生徒（有効データ数 162）	
方法	質問紙（5 段階評価）	
質問紙の内容	Student's attitude (11)	
	Student's general impression of trainees' lessons (8)	
	Student's detailed impression of trainees' lessons (19)	
分析方法	グラフ（平均値）、t 検定	

結果と所見

生徒の態度の比較

　比較的高いスコアを獲得したのは Q1 (4.41)、Q6 (4.52)、Q7 (4.15)、Q8 (4.01) と Q11 (4.09) であった。TOT の結果と異なり、差がはっきりとして、t 検定の結果、Q3、Q5、Q9、Q10、Q11 に 1%水準の優位な差、Q6、Q8 で 5%水準の優位な差が見られた。

　この結果は次のようなことを意味している。まず生徒は、教師はより生徒中心型の授業をしていると考えている（例えば、質問への教師や生徒が実験に参加しているかなど）。

また理科に対する興味も上がっている。研修に参加した受講者の熱意が生徒の態度に影響
に与えたようであるが、今後より詳細な調査が必要である。

Q1 I make a preparation of science lessons.
Q2 I review science lessons.
** Q3 I ask questions to my teacher in science lessons.
Q4 I ask questions to our classmates in science lessons.
** Q5 I participate in experimental activities in science lessons.
* Q6 I enjoy experimental activities in science lessons.
Q7 I want to find something interesting related to what I have already studied in science lessons.
* Q8 I take notes of important points on science lessons.
** Q9 I have interest in learning science lessons.
** Q10 I like reading about broad science.
** Q11 I would like to work on broad science projects as an adult.

図 4-12　STT での生徒の態度の変化（比較）

生徒の受講者の授業に対する印象の比較

この項目についての差異も多くの質問項目ではっきりしていた。結果としては t 検定の結果、Q13、Q15、Q16、Q18、Q19、Q20 に 1%水準の優位な差、Q12、Q14 で 5%水準の優位な差が見られた。この結果の意味としては、生徒は研修後の授業をより楽しく、理解しやすく、そして新しいものだと考えている。また受講者もより生徒中心型学習を適用し、よりよい授業を構成できるようになっているようである。そして、受講者は授業においてより実験や ICT を活用しているようである。

* Q12 I understand this science lesson better in comparison with other science lessons.
** Q13 I like this science lesson more in comparison with other science lessons.
* Q14 I am interested in this science lesson more in comparison with other science lessons.
** Q15 This science lesson is a new type.
** Q16 The teacher explains the objective of lesson at the beginning of this science lesson.
Q17 The teacher lets us tell our opinion fairly in this science lesson.
** Q18 We watch the teacher demonstrate an experiment or investigation in this science lesson.
** Q19 I watch experimental activities on PC in this science lesson.
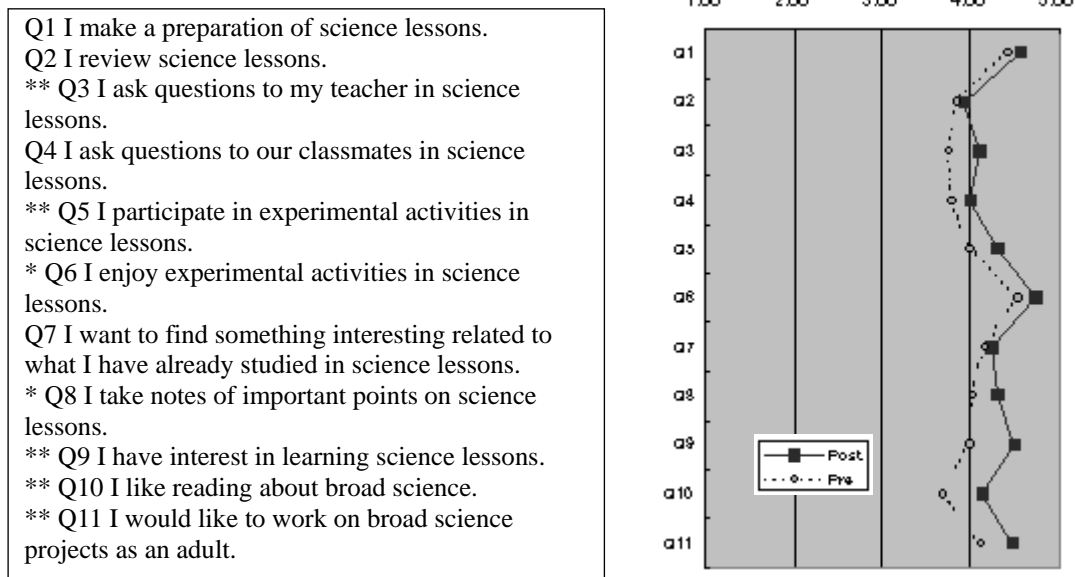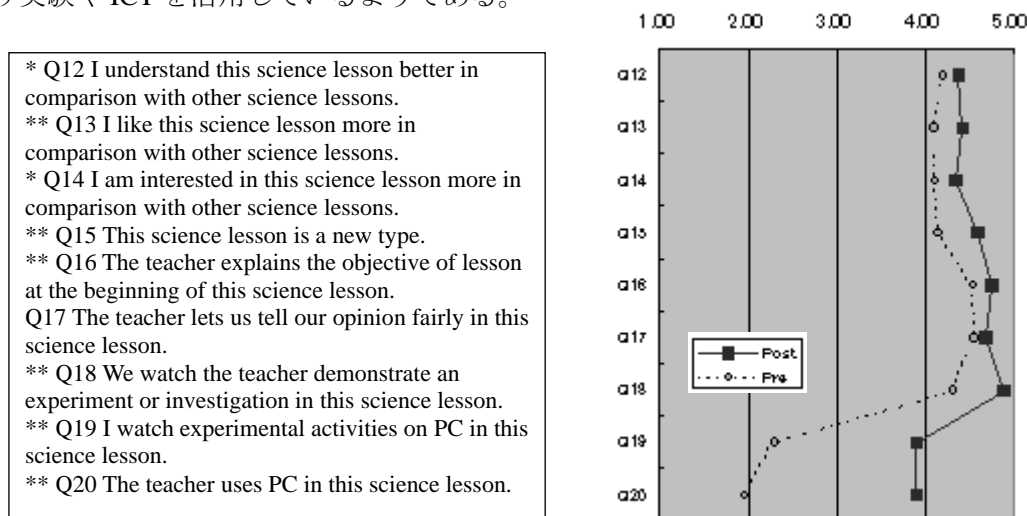** Q20 The teacher uses PC in this science lesson.

図 4-13　STT での生徒の授業の印象の変化（比較）

生徒の受講者の授業に対する印象の比較（詳細な質問項目）

　結果としては t 検定の結果、Q21、Q26、Q27、Q28、Q29、Q30 に 1%水準の優位な差、Q24 で 5%水準の優位な差が見られた。

　この結果の意味としては次のようなことである。　教師のデモンストレーションがより増えている。普通の実験装置がより準備されている。ワークシートの利用も増加している。別の言い方をすれば、研修後、受講者の授業方法は生徒中心型のより近づくように変化している。これらの結果から、受講者は、実験や ICT の活用や協働学習など新しい方法を身につけ実際の授業に利用できている。

** Q21 Some phenomena are demonstrated for us to consider why they occur in this science lesson.
Q22 The teacher makes us form groups to do brainstorming in this science lesson.
Q23 I formulate hypotheses or predictions to be tested in this science lesson.
* Q24 The teacher gives us time to consider in this science lesson.
Q25 I engage in group discussion in this science lesson.
** Q26 Students are asked to do an investigation to test out their own ideas in this science lesson.
** Q27 Every group of students has equipment in this science lesson.
** Q28 Experimental equipment and materials are casual (not special in a laboratory).
Q29 I participate in experimental activities in this science lesson.
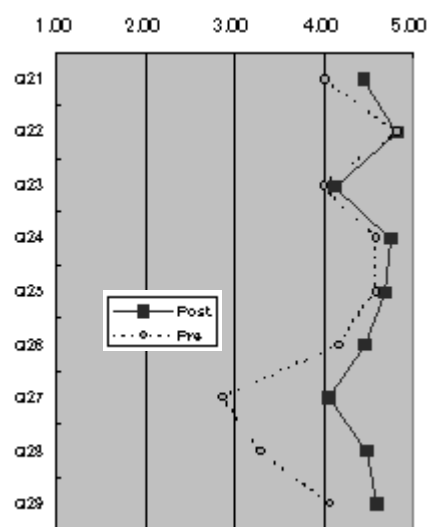
図 4-14　STT での生徒の授業の詳細印象の変化（比較）

(3)　結果と考察

- STT において、研修前後の差ははっきりしていたが、TOT の場合はそれほどはっきりしていなかった。これについて日本人専門家は次のような理由を考える。
  - TOT の事後調査の対象者数は少なかった、このため統計的に TOT の結果がはっきりしなかったと思われる。これに対して STT の対象者は十分であり、その結果は信頼できるものである。
  - TOT の受講者はフルタイムで研修に参加したため、彼らは新しい授業方法を実際に生徒に実施する機会がなかった。このため生徒たちの態度が変化しなかった。

- 研修の効果は妥当であった。理科教員である受講者たちは生徒中心型、ICT と実験の活用、構成主義に基づく授業の流れを理解している。そして彼らは授業自体の内容を変えて、それは生徒にも認識されている。

- 生徒も新しい理科授業を歓迎し、それらの授業は生徒の理科に対する興味を高めるとともに、理科に対する生徒の態度も変化させたようであった。

- 短期的には、受講生は新しい理科授業を実施できるようになった。但し、この結果は長期的に彼らが、その状態を保つことは保証してない。さらに長期的な調査が今後必要である。
- ICT の活用においては、Q19 や Q20 の質問結果から示されるように、非常に改善されている。ワーキンググループの報告では 60%程度の授業案で ICT を使用しているとのこと。

4.2.3　受講者の自己評価による興味と態度の評価

　TOT と STT の調査 B は受講者の自己評価による ERfKE の推奨している新しい授業に対する興味や態度の変化を評価するように設計されている。

(1)　TOT と STT における受講者の興味と態度の比較

調査計画

表 4.5　TOT の調査 B の調査計画

項目	内容	コメント
目的	Measure trainees' interest and attitude towards: -Teaching and learning process -Use of learning materials and equipment -Plan and preparation of lesson -Method of assessment and evaluation	
実施時期	TOT 事前・事後	
対象者	事前：TOT 受講者（有効データ数 63） 事後：TOT 受講者（有効データ数 60）	
方法	質問紙（5 段階評価）	
質問紙の内容	Teaching and learning process (8)	
	Use of learning materials and equipment (18)	
	Plan and preparation of lesson (5)	
	Method of assessment and evaluation (12)	
分析方法	グラフ（平均値）、t 検定	

表 4.6　STT の調査 B の調査計画

項目	内容	コメント
目的	Measure trainees' interest and attitude - Teaching and learning process - Use of learning materials and equipment - Plan and preparation of lesson - Method of assessment and evaluation	
実施時期	STT 事前・事後	
対象者	事前：STT 受講者（有効データ数 89） 事前：STT 受講者（有効データ数 59）	
方法	質問紙（5 段階評価）	.
質問紙の内容	Teaching and learning process (8)	
	Use of learning materials and equipment (18)	
	Plan and preparation of lesson (5)	
	Method of assessment and evaluation (12)	
分析方法	グラフ（平均値）、t 検定	

結果と所見

研修の前後における変化

　TOT と STT の結果はわずかな変化があるだけであり、これは受講生が、すでに生徒中心型学習、実験や ICT の活用などの新しい教育方法について正しい考え方をすでに獲得していることを示していると考えられる。TOT では 20 問、STT では 44 問の質問があるが全部あわせても次の 8 項目だけに有意な差が見られた。

- TOT: Q1. Teachers should use lecturing approaches in the teaching-learning process. (STT didn't have a significant difference and average is nearly equal to the one of pre-survey of TOT)
- TOT: Q2. Students should engage in teaching-learning activities of subject matters (e.g., discussion, role-playing, group problem-solving in the classroom).　(STT didn't have this question)
- TOT: Q5. Computers should be used in the teaching-learning process (STT didn't have this question)
- TOT: Q10. Individual teachers should develop lessons, tests, handouts, and instructional materials as part of their lesson planning. (STT didn't have a significant difference and the average is nearly equal to the one of the pre-survey of TOT)
- TOT: Q11. Evaluations of essays, written reports, and student daily journals should be used in assessing student's progress. (STT didn't have a significant difference and the average is nearly equal to the one of the pre-survey of TOT)
- TOT: Q12. Teachers should evaluate oral presentations by students to assess student achievement. (STT didn't have a significant difference and the average is nearly equal to one of the pre-survey of TOT)
- STT: Q28. Lesson plans should include objectives and intended learning outcomes. (TOT didn't have this question)
- STT: Q29. Teachers should implement their lessons in keeping with their lesson plans. (TOT didn't have this question)

(2)　結論と考察

- TOT と STT の両方の受講者はすでに新しい教育方法について正しい概念を獲得しているようであった。これについて日本人専門家は教育省で実施した新しい教育方法に関する研修は機能していて、教員はすでに新しい教育の概念やポリシーについて理科していると考える。但し、教員はそれを利用することができない。これらの背景により、プロジェクトで実施した研修の効果は非常に弱いが、但し、前述したように全く無いわけではない。
- TOT では Q11、Q12、Q13 において差異が見られたが、STT では見られなかった。これについては、STT で評価に関する時間を減らしたことが、この TOT と STT での結果の違いを生んだかもしれない。

- STT において、Q26. Experiments should be done in classrooms.に対して否定的な回答が多い。受講者は、実験は理科実験室で行うものと考えているのかもしれない。しなしながら、日本人専門家は生徒が実験する機会を増やすために、普通教室での実験の実施を推奨したい。

4.2.4　達成度試験の結果

　プロジェクトは研修を評価するた TOT と STT において達成度試験を準備・実施した。

(1)　TOT の試験の結果

概要と準備

表 4.7　TOT の試験の概要

項目	内容	コメント
目的	Measure the skills and knowledge trainees have acquired from the training	
実施時期	After TOT , 20th July	
対象者	TOT 受講者（有効データ数 61）	
方法	ペーパテスト（3 時間）	
試験の内容	Multiple-choice (10 quiz)	Mark 20/100
	Short writing (4 quiz)	Mark 20/100
	Making lesson plan (1quiz)	Mark 60/100

　試験は初め、選択枝式問題から構成することを推奨していたが、カウンターパートから選択枝のみの試験は教育省の一般的基準にそぐわないことが指摘された。このため試験は表 4.7に示すようないろいろなタイプの問題を含むことになった。

Results

　試験結果は平均点 59.6（100 点満点）、標準偏差 6.9 (n=61) であった。.
図 4-15のヒストグラムで示されるように、この手の一般的な試験に比べて、平均点付近に得点が集まっているようであり、また標準偏差の値も小さい。このため、日本人専門家とワーキンググループは個々の問題の得点などを調べ、次のような原因を見つけた。

- 授業案の作成の得点は 36.98（60 点満点）で標準偏差は非常にせまくは 5.39 であった。統計的に考えて、約 97%の得点が 47.76 と 53.15 の間に入ることになる。これは、採点者が非常に高い点も低い点もつけなかったのだろうと考えられる。
- 記述式の問題において研修ではあつかわなかった ERfKE の政策に関する質問があり、この問題の平均点が 8 点満点中 2.00 だった。この問題だけで平均点を 6 点下げていることになる。
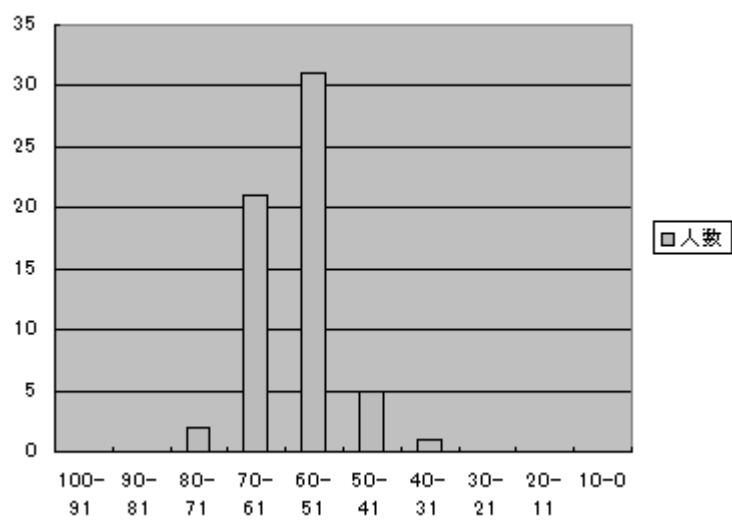
　日本人専門家は、これらの詳細の分析から、研修において受講者はある一定の知識・技能を獲得していると考える。

図 4-15　TOT の到達度試験結果

(2)　STT の試験結果

概要と準備

表 4.8　STT の試験の概要

項目	内容	コメント
目的	Measure the skills and knowledge trainees have acquired from the training	
実施時期	After STT, on 4th February after the winter summer holiday	
対象者	STT 受講者（有効データ数 174）	
方法	ペーパテスト（4 時間）とトレーナーによる評価	
試験の内容	Multiple-choice (30 quiz)	Mark 20/100
	Short writing (4 quiz)	Mark 20/100
	Making Lesson Plan (1quiz)	Mark 40/100
	Evaluation by trainers	Mark 20/100

　TOT 達成試験の結果をもとに、日本人専門家とワーキンググループは STT の達成度試験を改善するため次のような処置をとった。

- 授業案作成の配点を下げた。またトレーナーによる評価を追加した。
- 授業案の採点方法の基準を作成した
- 選択枝の質問紙数を増やした。またこの質問を 10 個の基本問題と 20 個の応用問題とした。
- 試験前に受講生が達成すべき期待得点を設定した

結果

　2009 年 2 月 4 日に試験を実施し、ワーキンググループが現在採点中であることから、日本人専門家は選択枝問題のみ評価して、ここに結果を示す。試験結果は平均点 18.0（30 点満点）、標準偏差は 8.4 (n=174) であった。詳細の結果を表 4.9に示す。

表 4.9　STT の達成度試験の期待点と得点

問題の種類	配点	期待点	結果（平均）
基本	10	8.5	8.5
応用	20	13.5	9.5
合計	30	22.0	18.0

　受講者の得点は基本問題については、期待値どおりだったが、応用問題については期待値を下回っていた。これについて日本人専門家とワーキンググループは次のような理由を見つけた。

- 受講者は Windows media player のソフトの名前や、jpeg というようなファイルの種類の簡単な IT の問題に解答することができなかった。彼らはそれらを使っていて操作できるのに名前は知らなかった。受講者はこれらの知識を ICDL 研修で習得したが、それらを忘れているようだった。日本人専門家は教育省がもっと教室での教員の活動に直結した IT の研修を実施することを推奨する。

- いくつかの質問は実施的に難しかった。それらは実際の授業の複雑な場面で知識技術をどのように応用するかという問題だった。

日本人専門家は、これらの詳細の分析から、研修において受講者はある一定の知識・技能を獲得していると考える。

4.2.5　エンドライン調査の結果

プロジェクトはエンドラン調査を実施した。このセクションでは学校長らの研修に対する評価の結果を示す。これはプロジェクトの上位目標に関連したものである。

(1)　研修に対する学校長とスーパーバイザーの評価

調査計画

表 4.10　学校長・スーパーバイザの研修評価の調査計画

項目	内容	コメント
目的	Measure effect of the training evaluated by School manager and FD's supervisor	
実施時期	TOT 事後, Nov., 2008	
対象者	TOT 受講者の学校長および担当スーパーバイザー（有効データ数 17）	
方法	質問紙（5 段階評価）	
試験の内容	General impression to the training and　science teacher who joined the training (5)	
分析方法	グラフ	

Results

一般的な印象

学校長およびスーパーバイザーの 70%が "very good and useful"、90%が "good and useful" 以上の回答をしている。
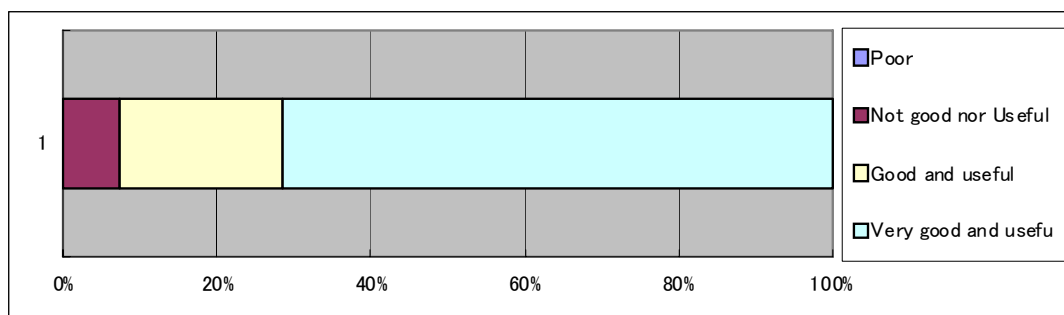
図 4-16　質問 'How do you think of SEED science Training for teachers?'の結果

研修に参加した理科教育の能力について

　研修に参加した理科教員の能力について、学校長およびスーパーバイザーの 85%が
"Great Many"と回答している。
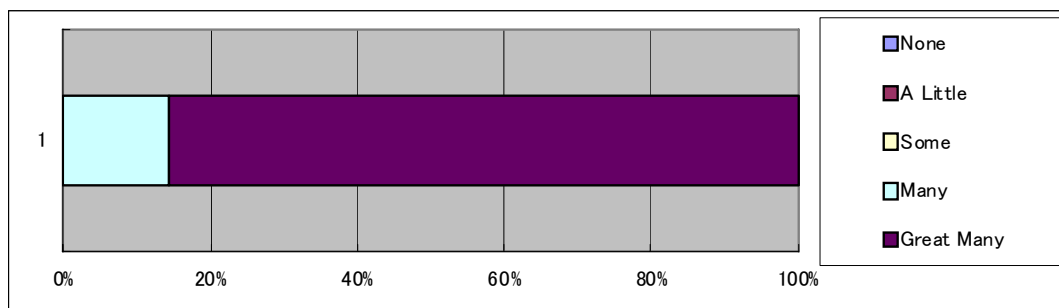
**図 4-17　質問 'How do you think capability of science teacher
who join the SEED Training is improved?'の結果**

今後の教員の研修への参加

　学校長およびスーパーバイザーの 85%が今後との研修参加させることを考えていて、
"very willing" と回答している。
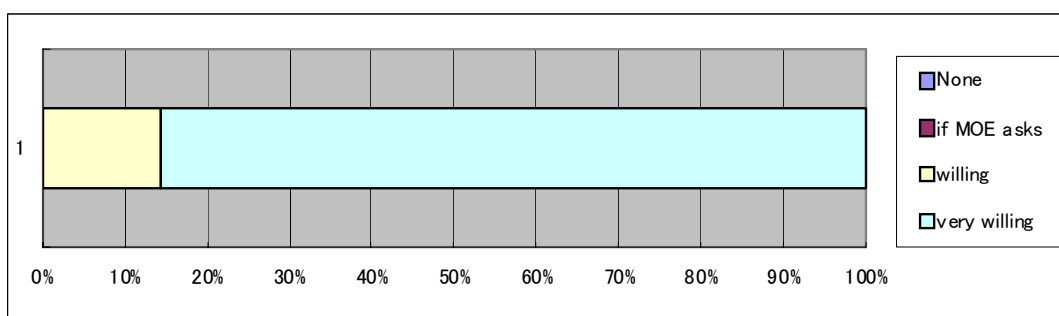
**図 4-18　質問 'Do you want your other teachers to join
further SEED project training?'の結果**

結論と考察

　学校長と地方教育委員会のスーパーバイザーは研修に対して良い印象を持ち、他の理科
教員も参加させたいと考えている。

4.3　　プロジェクト目標の達成状況

　このセクションではプロジェクト目標の達成状況について述べる。PDM の活動の成果に
ついてはすでに 3 章においてプロジェクトの活動として、4 章 2 節では調査と試験結果と
してすでに説明してある。なお、前述したがトレーナー人数などは RD に示されたオリジ
ナルの計画に比べて大幅に増加している。

4.3.1　　プロジェクト目標

プロジェクト目標:

QRC とパイロット LRCs/FDs が ICT を活用した効果的な理科教育を実施する教員の能力向上の中心として機能できるようになる。（7-10 年生）

指標
指標 1. QRC およびパイロット LRCs/FDs で 70 名以上のトレーナーが育成される。

指標 2. トライアル校の教員研修コース参加者の 75％以上がパイロット LRCs/FDs による研修に満足する。

　総論として、プロジェクト目標は達成されている。第 3 章で説明したように、プロジェクトは 80 名以上のQRCおよびパイロットLRCs/FDsのトレーナーを育成してきた。また、教育省のクラスター型の研修や他の地方教育委員会への拡大計画においてSTTの受講者の何人かは新たなトレーナーとなる予定である。また調査の結果により、理科教育研修に参加した受講者の 81%が満足した（4.2.1参照）ことが分かっている。

図 4-19　トレーナー数

トレーナー種別	QRC（コアトレーナー）	LRCs/FDs
コアトレーナー	14	--
コアトレーナー (IT)	5	--
STT のトレーナー	--	39
STT のサポーティング・トレーナー	--	25
合計	19	64

　指標は主に研修と理科授業がうまくいったかについて定義しているが、ICT 活用の面からも調査 C が示しているように、受講者は受講前に比べてより ICT を授業で活用していることを示している。

4.3.2　　上位目標

<u>上位目標</u>
ターゲット地域の基礎教育の教員が ICT を活用した効果的な理科教育を展開している。

<u>指標</u>
指標 1. 効果的な理科教育のための研修に教員を派遣した学校の 75%以上が、受講した教員の能力向上に満足する。

指標 2. ターゲット地域の生徒が他地域に比べて理科教育における高い興味を示す。

　　上位目標は長期的目標と考えられる点もある。短いプロジェクト期間ではその証拠を完全に示すことが難しい。ただし、プロジェクトは将来的な見通しについて幾つかの証拠を示すことができる。

- 4.2.5で述べたように 85% の学校長とスーパーバイザーがTOT研修に参加した理科教員の能力が向上していると考えている。調査の対象者数が少なく、この手の変化は長期の観察が必要であるため、この結果の信頼性はそれほど高くない。しかしながら、少なくとも学校長とスーパーバイザーは現在、研修に対して肯定的な態度であり、実際、TOTの後のSTTの受講者選定においては多くの理科教員が参加に興味を示した。
- 調査 C は異なる地域の比較ではなく、同一エリアでの研修前後の比較であったが、研修後、教師の授業の変化は、短期的な範囲であるが生徒の理科に対する興味を増加させている。
- フェーズ 1 のワーキングメンバーの一人が現在 QRC の教育調査部に配属されていて、プロジェクトの成果の追加調査を数ヶ月以内に実施する計画を作成している。この調査が実施されれば、研修の成果がより明確になるだろう。

4.3.3　　Outputs

表 4.11に活動の達成状況を示す。ほぼ達成されている。

表 4.11　プロジェクト活動の達成状況

活動	指標	実績
1. Institutional framework of QRC to develop the capacity of trainers and teachers who can conduct effective science education is established.	1-1. Staff, budget, facilities and equipment are properly assigned and prepared at QRC.	プロジェク期間中、教育省とQRCにおいてワーキンググループに研修の開発と実施を行った。 教育省はQRCの改革を実施した。 QRCはteacher's communityを含むLRCの改革を行っている（3.2.1参照）。
2. Teacher's training courses to implement effective science education are developed and maintained at QRC.	2-1. Course curricula, training plan, digital teaching material, Website and Portal site for teacher's training are prepared at QRC. 2-2. Course materials and trainer's manual for teacher's training are prepared at QRC.	プロジェクトは研修カリキュラム、シラバス、実施計画、印刷版・デジタル版理科教員ハンドバックとTOTとSTTのトレーナー用の教材を開発した。 プロジェクトは研修用ウェブサイトの設計を行った。QRCとラムザLRCは理科教員ポータルサイトを開発中である（3.3参照）。
3. Capacities of core trainers* who conduct teacher's training courses for effective science education are developed at QRC. *: "Core trainers" are teachers and staff that receive technical transfer directly from Japanese experts at QRC.	3-1. More than 10 teachers and staff are trained as core trainers for effective science education at QRC. 3-2. More than 75% of participants of training of trainers for pilot LRCs/FDs are satisfied.	14名のワーキンググループA、Bと5名のワーキンググループが研修教材を開発しTOTを実施した（3.4.3参照） 81%のTOTの受講者が研修に対して"it was good"以上の評価をした（4.2.1参照）
4. Teachers and staff of pilot LRCs/FDs develop the capacity to conduct teacher's training courses for an effective science education for teachers and staff of trial schools.	4-1. More than 60 teachers and staff of pilot LRCs/FDs are trained by core trainers at QRC. 4-2. Teachers and staff of pilot LRCs/FDs who received teacher's training conduct at least one training course for teachers and staff of trial schools.	TOTの受講者は、その後65名のトレーナーになりSTTの準備と実施を行った（トレーナー39名、サポート・トレーナー25名）。

4.4　　評価団による評価結果

　これまで述べてきたように、本プロジェクトではプロジェクト終了時までに PDM のプロジェクト目標が達成されたうえ、上位目標達成の可能性も示唆した。調査団が実施した、

評価 5 項目によるプロジェクト評価結果は下記の通りである (終了時評価が実施されたときは、プロジェクトは理科教育研修(STT)の実施期間中であり、その後、プロジェクトはいろいろな点を改善していると日本人専門家は考える)。

4.4.1　　調査団による評価 5 項目

表 4.12　終了時評価団の評価結果, 2008 年 11 月

評価結果	内容説明
妥当性 高い	評価団は、以下の事柄より妥当性は「高い」と結論付けた。 - ヨルダン教育省が進めている教育改革と整合している。. - プロジェクトの研修方法が QRC-LRC 改革との整合性と整合している。 - 研修がターゲットグループのニーズと整合している。ニーズ調査を毎年実施していること、研修参加者の満足度が高いことから、ターゲットグループである基礎教育の教員のニーズと整合していると判断する。 - JICA の援助方針と整合している。ヨルダン国別事業実施計画の内容と整合している。
有効性 高い	評価団は、以下の事柄より妥当性は「高い」と結論付けた。 - プロジェクト目標「QRC 及びパイロット LRC、パイロット FD が ICT を活用した理科教育を実施できる教員の育成センターとして機能する」は達成が見込まれる。 - 成果とプロジェクト目標の関係が明確である。 - プロジェクト目標に対する阻害要因は以下のとおり。現在改善されている。 事前調査の未実施によりプロジェクトの枠組みが明確でなかったため、問題分析と調査が必要となった。 事前調査の未実施によりヨルダン側と日本側の間でプロジェクトの基本方針の確認ができなかった。 いくつかの地方教育委員会はプロジェクトに対する理解が必ずしも十分でなく、プロジェクト活動に関する協力が得にくかった。 教員研修の修了証書が教員のランキング制度の資格として教育省により承認されたものでないため、教員研修受講者の動機に悪影響を与えた可能性がある。 プロジェクトが QRC の能力向上も含んでいたにも関わらず、教育省内での QRC の位置付けが明確でなかった。
効率性 比較的高い	評価団は、以下の事柄より妥当性は「比較的高い」と結論付けた。 - 派遣された日本人専門家の専門性、人数、派遣期間及び派遣のタイミングは適切であった。 - 建物、施設、機材は質、量ともにプロジェクト実施に十分なものであった。 - 配置された C/P 人数は 12 人から 20 人へ増加しており、プロジェクトにより育成されたトレーナー、研修受講者数も増加している。配

評価結果	内容説明
	置された C/P の人数、専門性は高く、プロジェクト活動実施に十分である。 - 本邦研修参加者は本邦研修が知識と技術の向上に有意義なものであったと評価しており、研修で得た内容を同僚や教員研修受講者を共有している。
インパクト 高いインパクトを持つことが見込まれる	評価団は、以下の事柄より「高いインパクトを持つことが見込まれる、負のインパクトは見受けられない」と結論付けた。 - 上位目標は対象地域の LRCs/FDs のトレーナー及び教員が継続して知識と技術の向上に努めることで達成されると想定される - 本プロジェクトから得られた教訓が ERfKEⅡ の策定に活用されている。 - プロジェクトの成果は対象地域の他校への適用が可能であり、他地域への適用も可能であると考えられる。研修実施は教育省のトレーニング局の所掌となるところ、関係機関との協働が成果の波及のために重要となる。
自立発展性 比較的高い自立発展性を持つと想定される	評価団は、以下の事柄より自立発展性は「比較的高い自立発展性を持つと想定される」と結論付けた。教育省が本件に関心を持つこと、高いモチベーションを有するトレーナー及び教員研修受講者の確保することがプロジェクトの自立発展性のために必要である。 - プロジェクト活動及び QRC 改革を通じて QRC の組織能力強化が行われた。 - プロジェクト終了後におけるコアトレーナーの知識、技術の維持及び新たな知識の獲得に関して、日本人専門家及び C/P は可能であるとの見解を示した。しかしながら、現在 C/P が知識や技術を新たに獲得するための仕組みは確立されておらず、ヨルダンの大学や研究施設は授業での ICT の活用にかかる調査研究能力が不足している。

4.4.2　終了時評価の提言のフォローアップ

　終了時評価は全般的に良好であり 2 月末までプロジェトク活動を完成せることを指示していた。また、いくつかの対策を終了時評価以降実施し、プロジェクトの目標・活動の達成と継続性の確保を努めるように提言があった。このセクションではこの終了時評価チームからの提言とそのフォローアップの活動について述べる。特に5.3に示すが、教育省において、すでに研修の拡大計画は具体的な実施のための詳細計画段階に移り、その継続性に関しては終了時評価時に比べて確実なものとなってきている。

表 4.13　プロジェクトの終了時評価の提言に対するフォローアップ

提言	カウンターパート、教育省およびプロジェクトによるフォローアップ内容
1) 第 2 回教員研修計画の策定	研修自体が 4-6 ヶ月と長期のためプロジェクトの残存期間で実施することはできなかった。しかし、トレーニング局が拡大計画を策定中で 2009 年 8 月から再度実施することを進めている。
2) 教員研修の正当性の強化	日本人専門家も教育省と協議を重ね、1)で述べたようにトレーニング局を中心に教育省の正式研修に採用する作業が進められている。
3) プロジェクトのウェブサイトの設立	ポータルサイトは QRC とラムザで構築された。研修の教材と成果物については教育省のイントラネットを通じてすべての学校からアクセスできる予定。
4) 新たな教育方法及び ICT 活用の研究能力向上	ICT の活用と教育理論について追加の技術移転を実施。QRC に新しい理科グループを作り、今後の研究能力の向上の中核になる予定。
5) プロジェクト成果の広報活動の実施	ERfKE2 のドナーミーティングにもヨルダン事務所、プロジェクトが参加。ラムザでの活動が地方紙に報じられたように、今後地域の活動が注目されることが予想される。
6) PDCA サイクルの強化	評価に関する技術移転を追加で実施。、QRC で、プロジェクト終了後にプロジェクトの効果に関する追加調査の実施計画の策定が開始された。

5. 今後の対応に関する提言

5.1 序文

　プロジェクトはその目的を達成し、教育省はすでに ERfKE2 においてプロジェクトの継続と拡大を目指した活動の準備を始めている。プロジェクトは新しい理科授業とその教員研修を導入することかできたが、理科教育と「ヨ」国教育システムには、改革の余地が多く残っている。この章では、日本人専門家からの今後の対応に関する提言を示す。ただし、提言といった場合、今後の希望、期待を示す言葉であるが、すでに教育省側で多くのアクションをとっているため、それについても示す。

5.2 プロジェクトの活動の継続性と拡大

　本プロジェクトは ERfKE1 の考え方にそって、新しい方法や活動を行ってきた、今後とも QRC を中心により効果的な理科教育を行うために下記のような活動を拡大・継続実施してほしい。.

5.2.1 理科教育研修の他地域への拡大

　プロジェクトは現在 34 ある地方教育委員会の内、8 地方教育委員会を対象に活動してきた。現在日本人専門家も DTQS などと、教育省としての研修の正式承認と他の地域への拡大を協議してきている。プロジェクト終了後も教育省として正式に継続して研修を拡大することを望む。

　また、今回はカスケード型の研修形態をとってきたが、より早急に多くの教員がプロジェクトの考え方・方法を理解して、より良い授業を実現できるようになるため、現在教育省で計画しているクラスター内での授業研究の実施など新規にデザインして実施してほしい。

5.2.2 Teacher's Community の活動の実現とポータルサイトの構築の継続

　本プロジェクトのスコープからは少し離れるが、教師の共同作業による授業改善と能力開発のため各地方教育委員会レベルでの Teacher's Community の形成とその活動を推奨してきた。プロジェクト期間中に、幸運にもラムザでプリパイロットの活動を開始できたが、プロジェクト後もその活動を継続してほしい。また同時にポータルサイトもラムザと QRC で構築・運用が始まったが、教師に質の高いリソースを提供する意味でもこの活動を継続してほしい。これらの活動を継続し成功させるためのポイントしては

- small スタートで開始する。はじめは小さい活動でシステムを初め、徐々に大きくしていく。
- 上記と関連するが、利用できるリソースを最大限に活用する。工夫をすれば、いろいろなことができるリソースは、ある程度現在でも整備されている。
- 活動を目に見える形にする。大きな成果はいらないが小さな成果を常に外部にみえていくようにする。

- やる気を高める工夫を考える。常に作業した人、アウトプットを出した人を評価する仕組みを活動の中に組み込む。またその評価は公平で広く開かれたものとする必要がある。

5.2.3　プロジェクトの実施方法や考え方の他のプロジェクト、研修や他教科への応用

　本プロジェクトはニーズ調査段階で問題点の洗い出しから始まり、毎年の改良を重ね特徴のある研修が実施できた。その内容を他のプロジェクト、研修や他の教科に応用することを望む。日本人専門家として研修が成功した理由として次のような点があると考えている

- 一般論ではなく理科という教科に特化した。
- 理論ではなく、授業を開発・実施するという教師に最も重要な仕事という実践的な内容にした。また構成主義に基づく考え方や授業案の開発手順などを明確にした。
- 講義ではなく、参加者の共同作業により授業案を作成・改善していくという実習中心であった。
- 他国で開発されたものをそのまま利用するのではなく、ヨルダン人が日本人専門家のアイデア・指導をもとにヨルダンの状況にあった研修を開発した。
- ICT の活用が目的でなく、いろいろなリソースの中で ICT をどのような活動で使用するかというブレンディドな考え方をした。
- コンセプトマップでの教育目標の定義、フローチャートでの授業の流れの概要設計など、授業設計の前段階を重視し、柔軟に授業案が作れるようになった。
- 長期の研修で、教師の授業スタイルを変更するのに十分な時間だった。
- ICT の活用に関して、教師が新しいデジタル教材を作るより、いま身の回りやインターネット上にあるものをいかに活用するかという考え方をした。
- 教師の活動の成果をレッスンプランなどの目に見える形にして、ポータルサイトなどを使い、教師間で共有できるようにした。
- 地方教育委員会レベルの研修では、コーディネータや講師が地域の状況により教材を変更できるような自由度を与えた。

　特に ICT に活用については、今回のプロジェクトの方法が他の教科の流用できるものがあるが、教科の特徴に会わせて特化した方法を研究し、実践でその効果を確認していくことが必要あり、個々のプロジェクトはこの部分に、今後焦点をあてていくことを推奨する。但し、このような研修の開発方法や効果についての効率性については再検討する必要がある

5.2.4　総合的な理科グループの形成とプロジェクト活動の拡大

3.2.1で述べたように。日本人専門家はQRCとプロジェクト活動を継続・発展させるための新しい理科グループの形成について協議している。
図 5-1、 図 5-2、表 5.1 は一般的なe-learningのための組織についての考えを示している。e-learningの開発と実施のためにはIT専門家と個々の教科の専門家の共同作業が必須であり。

このため、新しい理科グループは教育省内部で始めての教科専門グループになるだろう。
そして、それがうまく機能すれば、教育省は他の教科のグループを作っていけばよい。
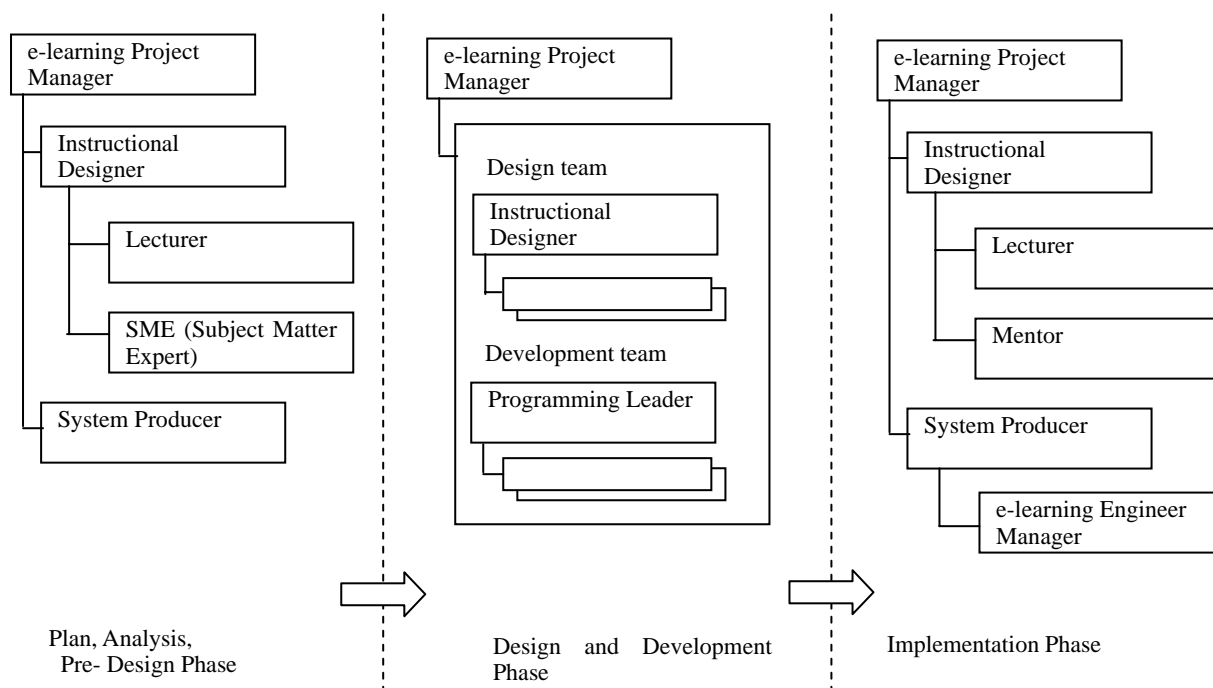
図 5-1　e-learning の体制

表 5.1　e-learning の要員の役割

Person	Plan, Analysis, Pre-Design Phase	Design and Development Phase	Implementation Phase
e-learning Project Manager	Responsible for all aspects of e-learning, the management of the schedule, the budget, and making final decisions.		
Instructional Designer	Conducts the front-end analysis and needs assessment. Makes course design.	Designs materials. Management of design schedule.	Monitoring and evaluation of the lessons and materials. Supports lecturers and mentors.
SME (Subject Matter Expert)	Advises as a Subject Expert.	Designs detailed contents as a Subject Expert.	Sometimes becomes lecturer and mentor
Design Team/ Development Team		Designs and develops materials	
Lecturer	Supports Instructional Designer in making the course design.		Conducts lessons by using e-learning.
Mentor			Facilitates and supports learners.
System Producer	Advises on technical issues.	Provides support for the development of learning environments.	Operates and maintains the e-learning system.

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┌─────────────────────┐
│ e-learning   Project │
│ Manager              │
└──────────┬──────────┘
     ┌──────┴────────────────────┐
┌────┴──────────┐        ┌────────┴─────────┐
│ Design team   │        │ Development team │
└────┬──────────┘        └────────┬─────────┘
```

Design team	Development team
Instructional Designer	Graphic designer (2D/3D)
SME (Subject Matter Expert)	Movie/Audio Editor
Contents Specialist	Narrators
Illustrator	Animation Programmer
Scenario writer	Programmer
Composer	Tester
Photographer	
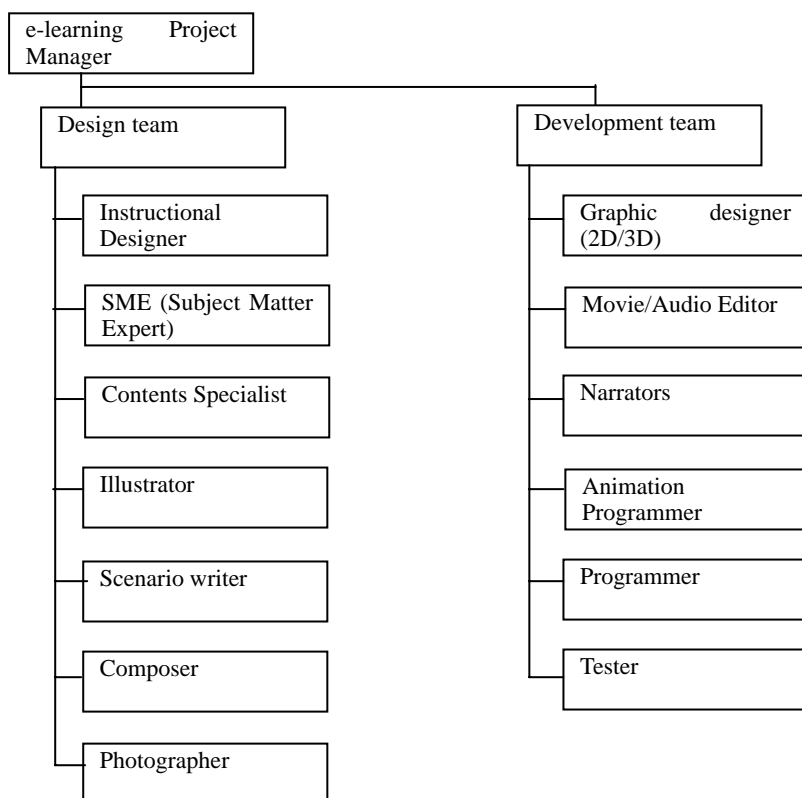
図 5-2　E-learning 教材の開発体制

5.3　提言に対する教育省の今後の活動計画

　教育省、カウンターパートと日本人専門家は提言に関して、すでに協議を行い。今後、教育省は次のような活動を開始することを確認している。

- トレーニング局ではすでに教育省の必要概算予算を含む拡大研修計画案を作成し、終了ワークショップと最終 JCC において発表している。最終 JCC では教育省次官(プロジェクト・ディレクターでもあるが)は計画案に賛同し、さらにトレーニング局長、カリキュラム・テキスト局長および QRC 所長に対して実施に向けて、より詳細な計画を作成するように指示が出された。トレーニング局が提案している大まかなスケジュールとしては。
    - 2009 年 4 月より拡大研修実施のための準備開始
    - 2009 年 8 月より拡大研修実施
- QRC 所長（プロジェクトマネージャー）は Teacher's Community の活動の継続と QRC に新たな理科グループを形成することに同意している。今後プロジェクト終了後、プロジェクトリーダーが引き続きこれらの活動の責任者となる予定である。

終わりに

　アブドッラー2 世国王の強力なリーダシップのもと、ヨルダン・ハシェミット王国は、国家の経済と社会開発の基礎となる競争力のある質の高い人材育成を目指しいている。「ヨ」国の教育セクターは、世界的な競争力にも勝ち抜く、教育された技能のある若い人材の育成に多大な責任を持っている。このセクターは ERfKE という意欲的かつ総括的な改革案を実施してきて、2009 年に開始される ERfKE2 への引継ぎ時期にきている。教育省はJICA のサポートにより ICT の教育活用を目指し、QRC と LRC の研修能力を強化するこのプロジェクトを実施した。

　この 3 年間のプロジェクトの実施において、プロジェクトは、QRC/LRC/地方教育委員会の研修能力の開発を達成した。コアトレーナーとローカルトレーナーは技術移転を受け、理科教員や IT 教員/技術者に対して、いかに ICT を活用するか、いかに生徒中心型の授業を実施するか、いかに授業を開発するか、いかに教育ポータルサイトを開発するか、いかにネットワーク上で教師が協力するか、などを指導する研修の実施・管理ができるようになっている。また、プロジェクトで実施したいくつかの調査では、受講者や生徒が非常に好意的な反応を得ている。そして、終了時評価チームからも評価 5 項目のすべてにおいて高い評価を得ている。

　プロジェクト成果達成の後に、すでに教育省から研修の継続と拡大とのための作業を開始したことが示されている。さらに QRC も幾つかの地方教育委員会で Teacher's Community の設立に取り掛かっている。プロジェクトはいくつかの重要な提言をしている。1 番目は研修の拡大、2 番目は Teacher's Community の設立と継続とポータルサイトの構築と発展、最後は他のプロジェクトや研修へのプロジェクトの方針の適用である。教育省とQRC の今後の主導性は、これらプロジェクトの継続性のキーである。

　Teacher's Community の実践の普及を伴う研修の拡大を通じて、教育省と QRC が「ヨ」国の理科教員に対して生徒中心型教育と ICT 活用に関する能力を強化する機会を提供し、その結果、「ヨ」国の教育の質が改善されることを望む。

添付資料 1: Project Design Matrix

Project Design Matrix (PDM_0)

Capacity development of learning Resources Centers (LRCs) for science education utilizing ICT.

Target Group: Teachers for Secondary education   Target area: Science education For Basic school   Duration: 3 years

Narrative Summary	Indicators	Means of Verification	Important Assumptions
Overall Goal Teachers for secondary education perform the effective science utilizing ICT	More than 80% of trial schools which dispatch teachers are satisfied with lectures improved	Results of interview and questionnaire hearing to schools	The government of the Hashemite Kingdom of Jordan does not change the Reformation policy for education
Project Purpose QRC and the Pilot LRCs' function as the centers to develop the capacities of teachers in science education utilizing ICT and Lab. activities grade (7-9)	1- More than 80% of participants of pilot LRCs are satisfied with the training 2- More than 80% of participants of trial schools are satisfied with the training	1- Results of interview and questionnaires to the pilot LRCs 2- Results of the interview and questionnaire to the trial schools	The government of the Hashemite Kingdom of Jordan does not change the position of QRC and LRC's as the centers to develop the capacities of teachers. The general economic conditions do not deteriorate.
<u>Outputs</u> 1- Institutional framework of QRC and LRCs to train teachers in science education is established utilizing ICT (grade 7-9). 2- Teachers training courses in science education utilizing ICT are developed by QRC (grade 7-9). 3- QRC staff members develop the capacity to conduct training courses in science education in pilot LRCs (7-9). 3- Pilot LRC's member develop the capacity to conduct training courses in science education for teachers of traial schools (7-9).	1- Proper assignment of staff members, budget, facilities and equipment are prepared for the project in QRC & LRCs. 2-1 The course curricula in science education utilizing ICT are prepared by QRC and revised every year. 2-1 The course materials and trainers' manual for LRCs are prepared by QRC & revised every year. 3-1 QRC staff members pass performance examination 3-2 QRC staff members operate the teachers training courses utilizing ICT and pilot LRCs staff members. 4-1 Pilot LRCs'staff members pass the performance examination 4-2 Pilot LRCs'staff members operate the teachers training courses utilizing ICT to trial schools	1-1 Organization chart, chart of personnel distribution, budget, list of equipment. 2-1 Curricula, annual plan of raining, midterm plan. 2-2 Course materials and trainers' manual for LRCs 3- Result of the performance examination to QRC, Monitoring report of QRC staff members 4- Results of the performance examination to pilot LRCs, Monitoring report of pilot LRCs	Trained Counterparts remain at MOE

Activities	Inputs		
1- Establish of operation structure for the training and assignment of necessary personnel of QRC and LRCs 2-1 Survey on the needs and present conditions 2-2 Development of curricula of teacher training courses 2-3 Development of course materials and trainers' manual for LRCs 3-1 Formulation of technical transfer plan to QRC 3-2 Transferring the technical skills to QRC through lectures and practices 3-3 Monitoring of transferring of technical skills and conducting performance examination. 4-1 Formulation of technical transfer plan to pilot LRCs. 4-2 Transferring the technical skills to pilot LRCs through lectures and practices. 4-3 Monitoring of transferring technical skills and conducting performance examination 4-4 Implementation of training for the teachers in trial schools through lectures and practices by pilot LRCs staff members	Jordanian Side 1- Counterparts Personnel (Project Director, project Manager, Teachers, supervisors and IT programers, other staff) 2- Renovated facilities with necessary equipments. 3- Equipment required for courses. 4- Local cost. Japanese Side 1- Experts. 2- Training in Japan or Jordan		

Pilot LRCs (Amman, Karak, Ma'an, Salt)

PDM$_1$ (Revised on December 2, 2007 at the Mid-term Evaluation)

Capacity Development of Learning Resources Centers (LRCs) for Science Education utilizing ICT

Target Group: Teachers for basic education   Target area: Amman, Karak, Irbid, Salt   Duration: 3 years   (1/2)

Narrative Summary	Indicators	Means of Verification	Important Assumptions
<u>Overall Goal</u> Teachers for basic education in the target areas implement effective science education utilizing ICT.	than 75% of schools that dispatch teachers to the teachers' training for effective science education are satisfied with their improvement. 2. Students in the target areas show their higher interests than other areas.	1. Results of interview and questionnaire surveys to schools in the target areas. 2. Questionnaire surveys to students.	
<u>Project Purpose</u> QRC and Pilot LRCs/FDs* are capable of functioning as the centers to develop the capacities of teachers that implement effective science education utilizing ICT. (Grade 7-10)	1. Total number of developed trainers at QRC and pilot LRCs/FDs reaches to more than 70. 2. More than 75% of participants of teachers' training courses for trial schools are satisfied with the training by pilot LRCs/FDs.	1. Implementation report of the training. 2. Results of interview and questionnaire surveys to the participants of teachers' training courses for trial schools.	The government of the Hashemite Kingdom of Jordan does not change the ICT-oriented policy for education. MOE makes clear of the position of QRC and LRCs /FDs as the centers to develop the capacities of teachers.
<u>Outputs</u> 1. Institutional framework of QRC to develop the capacity of trainers and teachers who can conduct effective science education is established.	1-1. Staff, budget, facilities and equipment are properly assigned and prepared at QRC.	1-1. Organization chart, personnel allocation chart, budget, list of equipment	Trained teachers and staff remain at QRC and LRCs/FDs.
2. Teachers' training courses to implement effective science education are developed and maintained at QRC.	2-1. Course curricula, training plan, digital teaching material, Website and Portal site for teachers' training are prepared at QRC. 2-2. Course materials and trainers' manual for teachers' training are prepared at QRC.	2-1. Curricula, annual plan of the training, digital materials, Website and Portal site 2-2. Course materials and trainers' manual for teachers' training	
3. Capacities of core trainers* who conduct teachers' training courses for effective science education are developed at QRC. *: "Core trainers" are teachers and staff that receive technical transfer directly from Japanse experts at QRC.	3-1. More than 10 teachers and staff are trained as core trainers for effective science education at QRC. 3-2. More than 75% of participants of training of trainers for pilot LRCs/FDs are satisfied.	3-1. Monitoring report of the training 3-2. Results of interview and questionnaire surveys to the participants of the training	

4. Teachers and staff of pilot LRCs/FDs develop the capacity to conduct teachers' training courses for an effective science education for teachers and staff of trial schools.	4-1. More than 60 teachers and staff of pilot LRCs/FDs are trained by core trainers at QRC. 4-2. Teachers and staff of pilot LRCs/FDs who received teachers' training conduct at least one training course for teachers and staff of trial schools.	4-1. Monitoring report of the training	
<u>Activities</u> 1-1. Establishment of operation structure for the training and assignment of necessary personnel at QRC 2-1. Survey of the needs and present conditions 2-2. Development of curricula of teachers' training courses 2-3. Development of trainers' manual 2-4. Development of digital course materials 2-5. Development of Website for the training 2-6. Development of Website for science teachers 3-1. Formulation of technical transfer plan for core trainers 3-2. Transfer of technical skills to core trainers through lectures and practices 3-3. Implementation of teachers' training courses by core trainers 3-4. Monitoring and evaluation of the achievement of technical transfer to core trainers 4-1. Formulation of technical transfer plan to teachers and staff of pilot LRCs/FDs 4-2. Transfer of technical skills to teachers and staff of pilot LRCs/FDs through lectures and practices 4-3. Implementation of teachers' training courses to trial schools by teachers and staff of pilot LRCs/FDs 4-4. Monitoring and evaluation of the achievement of technical transfer to teachers and staff of pilot LRCs/FDs	Inputs by the Jordanian Side 1. Assignment of Jordanian counterpart Personnel (Project Director, Project Manager, six teachers, other staff) 2. Renovated facilities with necessary equipment 3. Equipment required for courses 4. Expenses necessary for the implementation of the Project	Inputs by the Japanese Side 1. Dispatch of short-term experts. 2. Training of Jordanian counterpart personnel in Japan	Trained teachers and staff remain at QRC and LRCs/FDs.

MINUTES OF MEETING

OF THE JOINT COORDINATING COMMITTEE (JCC)

OF SEED PROJECT

Ministry of Education, Amman

10:00 AM -   , 7th   February, 2007

Presence:

Dr. Tayser AlNahar, General Secretary

Dr. Fawaz Jaradat, Managing Director General of Curricula & Textbook

Dr. Mwafaq AlZoubi, Director of Curricula

Mr. Mohamad AlZoubi, Director of Training

Mr. Sari Haymoor, Manager of QRC

Mr. Ali Abdallat , Secretary

Mr. Go Ota, Japanese Expert -Team Leader

Ms. Nisreen Oran, DCU

Ms. Lama Shafii, JICA Representative.

Absences:

Mr. Husni AlShareef, Director of Examination

Representative of the Embassy of Japan

The meeting was inaugurated by Dr. Tayseer AlNahar the Secretary General of Educational and Technical Affairs

Dr. Tayseer Emphasized the following points:

- SEED project is very important for the ministry, not only because it deals with the concepts of science but also supports the terminology computing (employing technology).

- The project supports student and teacher, leading to the integrated process in education (ICT support) for Sciences of various classes.

- Hope that the project will be expanded to include all departments and directorates

Dr. Fawaz Jaradat, Director of the curricula and textbooks

- Thanked JICA then spoke about the beginning of the project and its importance in terms of its emphasis on learning based on student centered learning, and blended education, the use of the laboratory, teacher's guide, and the rest of educational sources.

- The overall objective of the Project is (Capacity Building) of MoE staff, in order to build and develop scientific materials for grades 7,8,9,10.

Dr. Mwafaq AlZoubi, Director of Curricula / Leader project:

- The importance of the Japanese experience and support for the project, through cooperation with JICA Office in Jordan for the training of Science teachers on how to develop the strategies in teaching science through the integrated method (blending the traditional and electronic with the laboratories experiments.

- Quality control and assurance through the formation of a technical committee. Experts from universities and MoE, for review and evaluation of the scientific material prepared by the teachers (Working team)

- The training process in schools: after the preparation of teachers in acquiring the abilities and qualified skills for a leading role to enable them to train other teachers in other directorates.

- Mr. Ota Japanese expert / project manager emphasized the following points:

- Named the project SEED project.

- Strategies Adopted for the project based on EREFKE orientation.

- The stages of the implementation of the project.

- The role of the Technical Committee and the JCC Committee for the project.

- The impact of SEED project on teachers.

-

A presentation was made by the teacher, Miss Wafa Chrisa T, the impact of the project on the Jordanian teacher and, also reviewed the following points :

- Blended learning strategy in teaching science.

- The skills used in the lessons.

- The model lesson plan.

- Development Plan lesson (lesson plan).

- A presentation of the lesson plan for teachers in schools.

- Demo for different subjects i.e. (physics, chemistry, science earth science).

-

Mr. Hazem Khatib a teacher and member of the team explained about the electronic teacher's guide, which included the following:

- The development of learning the knowledge economy.

- New role for science teachers. The new strategies –student centered learning.

- The new strategies employed on student centered learning.

- Cooperation between the science teachers.

- Demo of the Website questionnaire

- Demo one of the chapters of the teacher's guide developed by one local company.

Discussion chaired by the Secretary-General touched on the following:

- The link between learning resource centers and schools, to extent to all Directorates for the necessity of a complimentarily role in educational process.
- Use of Laboratory (virtual lab), to evaluate its benefit on teacher and student
- Preparation of training material and how it could be used for the training of teachers and librarian on the new curriculum and the new teacher's guide and lab manual

At the end of the meeting, his Honors proceeded with special thanks to all those who worked with effort to complete and success this project.

MINUTES OF MEETING

OF THE JOINT COORDINATING COMMITTEE (JCC)

OF SEED PROJECT

Ministry of Education, Amman

10:00 AM -   , 14th   June, 2007

Members of the Steering Committee met:

Dr Tayser AlNahar   / General Secretary

Dr. Fawaz Jaradat   / Managing Dir. of Curricula & Textbook

Mr. Mohamad AlZoubi / Dir. Of   Training

Mr. Sari Haymoor   / Manager of QRC

Mr. Go Ota   / Japanese Expert -Team Leader

Mr. Ian   / DCU

Mr. Ali Abdallat   / Secretary

Also, the following list attended the meeting:

Dr. Mwafaq AlZoubi   / Dir. Of   Curricula

Ms. Nisreen Oran   / DCU

Mr. Nakahara   / JICA Officer-

Ms. Lama Shafii   / JICA

Directorate of Karak & LRC Manager:

Directorate of Amman & LRC Manager:

Absences:

Mr. Husni AlShareef   / Dir. Of   Examination

The meeting was inaugurated by Dr. Tayseer AlNahar the Secretary General of Educational and

Technical Affairs

Dr. Tayseer thanked and welcomed the second SEED Steering Committee meeting.

He thanked the good work of SEED Project which strengthens the capacity building of the MoE for Science Education. and therefore; the integrated outcomes with MoE resources.

Dr. Tayseer noted that Science Education is considered to be a very important issue where it concentrates on the e-learning. And the development process which serves in teaching science; beneficiary and supportive for both: teacher and learner.

Mr. Ota the Project Manager/ Team Leader

Thanked the participants and went through the purpose and the target of SEED Project and the duration of Seed Project / until 2009 .

-The development of the training material for teachers & lab technicians with the concentration on the blended learning method.

-The development and support of teacher educative system; to include a portal site and building a teachers' community for teachers to share their ideas and any new initiatives.

-The development of QRC so as to function as a model LRC and as a resource center.

   The targets:

   -pilot LRC and field directorates in 4 regions: Amman- Salt- Irbid & Karak.

   -Pre-Pilot schools 4 in Amman directorates.

   -Pilot schools 4 schools in each pre-pilot and pilot LRCs.

Mr Abbadi Supervisor

Elaborated SEED Progress through out the Japan Fiscal Year 2006:

   – Development of 12 model lessons

   – Development of model experiments

   – Development of training material

      Teacher's Digital handbook (Draft)

                                          - Development of digital lab manual

   – Nation wide workshop (launching of SEED Project)

   – Training in Japan.

   – Reformation of QRC & LRC

   – Needs assessment.

Mr. Ota/ Team Leader/Manager

- Demonstrated the developed model lesson material, exhibited one chapter of digital teacher guide and pointed about the other 8 chapters.

- Development of lab activities.

-Development of training material ,30 virtual experiments were filmed   and demonstrated the electric generator(real experiment & ICT .All data will be on CD-ROM & distributed to all schools.

-Development of data lab manual for 100 experiment, explained that some experiments are dangerous and costly

- Nation wide conference for promoting science with the cooperation of universities & MoE.

- Training of LRCs, so as to assist the whole community.

- Pre-pilot science teacher training,

- Reformation of QRC and LRC.

 - Training in Japan

- Develop an integrated portal site ; (e-lab manual, e-lesson plan, textbook, teacher's guide),and other educational material.
- Outlined SEED Project schedule.

Dr. Tayseer raised the following points:

* SEED Project did a very important work to this date.

* Pointed the importance of the integrated plan in this project, and which shall be available for all teachers.

*   The work must be compiled in one book. Thus how?

* Dissemination of work to all schools. This requires awareness & training.?

*   How can we evaluate the outcomes and content (quality of science) of this project ?

*   Training procedure.

*   How to link the work of SEED Project through eduwave and ITN ?.

Dr. Fawwaz, pointed out the following issues:

- This project mainly is capacity building, therefore should upgrade the teachers teaching level.
- Resources should be available in all schools to enable   teachers to conduct lesson and experiment considering the blended learning approach.
- Teacher must explain the lesson in the classroom, then demonstrate the lesson in the lab using the teacher's guide.
- 16 teachers were selected and they developed the lessons.
- Lessons applied in schools.
- Some lessons were modified.
- Experiments in this project are manual (blended lesson).
- SEED Project, did it really assist in developing science teaching?
- SEED Project should be evaluated.
- All electronic data must be put on the eduwave,-knowing that there is a SEED website-, to enable teachers to exchange their ideas and experiences.

The most important stage in the project is the second stage⊗(training).

- 64 teachers will be trained in the four directorates.
- Trainees (Teachers) should acquire skills and adequacy in developing the science material utilizing the blended learning methodology.
- Digital teachers guide should be available.
- LRCs should be available and ready for this stage (execution of training)
- Educative managers should provide the place and all facilities for the teachers group (64),beginning of training in August 2007.

Dr. Mwafaq thanked the participants and elaborated the following issues:

- SEED Project started its capacity building training at QRC. (transfer of knowledge)the Know How should be transferred to other schools and LRCs.
- Knowledge should be deployed in all schools.
- QRC is considered the model for LRC and the other 4 LRCs.
- LRCs should be equipped with all facilities, human and physical resources should be provided.
- The outcome of this project is to build capacity in schools, to enable teachers to work together, therefore; should provide the place and tools so as to bring out their initiatives, and building a portal which facilitate summing their ideas and exchanging it easily.
- A Committee was established for reforming the Knowledge Center and in its role discuss the full requirements for the Learning Resources Centers. Thus,
- QRC considered as a model LRC and should transfer the knowledge to 4 directorates.
- Develop lab manual on portal, to be hosted for all.
- Develop teacher handbook (guide).
- Develop trainers' manual.
- Discuss the Training in Japan with JICA office.

Dr Fawwaz pointed out that training in Japan should be for four trainees considering the four science topics. (integrated training). Should discuss this matter with JICA Office

Dr. Tayseer commented, should subsidize the training, and find other donors (Resources), in case JICA cannot.

The *National Conference* which was enclosed on the Agenda,

Dr. Tayseer commented that it seems a very interesting issue.

Dr.Mwafaq explained, it would be a great idea for such a function, where teachers and students may present their new initiatives and exchange ideas about science education through discussion and the best notion would be awarded with a prize for well done job. And as a result it would be a good example for MoE in promoting science education.

At the end of the session, His Excellency Dr. Tayseer reiterated his thanks for Mr. Ota, JICA,and all MoE staff.

MINUTES OF MEETING

OF THE JOINT COORDINATING COMMITTEE (JCC)

OF SEED PROJECT

Ministry of Education, Amman

9:00 AM -   , 4th   November, 2008

Attendance:

-Dr. Fawaz Jaradat	General Secretary/Managing Director Seed
-Dr. Mwafaq AlZoubi	Member of Steering Committee
	Managing Director of DCT
-Dr. Mohammed Majali	Queen Rania Center Manager
-Mr. Takeaki Sato	JICA Jordan Resident Representative
-Mr. Yoshio Niizeki	JICA Evaluation Team Leader
-Mr. Takahiro Goto	JICA Evaluation Team Member
-Mr. Atsushi Tokura	JICA Evaluation Team Member
-Mr. Go Ota	Project Leader/ SEED Japanese Expert
-Dr. Ziyad AbdelJawad	Project Leader
-Dr. Mohammed Zoubi	Managing Director of DTQS
-Ms. Wafa Khraisat	Member of Technical Committee
-Ms. Yumi Yasuda	JICA Jordan Project Formulation Advisor
-Mr. Tomohiro Suzuki	JICA Jordan Assistant Resident Representative
-Mr. Shiro Nakata	SEED Japanese Expert
-Ms. Akiko Nakano	SEED Japanese Expert
-Mr. Kei Sakamoto	JICA Jordan Representative
-Mr. Adnan Heleiwa	Working Group Team Leader
-Ms. Wafa Khreisat	Working Group Member

Absence :   Dr. Dr.Tayseer AlNahar/Minister

Meeting was inaugurated by Dr. Fawaz Jaradat

Emphasis has been placed on the following points :

1 –   Dr. Fawaz welcomed JICA Experts and thanked the Japanese effort for their full support for SEED Project (output and activities) which is highly regarded as a pioneer because Seed integrate in

ERFKE 2.

Meantime MoE's emphasis on ERFKE 2 which concentrates & focus on administrative capacities and also on the teacher being the core of training.

2- Dr. Mwafaq thanked the Japanese Team and the Jordanian working group for their continuous effort and support so as to successes the project and achieve the required outcomes in science education. Pointed that, the final evaluation for the Project presented by the Japanese evaluation team was relatively high.

3- Mr. Sato commented that Seed have achieved high success whether it is between science teachers trainees or skills development in different fields.

4- Dr. Majali thanked the Japanese experts for offering full support for Seed project in the three stages and also appreciated Dr. Fawaz and Dr. Mwafaq for their continuous support and monitor.
Also pointed on the main objectives of Seed :(teacher, student centered learning, ICT, real experiment, development of lesson plan, assessment & evaluation strategies in the classroom and the development of LRCs etc… and the transfer of the Japanese experience and capacity building to the Jordanian counterpart.

5- Dr. Ziyad emphasized on the final achievement of Seed; with regards to the achieved outcomes within the specified time limit.

6- Mr. Niizeki explained the outcome and recommendation of the final evaluation of SEED, and assured that the final evaluation was respectively high and the outcomes were successful.

7- Dr.M Zoubi, was highly impressed by Seed training and thus its reflect on science teachers, i.e. teachers are able now to deploy ICT in the classroom ,also utilizing the new assessment and evaluation strategies for students and considering the student centered learning.

8- Mr. Ota and the Japanese experts raised the following issues:
The main objective of Seed project is to develop knowledge among teachers , to develop teaching skills and also to diversify teachers attitudes. These issues were clearly noticed and reflected on science teacher performance in the classroom.
To enhance cooperative attitude between teachers, through continuous support and monitor both by the Japanese and Jordanian members.
To support communication between science teachers over Jordan by utilizing the teacher-student portal site so as to improve learning-teaching science education.

Recommendations:

1- Expand the project to include all directorates over the Kingdom.

2- To integrate Seed Project in ERFKE2

3- Certificates by SEED Project, to be adopted for accreditation of
   employment rank level.

4- Adopt the training material in the Teacher Academy.

The report of the Final Evaluation Mission was signed by Dr. Fowarz and Mr. Sato.

MINUTES OF MEETING
OF THE JOINT COORDINATING COMMITTEE (JCC)
OF SEED PROJECT

Ministry of Education, Amman
9:00 AM to 10:00 AM, Sunday, 22nd February, 2009

The following were the main points of the discussion and agreements made among the participants:

1. **Opening Address by Dr. Fawaz Jaradat, General Secretary of MOE:**
   - Project was important for MOE since it provided a new initiative of teaching and learning science.
   - Very satisfied with project because it was a capacity-building project. Now we have close to 70 teachers who can develop science lessons for 7th-9th grades and teach in a new way. This project is important for improving student achievements in science.
   - Have asked colleagues to integrate lessons learned from this project in the MOE's Educational Training Center and ERfKE2 which will be launched shortly.

2. **Opening Address by Mr. Shigeru Okamoto, Chief Representative of JICA Jordan Office:**
   - Would like to express his sincere gratitude for everyone associated with the project.
   - Around 300 people have been trained to implement new teaching methods transferred from Japanese experts.
   - Proud of success of the project. Suggest MOE to expand the results of the SEED Project by their own efforts.
   - SEED Project has achieved all of its objectives through the support of the Jordanian counterparts.

3. **Survey Report and Recommendations by Mr. Go Ota, Project Leader:**
   - Brief movie presentation by SEED Working Group member Mr. Tayseer Akal on the differences between a traditional science lesson and a SEED science lesson. In the traditional science lesson, teacher uses the blackboard to explain concepts and conducts the experiment in front of the students. In the SEED science lesson, the students conduct the experiments by themselves and are encouraged to communicate with each other. The teacher guides the students in learning and doesn't interfere with the students' work. Students gain practical experience on their own. Also, the teacher evaluates the students' work through the use of a rubric or check-list.

- Survey Results- Students were asked to evaluate their teacher's science lesson before and after the training. Results showed that students have an increased interest in learning science and participating in experiments. Teacher's lessons include more aspects of student-centered learning such as the encouragement of students in asking their teacher questions and having them think more on their own. The use of real experiments and ICT in lessons was also increased.

- Question from Dr. Fawaz- Are there any questions in the survey on students conducting experiments by themselves? Answer: Yes, and we will provide the full list of survey questions and results.

- Purpose of SEED- First step is recognizing new ideas and method for lessons which Jordanians have accomplished before the training from the many trainings MOE has implemented. Second step is that teachers know what is a good lesson which Jordanians understand in theory but have trouble with the application. The project achieved this second step of applying new ideas and methods to lessons. After the project, the third step will be improving and creating new ideas and method of lessons.

- Reasons of SEED's success- Conducted pre-survey to find the needs of teachers which were subject-oriented and practical trainings. Applied new teaching methods and knowledge such as activity-oriented, blended-learning, collaboration among trainees, lesson development, focused on teacher's utilization of digital materials. Although the training was long and lasted about 5 months, this turned out to be an adequate amount of time since it takes time to change teacher's attitudes.

- Project recommendations- expansion of SEED Training to other FDs, establishing Teacher's Community and maintaining the science portal- QRC is currently implementing pilot Teacher's Community activities in Ramtha, applying the project's training methods to other trainings, and formulation of a cross-sectional science group at QRC.

4. Achievement, Output, and Further Action Plans for After the Project by Dr. Ziad Abdel Jawad, SEED Project Leader and Mr. Mohamad Gazal, Training Manger of Training Directorate:

- Project achievement and output by Dr. Ziad- prepared 40 trainers, 250 trainees from all phases, 700 lesson plans in science for classes from 4th grade to 10th grade, and 200 movies of lessons, and printed and digital training handbooks.

- Training expansion plan by Mr. Gazal- expansion plan and budget are being prepared by Training Directorate and QRC will provide technical support. Will prepare a training team from 2nd and 3rd phases of the project (at least 12) to train on all subjects of science. Will prepare training materials for science teachers and IT staff from April 1st to May 25th. Training is scheduled to begin in August. Future tasks- (1) Directorate Level- select and choose new schools and 30 trainees from those schools. Training will begin on August 10th. (2) Nearby

Directorates Level- each of the 8 pilot field directorates will choose a nearby directorate and forms a team and will train them. (3) Formation of local committees and determining their role- local technical committees will be formed to control content and follow up the work of the project. Committee will consist of technical managers, supervisor/coordinator, 2 science education supervisors, working group members in phases 2 and 3, and members from science faculty in universities. (4) Directing Committee- manager/supervisor, supervisor/coordinator, supervisors from directorates, and 2 school headmasters.

- Comments by Dr. Fawaz – Would like to receive the detailed expansion plan as soon as possible.

5. Review of Project Completion Report
- Dr. Fawaz reviewed and approved the Project Completion Report.

6. Conclusion of Meeting:
Dr. Fawaz:
- MOE will train teachers on how to implement SEED style lessons.
- Project has developed many lessons, manuals, and trainers which will be used to expand the training.

Mr. Okamoto:
- JICA Jordan would like to keep in close contact with the MOE. Interested in following up the continuation of the project by the MOE.

LIST OF PARTICIPANTS

Dr. Fawaz Jaradat	General Secretary
Dr. Mohammed Daoud Al-Majali	Queen Rania Center Manager
Dr. Ziad Abdel Jawad	Project Leader
Dr. Saleh Khalayleh	Directing Manager of Directorate of Textbook and Curricula
Ms. Wafa Abdullat	Manager of Curricula, Directorate of Textbook and Curricula
Dr. Mohamad Zoubi	General Manager of Training Directorate
Mr. Mohamad Gazal	Training Manager of Training Directorate
Ms. Ferial	Directorate of Textbook and Curricula
Mr. Shigeru Okamoto	Chief Representative JICA Jordan Office
Ms. Yumi Yasuda	JICA Project Formulation Advisor
Mr. Maki Ito	JOCV ProgramCoordinator
Ms. Dema Hamoudeh	JICA Jordan Office

Mr. Go Ota	Project Leader/SEED Japanese Expert
Ms. Akiko Nakano	SEED Japanese Expert
Mr. Jutaro Sakamoto	SEED Project Coordinator
SEED Working Group Members	

添付資料 3: カウンターパートリスト

1. Working Group Members

	Name	Title / Position	New Possession
1	Mr. Nader Saleh	Group A / Physics	School
2	Ms. Huda Abdel Razek	Group A / Physics	School
3	Ms. Fahema Zayed	Group A / Chemistry	School
4	Mr. Samer Sadeq	Group A / Chemistry	School
5	Mr. Hazem Ahmad	Group A / Chemistry	DCT
6	Mr. Hisham Alaween	Group A / Biology	QRC
7	Ms. Maha Alqadi	Group A / Biology	QRC
8	Ms. Samira Shanak	Group A / Biology	School
9	Ms. Wafa Khreisat	Group A / Earth Science	DCT
10	Mr. Tayseer Aqel	Group A / Earth Science	QRC 1
11	Mr. Emad AlAkhras	Group A / Earth Science	QRC
12	Mr. Adnan Abu Hilewa	Group A (QRC) / Chemistry	QRC
13	Ms. Sanaa Gazzale	Group B (QRC)	QRC
14	Ms. Khawla Hattab	Group B	QRC
15	Mr. Tayseer Bishish	Group B	School
16	Mr. Khalid Ghannam	Group C (QRC)	QRC
17	Mr. Haytham Hemsi	Group C (QRC)	QRC
18	Mr. Abdalla Odeh	Group C (QRC)	QRC
19	Ms. Amal Tafish	Group C (QRC)	QRC
20	Ms. Omayya AlQudah	Group C (QRC)	QRC

2. DCT

	Name	Title / Position	
1	Dr. Mwaffaq Awad Al-Zou'bi	Director of DCT	Director of DCT (Former PM)
2	Dr. Ziad AbdlJawad	Digitalization Division	QRC

3. DTQS

	Name	Title / Position	New Possession
1	Mr. Mohammad Al-Zoubi	Director of DTQS	<=
2	Dr. Ahmad Iasreh	Director Training Department	<=
3	Mr. Mohammad Ghazal	Science Training	<=

添付資料 4: 供与機材リスト

取得年月日 Date of Registration in JICA	資機材名 Description/Name of Equipment/Goods	仕様・規格 Specification・Standard	数量 Quantity	購入先 Provider	供用者 User
18/09/2006	Laptop	Fujitsu Siemens V2035	6	Fun Directory	Japanese Experts and Project Counterpart
05/06/2007	Laptop	Acer, Aspire2483 NWXMI Laptops,	10	Fun Directory	Project Counterpart
22/08/2007	Laptop	Acer, Aspire 3684 NWXMI Laptops,	2	Fun Directory	Project Counterpart
01/03/2007	Laptop	Fujitsu Siemens AMILO PRO V3515	5	Fun Directory	Japanese Experts and Project Counterpart
30/07/2008	Laptop	Fujitsu Eiemens V2035 Laptops	16	Fun Directory	Project Counterpart
18/12/2006	Colour Laser Printer	Konica Minolta 5430	1	Modern Information Systems Design (MISD)	Japanese Experts and Project Counterpart
21/09/2006	Ink Jet Printer	Canon MP 170	1	General Computers and Electronics Co.	Japanese Experts and Project Counterpart
21/09/2006	Scanner	Canon DR2050c	1	General Computers and Electronics Co.	Japanese Experts and Project Counterpart
05/02/2008	Scanner	Canoscan 4400F	4	United Electronic	Project Counterpart of LRC
21/09/2006	Photocopy Machine	Cannon IR-2016 +	1	General Computers and Electronics Co.	Japanese Experts and Project Counterpart
21/02/2008	Device for Video Camera	Bandridge Firewire Cable 4P M–4P M	2	PC Zone	Project Counterpart of LRC
21/02/2008	Device for Video Camera	Bandridge Firewire Notebook Kit	2	PC Zone	Project Counterpart of LRC
07/04/2008	Video Card	Firewire PCMICA Card	1	Fun Directory	Project Counterpart of LRC
21/09/2006	Projector	ViewSonic PJ406D	1	General Computers and Electronics Co.	Japanese Experts and Project Counterpart
04/03/2007	Table	Oval Conference Table 213.5 x 107	1	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Table	Oval Conference Table 244 x 122	1	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Table	Round Conference Table 120	9	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Table	Rectangular Conference Table 180 x 90	9	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Desk	Writing Table 120 x 73	10	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Desk	Writing Table 160 x 80	2	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
01/03/2007	Chair	Chairs with hand	79	Abu Khashab For Office Furneture	Japanese Experts and Project Counterpart
04/03/2007	Chair	Swivel Chair with armrest	1	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
01/03/2007	Chair	Chairs without hand	35	Abu Khashab For Office Furneture	Japanese Experts and Project Counterpart
04/03/2007	Chair	4 leg chairs with armrest	10	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Mobile Pedestal	Mobile Pedestal 3D(40.5x48x56)	42	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Bookshelf	Bookshelf with glass door (80x40x205)	6	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Partition	150 x 180	2	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Partition	180 x 120	2	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
01/03/2007	White board	120 x 90	1	Maani & Partners Furniture Co.	Japanese Experts and Project Counterpart
01/03/2007	Hunger	Coat Hunger	5	Abu Khashab For Office Furneture	Japanese Experts and Project Counterpart

取得年月日 Date of Registration in JICA	資機材名 Description/Name of Equipment/Goods	仕様・規格 Specification・ Standard	数量 Quantity	購入先 Provider	供用者 User
01/03/2007	Computer table	Computer Table with sliding keyboard shelf and	5	Maani & Partners Furniture Co.	Japanese Experts and Project Counterpart
01/03/2007	Shelving Unit	Shelving Unit (6 shelves)	1	Maani & Partners Furniture Co.	Japanese Experts and Project Counterpart
01/03/2007	Shelving Unit	Shelving Unit (6 shelves, 90x48x210)	1	Maani & Partners Furniture Co.	Japanese Experts and Project Counterpart
01/03/2007	Trolley	Multi purpose trolley (84*50*100)	1	Maani & Partners Furniture Co.	Japanese Experts and Project Counterpart
01/03/2007	Side desk	Curved Side Desk 160 x 120 x 74	1	Maani & Partners Furniture Co.	Japanese Experts and Project Counterpart
04/03/2007	Photocopier stand	Photocopier stand	1	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	Printer Table	Printer Table	2	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
04/03/2007	High Cabinet	High Cabinet	1	Al-Shakah Trading Est.	Japanese Experts and Project Counterpart
18/12/2006	DVD Multiwriting Ecternal Drive (USB)	DVD Multiwriting Ecternal Drive (USB)	1	MEGA Jordan Co.	Japanese Experts and Project Counterpart

添付資料 5: SEED 研修計画

Overall Plan of The SEED science training

1 Outline of the Training

1.1 Purpose of the Training

- Candidate trainers (Trainees of the training) will acquire enough knowledge and skills for SEED Science Teacher Training.
- Candidate New LRC science staff acquire enough knowledge and skill to support schools and teachers for science education.
- IT staff of the pilot LRCs will develop ICT tools (digital lab manual, digital model lesson, virtual training room, local portal site) to support SEED Science Teacher Training.

1.2 Policy of the Training Method

- SEED Working group members (Trainers of the training) do not transfer what they acquired, but transfer the know-how they acquired based on their experience, learning process, and lessons learned.
- Main contents of the Training are experience, development and thinking by trainees.
- Trainers utilize and show their output such as model lessons and design of documents they made through the use of movies and real demonstrations.
- Teacher trainees and IT staff trainees will cooperate and collaborate closely in designing and developing the ICT tools.

1.3 Type of the Training

As shown in Table 1-1, the SEED Training has two trainings.

Table 1-1 Type of the SEED Training

Name	Type	Target	Period	Summary
SEED LRC Training	Core Training	Candidate Trainer (LRC science staff and FD teachers)	9 weeks (45days)	• New science education method • Development model lesson • Teacher's collaboration to improve lessons and share ides and recourse
		LRC IT staff	9 weeks (45days)	• Development of digital Lab. manual and lesson plan • Development and management of local science portal site. • Development and management of Virtual Training Room for SEED science Teacher Training
	Follow up Training	Candidate Trainer (LRC science staff and FD teachers) LRC IT staff	2 moths	FD and LRC's needs oriented • Development of Local materials including model lesson and digital Lab. Manual • Development of Local portal site • Conducting small Lab. workshop • Conducting science teacher's community
SEED Science Teacher Training	Core Training	Science teachers	8 weeks (10days)	• New science education method • Development model lesson • Teacher's collaboration to improve lessons and share ides and recourse

	Follow up SBT (School Based Training)		Almost Once a month	• SBT (School Based Training) by conducting lesson demonstration and review meeting

1.4   Organization of the Training

The Training consist of Trainer, Trainee, Coordinator groups shown in Table 1-2

Table 1-2Group of the Training Organization

Group	Belonging	Role	Comment
Trainer of SEED LRC Training for science	QRC, Schools (SEED working group A,B)	• Conduct SEED LRC Training for science • Modify the Training materials • Develop new model lesson and new education method • Manage model lessons and materials teacher developed from LRC region • Monitor SEED Science Teacher Training at LRC region • Conduct science trainer's community	• Recommendation: Number of Working Group A,B is enough as trainer now
Trainer of SEED LRC Training for ICT	QRC (SEED working group C)	• Conduct SEED LRC Training for ICT • Modify the Training materials • Develop new digital materials including digital Lab. manual and lesson plan • Manage web site for model lessons and materials teacher developed at LRC region	• Recommendation: Number of Working Group C is enough as trainer now
Trainer of SEED Science Teacher Training	LRC, FD, schools (Trainee of SEED LRC Training) QRC, Schools for Amman region (SEED working group A, B)	• Conduct SEED Science Teacher Training • Develop new model lesson and new education method for LRC region • Manage model lessons and materials teacher developed at LRC region and Local web site • Coordinate, Support and Monitor SBT • Conduct local science teachers' community • Join science trainer's community	• Recommendation: after SEED Science Teacher Training, if some teacher has good capability, they will become Trainer of SEED Science Teacher Training
School science leader	Schools	• Coordinate and conduct lesson demonstration at schools • Join local science leader community	• Each schools select a few teachers as leader

Structure between the groups is shown in Figure 1-1. And Structure among group, MOE and SEED is shown in Figure 1-2
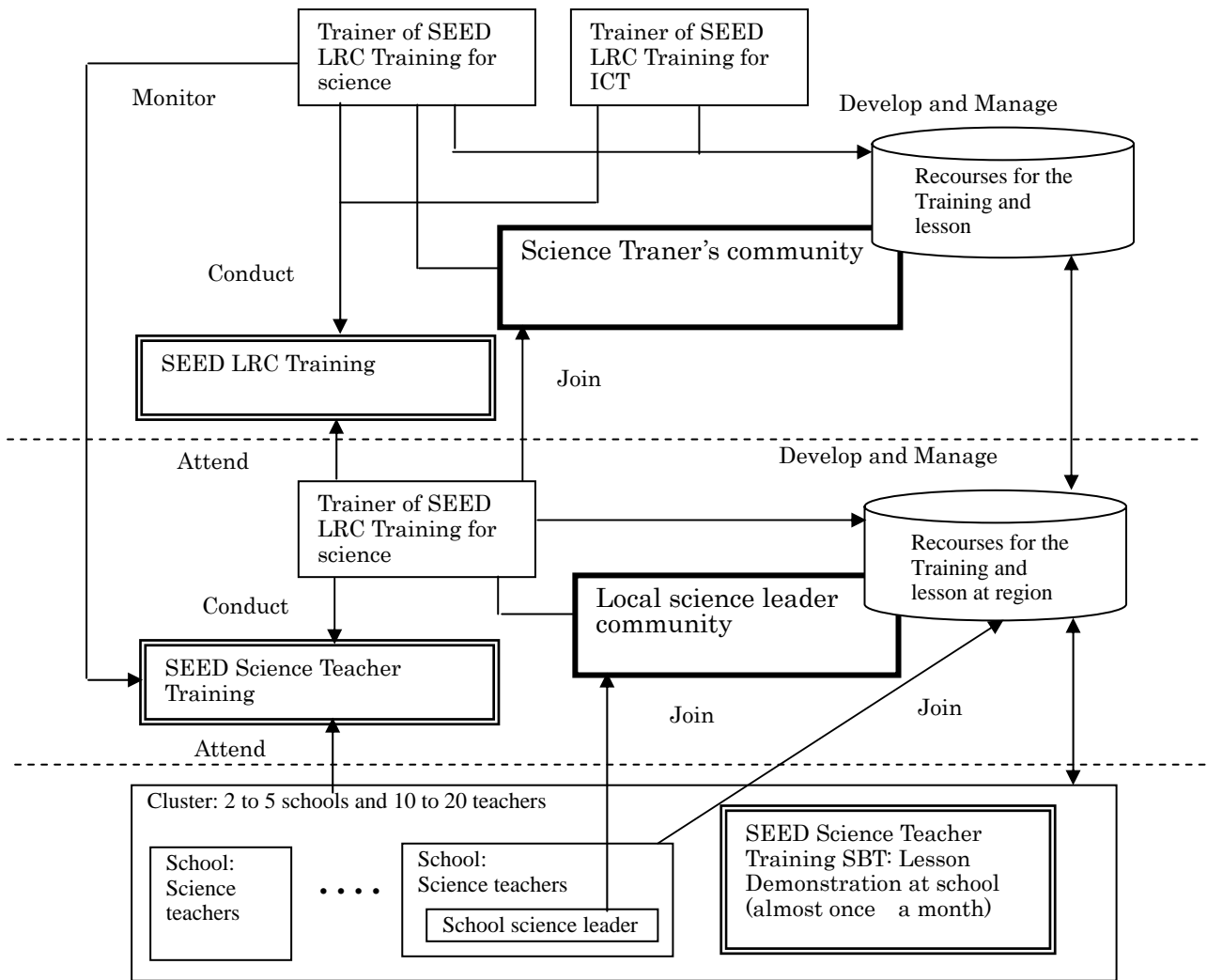
MOE & QRC Level

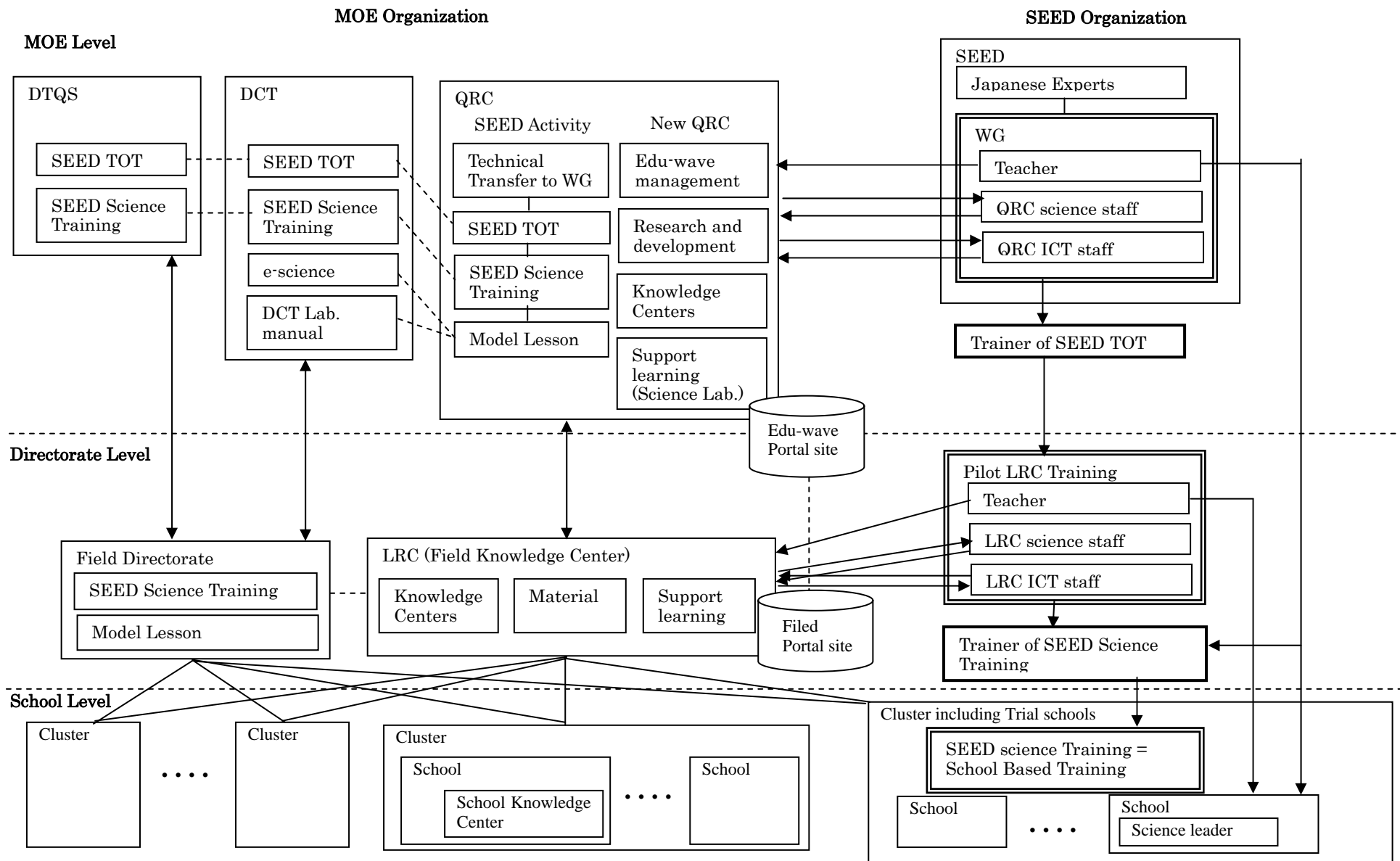**Figure 1-1Organization Structure of SEED Training**

Figure 1-2 Organization structure of the SEED

2 Summary of the Training

2.1 SEED LRC Training

(1) Outline

Table 2-1 Outline of SEED Science Teacher Training

SEED LRC Training for science teacher and staff (Core)	Period	9 weeks (45days)
	Method	Face to Face Trading, Self-learning, Virtual Training room and lesson demonstration at school
	Face to Face Training	32 days (160Hr)
	Self-learning (Self- Assignment)	13 days (75Hr)
	Place	QRC, LRC and Home
	Target Trainee	Science teachers, supervisor and LRC science staff
	Target Pilot region	Amman, Irbid, Salt, Karak
	Trainer	SEED working group A, B
SEED LRC Training for IT staff (Core)	Period	9 weeks (45days)
	Method	Face to Face Trading, Self-learning
	School demonstration	4 to 5 hours for each SBT
	Face to Face Training	25 days (125Hr)
	Self-learning (Self- Assignment)	20 days (100Hr)
	Place	QRC, LRC and Home
	Target Trainee	LRC IT staff
	Target Pilot region	Amman, Irbid, Salt, Karak
	Trainer	SEED working group C
SEED LRC Training (Follow up	Period	about 2 month after SEED LRC Training
	Method	Development science materials Conducting teacher's community and small traiinig
	Place	LRC (or QRC)
	Target Trainee	Science teachers, supervisor and LRC science/IT staff
	Coordinator	SEED working Group A,B,C
	Coordinate Organization	DCT, QRC, SEED project
	Observe Organization	DTQS

2.2 SEED Science Teacher Training

(1) Outline

Table 2-2 Outline of SEED Science Teacher Training

SEED Science Teacher Training Training (Core)	Period	2 months (8week)
	Method	Face to Face Trading, Self-learning, Virtual Training room and lesson demonstration at school
	Face to Face Training	80 hours
	Self-learning (Self- Assignment)	50 hours
	Place	LRC and Home
	Target Trainee	Science teachers
	Target cluster	5-10 schools (total 10 to 20 science teachers) in each training
	Trainer	LRC staff and Teachers who complete SEED LRC Training SEED working group A, B
SEED Science Teacher Training (Follow up SBT)	Period	Once a month after SEED Science Teacher Training
	Method	Lesson demonstration at school (one or two teacher conduct lesson demonstration and review meeting at school)
	School demonstration	4 to 5 hours for each SBT
	Place	One school at the cluster for each SBT
	Participant	Trainee of SEED Science Teacher Training
	Coordinator	Science leader at school
	Observer	Trainer of SEED Science Teacher Training

note: During SEED Science Teacher Training, 2 or 3 trainees can conduct lesson demonstration at schools. After the training, rest of the trainee continues to conduct lesson demonstration almost once a month.

(2)   **Training Content**

The training modules developed by the SEED project focuses on a variety of topics from introducing ERfKE and the importance of improving Science Education, to how to develop model lessons, Training modules are listed in Table 2-3 Module of Training.

Table 2-3 Module of Training

Module	Description
Module 1	What is ERfKE? Why teacher should change science education?
Module 2	What does student learn in science lesson? What role does teacher have in science lesson?
Module 3	How does teacher apply new methods such as Student Centered Learning, Problem solving, Collaboration , Critical thinking and in science lesson?
Module 4	How does teacher utilize real experiment and observation in science lesson?
Module 5	How does teacher utilize ICT including e-science in science lesson?
Module 6	How does teacher design, implement and improve a good science lesson?
Module 7	How does teacher cooperate with other teachers to improve science education?
Module 8	How does teacher evaluate and assess students in science lesson?
Module 9	How to conduct SEED Science trainings for teachers

添付資料 6: SEED LRC 研修(TOT)シラバス

Plan or SEED Pilot LRC Training and Preparation for science staff and teacher

1. Purpose of the Training

- Candidate trainers (Trainees of the training) will acquire enough knowledge and skills for SEED Science Teacher Training.
- Candidate New LRC science staff acquire enough knowledge and skill to support schools and teachers for science education.
- IT staff of the pilot LRCs will develop ICT tools (digital lab manual, digital model lesson, virtual training room, local portal site) to support SEED Science Teacher Training.

2. Policy of the Training Method

- SEED Working group members (Trainers of the training) do not transfer what they acquired, but transfer the know-how they acquired based on their experience, learning process, and lessons learned.
- Main contents of the Training are experience, development and thinking by trainees.
- Trainers utilize and show their output such as model lessons and design of documents they made through the use of movies and real demonstrations.
- Teacher trainees and IT staff trainees will cooperate and collaborate closely in designing and developing the ICT tools.

3. Summary of the Training

(1) Trainee

- 16 science teachers, supervisors and LRC science staff at each Pilot LRC
- 3 IT staff from each Pilot LRC
- Qualification of Trainees (for teachers and supervisors)

  Teaching experience: 5- 10 years;

  Training experience: Certification of World Link Training (desirable) or Intel 1 and 2 (desirable) ; and

  ICT skills: Certification of ICDL and good typing skills (desirable: The Training will ask trainees to practice typing before the training)

- Qualification of Trainees (for IT staff)

Working experience as IT technician: 5 years or above

Availability: Should have enough time availability to participate in the training fully (SEED training should be given the first priority over other LRC's IT tasks)

- Due date of selection of trainees: xx, Dec., 2008

(2) Training Term (Core Training)

17th, Feb, 2008 – 17th, Apr, 2008 and orientation on 8th, Jan, 2008 Total 45 days (9 weeks)

Face-to-Face Training at QRC: (9:30 - 15:00 including break 30min.)

Face-to-Face Training at LRC: (9:30 - 15:00 including break 30min.)

(3) Venue

QRC: Face to Face Training

LRC and schools at LRC region: Self-learning and lesson demonstration

Training	Type	Venue or Place	Total days (Teacher)	Total days (IT Staff)
Orientation		QRC		1
Training	Face-to-Face	QRC	9	25
Training	Face-to-Face	LRC	16	0
Lesson Demonstration	Lesson Demonstration	Schools at LRC region	4	0
Self - learning	Self - learning	LRC or another place (Home)	13	20
Completion		QRC		1
SEED workshop	Conference	Amman		1

4. Outcome of the Training

4.1 Outputs of the training for teachers

(1) Top Level

Category	Outcome
New science method based policy of ERfKE	• Explain ERfKE New science method based policy of ERfKE.
Development of Model Lesson	• Develop science model lessons by utilizing ICT and Lab. activity and conduct lesson demonstrations at schools.

			Instruct how to develop model lessons and conduct lesson demonstrations to other science teachers.
Support school and teachers			• Develop science educational material for schools and teachers. • Develop a local science teachers' community including using the science portal site.

(2) Module Level

* means the training has direct lecture and trainee's activities, according to other outcomes, the training expects trainees learns by themselves

Module	No	*	Outcome
Module 1	O1-1		• Explain the outline and purpose of ERfKE.
	O1-2	*	• Explain the new science education based on policy of ERfKE.
	O1-3	*	• Explain the problems and resolutions of new science education in Jordan.
Module 2	O2-1	*	• Explain why students learn science.
	O2-2	*	• Explain what students learn and acquire from science education.
	O2-3	*	• Explain details of what students learn and acquire from the view point of science knowledge, attitudes and skills.
	O2-4	*	• Explain meaning of Constructivism in science education and meaning of Lab. activity in science education based on idea of Constructivism.
	O2-5	*	• Explain the SEED science lesson framework based on Constructivism.
	O2-6	*	• Explain new role of science teachers in Jordan.
Module 3	O3-1	*	• Explain what new teaching methods ERfKE recommends.
	O3-2	*	• Explain the meaning of student centered learning style lesson and how science teachers can change their minds in Jordan.
	O3-3	*	• Explain meaning of problem solving, critical thinking and inquiring in both views of general idea and definitions of MOE in Jordan.
	O3-4	*	• Explain what kinds of lessons are appropriate to using problem solving, critical thinking and inquiring and Select appropriate lessons to these method.
	O3-5		• Design a lesson with Inquiry and conduct it.
	O3-6		• Explain and use appropriate tools for problem solving and critical thinking in science education.
Module 4	O4-1	*	• Explain the meaning of Lab. activity for science education and problem of conducting Lab. activity in Jordan.
	O4-2	*	• Explain real traditional Lab. activities (by teacher or students), real Lab. activity with ICT devices and simulation.
	O4-3	*	• Explain what kinds of lessons are appropriate to use real traditional Lab. actives (by teacher or students), real Lab. activity with ICT devices and simulation and Select appropriate lessons to these methods.
	O4-4	*	• Explain how to realize high quality experiments and conduct them.
	O4-5	*	• Explain how to save time in experiments and conduct them.
	O4-6	*	• Explain and conduct experiments with local materials.
	O4-7		• Design and conduct lesson related to environmental issues
Module 5	O5-1	*	• Explain the category of how to use ICT in science education and examples of them.

	O5-2	*	• Explain the category of how to use ICT at school and examples of them.
	O5-3	*	• Design and conduct experiments and observations with utilizing ICT.
	O5-4	*	• Design and conduct students' activities such as drill, reporting and presentation and collaboration.
	O5-5	*	• Explain what kinds of lessons are appropriate to simulation and virtual environment and select appropriate software and websites.
	O5-6	*	• Select appropriate digital materials in e-science and utilize them as demonstration and presentation to students.
	O5-7	*	• Select appropriate digital materials such as photos, movies, graphics and animations in the Internet and utilize them as demonstration and presentation to students.
	O5-8		• Instruct student to use web site effectively and efficiently in science lessons.
Module 6	O6-1	*	• Explain what good science lesson are from the view point of ERfKE.
	O6-2	*	• Explain the Seed development procedure of science model lesson.
	O6-3		• Select appropriate lesson for SEED model lesson.
	O6-4	*	• Design a concept map of lesson's outcome.
	O6-5	*	• Explain how to design a concept map of lesson's outcome and review and revise concept maps which other teachers designed.
	O6-6	*	• Design a flowchart of lesson.
	O6-7		• Explain how to design a flowchart of lesson and review and revise flowcharts of lessons other teachers designed.
	O6-8		• Design some flowchart of lesson to one concept map of lesson's outcome and select best flowchart according to conditions such as students' ability, learning environment and lesson time.
	O6-9	*	• Conduct a simulated lesson and microteaching and improve the lesson.
	O6-10	*	• Conduct a preliminary experiment and improve the experiment.
	O6-11		• Conduct a lesson demonstration at school and review meeting after it.
	O6-12		• Analyze questionnaire of a lesson demonstration and improve the lesson.
Module 7	O7-1	*	• Explain the new organization form MOE to School level based on LRC (Knowledge Center) in Jordan.
	O7-2	*	• Explain the new roles of LRC (KC), schools and teachers in Jordan.
	O7-3	*	• Explain how teachers cooperate and exchange information among teachers.
	O7-4		• Conduct how teacher cooperate and exchange information in the Internet.
	O7-5		• Develop a local science teacher's community.
	O7-6	*	• Explain how to conduct a school collaboration project in the Internet.
Module 8	O8-1	*	• Explain new method of evaluation and assessment according to ERfKE's definition.
	O8-2	*	• Design and use a check list and rating scale for science education in Jordan.
	O8-3	*	• Design and use a rubric for science education in Jordan.
	O8-4		• Collect appropriate information for portfolio and evaluate by using portfolio.

4.2 Outputs for the training for IT staff

The training will utilize training materials developed by the SEED Working group Group C: Digital Lab Manual, the SEED Virtual Training Room, and additional lecture materials.

The training modules developed by the SEED project focuses on a variety of knowledge and skills that are required to support the new science education utilizing ICT.

Module:

1) Movie development for Digital Lab Manual and Digital Model Lesson:

- Video shooting, editing and authorizing

2) Web site development:

- HTML/Java Script, FrontPage, Flash

3) CMS / Portal Package:

- Moodle, SharePoint Server

4) Web Based Questionnaire

5) Education and ICT:

- Basic concepts of science education utilizing ICT and Lab

- How teachers can use ICT in teaching

*** For module 5, IT staff will join the training of teacher and lab staff.*

Module	Lesson	Description	Proposed days		
			Face-to-Face	Self-Assignment	Total
Introduction	Intro	Introduction of the course & self introduction	-	-	-

Module	Lesson	Description			
Module 1	Lesson 1-1	Introduction: What are the digital educational materials? Development of digital Lab Manual and digital Model Lesson. Basic skills for digital lab manual development. How to use digital video and camera. Develop storyboard. Shoot a simple video. Edit movie file (cutting, subtitle). Add narration. Basic skills for digital model lesson development. How to shoot a lesson, and edit video. (help from Group B will be needed)	2	2	5
	Lesson 1-2	Shoot, edit and add narration to 3 lab experiment (experiment by lab technician of LRC – physics, chemistry, biology)	1	3	3
	Lesson 1-3	Shoot and edit videos of model lessons. 1 lesson per subject. (when teachers group has model demonstration)	1	4	4
Sub Total (hours)					
Sub Total (days)			4	9	12
Module 2	Lesson 2-1	Develop a draft web page for digital lab manual using FrontPage, and put it on web server	1	2	3
	Lesson 2-2	Develop a draft web page for local science portal site using FrontPage (include BBS and upload function), and put it on web server	1	2	3
	Lesson 2-3	Use Flash to create simple icons and motion pictures, edit pictures	2	3	4
Sub Total (hours)					
Sub Total (days)			4	7	11
Module 3	Lesson 3-1	Introduction: introduction of Moodle. What is Course Management System? How to use / configure functions of Moodle, install Moodle on web server and local computer. Develop a sample course for virtual training room for SEED training on web server Install Moodle on servers of LRC and configure	2	2	4
	Lesson 3-2	Introduction to SharePoint What is SharePoint? How to develop portal site by SharePoint? How to install? Install SharePoint on server of LRC	2	2	4
	Lesson 3-2	Develop Virtual Training Room for SEED Teacher Training (work together with teacher group)	0	3	3
Sub Total (hours)					

		Sub Total (days)	4	7	11
Module 4	Lesson 4-1	Introduction: What is Web Based Questionnaire Configure sample questions into Web Based Questionnaire Install WBQ on server of LRC	1	1	2
	Lesson 4-4	Develop Web Based Questionnaire for SEED Teacher Training (work together with teacher group)	0	2	2
		Sub Total (hours)			
		Sub Total (days)	1	3	4
Module 5	Lesson 5-1	What is ErfKE?　Why teacher should change science education? (join teachers training)	IT group joins teacher group		
	Lesson 5-2	How does teacher utilize ICT including e-science in science lesson? (join teachers training)	IT group joins teacher group		
	Lesson 5-3	How does teacher cooperate with other teachers to improve science education? (join teachers training)	IT group joins teacher group		
	Lesson 5-4	Coordinate a real and virtual science teachers' community (join teacher training)	IT group joins teacher group		
	Lesson 5-5	Develop and support a local science portal site (join teachers training)	IT group joins teacher group		
	Lesson 5-6	Develop digital Lab.manual (join teachers training)	IT group joins teacher group		
		Sub Total (hours)			
		Sub Total (days)	5	0	5
Summary	Summary	Summary of the course, Feedback of the course		-	-
	Team formation	Form a working group for future development and decide reporting procedure		-	-
		TOTAL (HOURS)			
		TOTAL (DAYS)	17	26	43

5. Detail schedule of the Training

5.1 Detail schedule of the Training for Teachers

　Type: Lec: Lecture, Gact: Group Activity, Pact: Personal Activity Gweb: Group Activity in Virtual Training Room (VTR), Pweb: Personal Activity in VTR

Ven.: Venue, S: Dividing into groups A= all regions, A2= All regins into 2group, A4= All group into 4 grpup, 1 group=Amman, Irbid 2= Salt, Karak,

WG : Working Group participates, MOD: Module O: Outcome, S.L.: Self Learning

Date	Day	Summary	Ven.	S	WG	MOD	O	Type	Detail (Lecture & Activity)
2007/Dec.		Pre-Survey of Trainees' lesson							• Administer questionnaire to students after trainee's science lesson at school
2007/Dec/n (TBD)	00	Orientation	QRC	A	*			Lec	• Outline of SEED project • Content and schedule of the training, Preparation before the training
			QRC	A	*				• Pre questionnaire and Test as pre-survey
			QRC	A	*	(M7)	O7-1	Lec	• MOE's new structure with the addition of KCs
			QRC	A2	*	M2	O2-1	Gact&Lec	• Why is science education necessary for students? (KJ Method)
		Demo: Model Lesson	QRC	A2	*	M6	O6-1	Lec&Gact	• Demonstration of model lesson as simulated lesson and discussion (1 lesson)
2008/Jan.		Preparation						Pact	• Self Practice of typing
								Gweb	• Self-Introduction
						M2	O2-2	Gweb	• Discussion: What students learn from science education
2008/02/13		Opening Workshop	Amman	A	*	All	All	Lec	Opening Ceremony and SEED Workshop
1st week									
		Meaning and problem of science education.				M1	O1-3	Gweb	• Discussion: Problems with implementing new science education and How to solve them.
2008/02/17	01	Introduction	QRC	A	*	-	-	-	• Administer pre-survey
		What students learn from science	QRC	A	*	M1	O1-2	Lec	• ERfKE and requirements for science education
			QRC	A2	*	M2	O2-2	Gact&Lec	• Discussion: What students learn from science education (KJ Method)
			QRC	A2	*	M2	O2-3	Lec	• Knowledge, skills, and attitudes students learn from science education
		What good science lessons are	QRC	A2	*	M6	O6-1	Gact	• Discussion on what is a good science lesson (KJ method) and ways to use blended learning
2008/02/18	02	SEED science lesson framework	QRC	A2	*	M2	O2-4/2-6	Lec	• Ideas on Constructivism in Science Education • New role of Science teachers in Jordan
			QRC	A2	*	M2	O2-5	Lec	• The SEED science lesson framework based on Constructivism
		Demo: Model Lesson	QRC	A2	*	M6	O6-1	Lec&Gact	• Demonstration of model lesson as simulated lesson and discussion (1 lesson)
2008/02/19	03	Demo: Model Lesson	QRC	A2	*	M6	O6-1	Lec&Gact	• Demonstration of model lesson as simulated lesson and discussion (3 lessons)

Date	Day	Summary	Ven.	S	WG	MOD	O	Type	Detail (Lecture & Activity)
2008/02/20	04	Seed development procedure	LRC		*	M6	O6-2	Lec	• Steps in developing SEED's model lessons
		Concept map of lesson's outcome	LRC		*	M6	O6-4	Lec	• Designing a concept map for the outcome of a lesson (including showing concept map of model lesson and how WG developed and improved it)
			LRC		*	M6	O6-4	Pact	• Practice: Designing a concept map for the outcome of a lesson
2008/02/21	05	Flowchart of lesson	LRC		*	M6	O6-6	Lec	• Designing a flowchart of a lesson (including showing flowchart map of model lesson and how WG developed and improved it)
			LRC		*	M6	O6-6	Pact	• Practice: Designing a flowchart of a lesson
									• (explanation of S.L.) Preparation of simulated lesson
2nd week									
		Meaning of Lab. activity	QRC		*	M4	O4-1	Gweb	• Discussion: Meaning of Lab. activity for science education and problem of conducting Lab. activity in Jordan.
2008/02/24	06	Type of Lab. activity Demo: Model experiments.	QRC	A2	*	M4	O4-2,3	Gact&Lec	• What kinds of lessons are appropriate to use real traditional Lab. actives (by teacher or students), real Lab. activity with ICT devices and simulation, and how to select appropriate lessons using these methods.
			QRC	A2	*	M4	O4-4,5	Lec&Gact	• Demonstration of experiment in model lesson and discussion (including how WG developed and improved it) (2 experiments)
2008/02/25	07	Demo: Model experiments.	QRC	A2	*	M4	O4-4,5	Lec&Gact	• Demonstration of experiment in model lesson and discussion (including how WG developed and improved) (4 experiments)
2008/02/26	08	ERfKE's new teaching methods	QRC	A2	*	M3	O3-3	Gact&Lec	• Discussion and presentation on general definition of problem solving, critical thinking, inquiry and definition in Jordan's education
			QRC	A2	*	M3	O3-1	Lec	• Lessons recommended by ERfKE
2008/02/27	09	Practicing new teaching methods	QRC	A2	*	M3	03-3	Gact	• Presentations and discussions of mini-lessons using new teaching methods
2008/02/28 (S. L.)	10	Preparation: Simulated lesson				M6	06-9	Pact	• Preparation of Simulated lesson (Concept map, flowchart, preliminary experiment and materials)
3rd week									
		Experiments with local materials				M4	O4-6	Gweb	• Web-search: Experiments with local materials (including discussion on how to use it in a lesson)
2008/03/02	11	Type of utilizing ICT	QRC	A2	*	M5	O5-1,5	Gact&Lec	• Category of how to use ICT in science education and examples of them (role of teachers and students and examples of tools) • Select appropriate lesson to use ICT

Date	Day	Summary	Ven.	S	WG	MOD	O	Type	Detail (Lecture & Activity)
		Demo: PPT and multimedia	QRC	A2	*	M5	O5-6,7	Lec	• Demonstration of PPT and multimedia in model lesson and discussion (including how WG developed and improved them) (2 cases)
2008/03/03	12	Demo: PPT and multimedia	QRC	A2	*	M5	O5-6,7	Gact&Lec	• Demonstration of PPT and multimedia in model lesson and discussion (including how WG developed and improved them) (2 cases)
		Cases of utilizing ICT	QRC	A2	*	M5	O5-3,4	Lec	• Cases of science lessons with ICT including cases in Japan (findings from WG trip to Japan)
2008/03/04 (S. L.)	13	Preparation: Simulated lesson				M6	O6-9	Pact	• Preparation of Simulated lesson (Concept map, flowchart, preliminary experiment and materials)
2008/03/05 (S. L.)	14	Preparation: Simulated lesson				M6	O6-9	Pact	• Preparation of Simulated lesson (Concept map, flowchart, preliminary experiment and materials)
2008/03/06	15	Simulated lesson	LRC		*	M6	O6-9	Pact&Gact	• Simulated lesson and review discussion (3 lessons)
4th Week									
		Simulation and virtual environment				M5	O4-7 O5-5	Gweb	• Web-search: Simulation and virtual environment (including discussion on how to use it in lesson)
2008/03/09	16	Simulated lesson	LRC		*	M6	O6-9	Pact&Gact	• Simulated lesson and review discussion (3 lessons)
2008/03/10	17	Simulated lesson	LRC		*	M6	O6-9	Pact&Gact	• Simulated lesson and review discussion (3 lessons)
2008/03/11 (S. L.)	18	Outcome & flowchart & experiment				M6	O6-4,6 ,10	Pac	• Modification of Concept map, flowchart, experiment and materials
2008/03/12 (S. L.)	19	Outcome & flowchart & experiment				M6	O6-4,6 ,10	Pac	• Modification of Concept map, flowchart, experiment and materials
2008/03/13	20	New evaluation method	QRC		*	M8	O8-1	Lec	• New methods of evaluation and assessment based on ERfKE's definition
		rubric, checklist and rating scale	QRC		*	M8	O8-2,3	Pact	• Design and usage of a rubric, checklist and rating scale scale for science education in Jordan (1)
5th week									
		Collaboration project in the Internet				M7	O7-6	Gweb	• Web-search: Collaboration project in the Internet (including discussion on how to use it in lesson)
2008/03/16	21	Outcome & flowchart	LRC			M6	O6-4-7	Pact&Gact	• Review of Outcome & flowchart (5 lessons)
2008/03/17	22	Outcome & flowchart	LRC			M6	O6-4-7	Pact&Gact	• Review of Outcome & flowchart (5 lessons)
2008/03/18 (S. L.)	23	Preliminary experiment			(*)	M6	O6-10	Pac	• Preliminary experiment
		Outcome & flowchart				M6	O6-4,6	Pac	• Modification of Concept map, flowchart
2008/03/19	24	Outcome & flowchart	LRC			M6	O6-4-7	Pact&Gact	• Review of Outcome & flowchart (5 lessons)
2008/03/20 (S. L.)	25	Preliminary experiment			(*)	M6	O6-10	Pac	• Preliminary experiment
		Outcome & flowchart				M6	O6-4,6	Pac	• Modification of Concept map, flowchart
6th week									
		How science teacher changes				M3	O3-2	Gweb	• Teacher and student communication using student centered learning and how science teachers should change

Date	Day	Summary	Ven.	S	WG	MOD	O	Type	Detail (Lecture & Activity)
2008/03/23	26	rubric, checklist and rating scale	LRC		*	M8	O8-2,3	Pact	• Design and usage of a rubric, checklist and rating scale for science education in Jordan (2)
2008/03/24 (S. L.)	27	Preparation: Microteaching				M6	O6-9	Pact	• Preliminary experiment • Preparation of Microteaching (experiment & activity)
2008/03/25	28	Microteaching (experiment & activity)	LRC		*	M6	O6-9,10	Pact&Gact	• Microteaching (experiment & activity)(3 lessons)
2008/03/26	29	Microteaching (experiment & activity)	LRC		*	M6	O6-9,10	Pact&Gact	• Microteaching (experiment & activity)(3 lessons)
2008/03/27	30	Microteaching (experiment & activity)	LRC		*	M6	O6-9,10	Pact&Gact	• Microteaching (experiment & activity)(3 lessons)
7th week									
		New evaluation method				M8	O8-1	Gweb	• New evaluation method for science education
2008/03/30	31	rubric, checklist and rating scale	LRC		*	M8	O8-2,3	Pact	• Design and usage of rubric, checklist and rating scale for science education in Jordan (3)
2008/03/31 (S. L.)	32	Preparation: Simulated lesson				M6	O6-9	Pact	• Preparation of Simulated lesson
2008/04/01	33	Simulated lesson	LRC		*	M6	O6-9	Pact&Gact	• Simulated lesson and review discussion (3 lesson)
2008/04/02	34	Simulated lesson	LRC		*	M6	O6-9	Pact&Gact	• Simulated lesson and review discussion (3 lesson)
2008/04/03	35	Simulated lesson	LRC		*	M6	O6-9	Pact&Gact	• Simulated lesson and review discussion (3 lesson)
8th week									
		Teacher's cooperation				M7	O7-3	Gweb	• How teachers cooperate and exchange information among teachers
2008/04/06 (S. L.)	36	Preparation: Lesson demonstration				M6	O6-10	Pact	• Preparation of Lesson demonstration
2008/04/07 (S. L.)	37	Preparation: Lesson demonstration				M6	O6-10	Pact	• Preparation of Lesson demonstration
2008/04/08	38	Lesson demonstration	(LRC)		*	M6	O6-11	Pact&Gact	• Lesson demonstration and review meeting (2-3 lessons)
2008/04/09	39	Lesson demonstration	(LRC)		*	M6	O6-11	Pact&Gact	• Lesson demonstration and review meeting (2-3 lessons)
2008/04/10	40	Lesson demonstration	(LRC)		*	M6	O6-11	Pact&Gact	• Lesson demonstration and review meeting (2-3 lessons)
9th week									
2008/04/13 (Reserved)	41	Lesson demonstration	(LRC)		*	M6	O6-11		• Lesson demonstration and review meeting (2-3 lessons)
2008/04/14	42	Lesson demonstration	LRC		*	M6	O6-1	Lec	• Result of Lesson demonstration including analysis of questionnaire
2008/04/15 (S. L.)	43	Preparation: Presentation						Pact	• Preparation of Presentation for completion (each LRC group)
2008/04/16 (S. L.)	44	Preparation: Presentation						Pact	• Preparation of Presentation for completion (each LRC group)

Date	Day	Summary	Ven.	S	WG	MOD	O	Type	Detail (Lecture & Activity)
2008/04/17	45	Completion	QRC	A	*			Pact	• Presentation for completion　(30 min for each group)
			QRC	A	*	M7	O7-2	Lec	• New roles of LRC(KC), schools and teachers in Jordan.
			QRC	A	*			Lec	• Further SEED plan and role of trainees
									• Post questionnaire and Test as post-survey
			QRC	A	*				• Presentation of Certificates

5.2 Detail schedule of the Training for IT staff

#	1st Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
1	17-Feb-08	Sun	QRC	1	1-1	Introduction	Lec	Introduction to SEED Training for IT staff (purpose, training contents, schedule, protocols, etc)	
						what are digital education materials?	Group	Discussion: How can ICT support education and teaching? What are digital educational materials for teachers and students? What are the roles of ICT staff at LRC in the new KC in improving education?	
						what are digital materials in SEED?	Lec	Overview of ICT tools for SEED Training. Digital materials for SEED Training and Web Sites for SEED Training	
						IT equipments for SEED	Lec Group	Introduction to the equipments provided to LRC by SEED (digital camera, digital video, scanner) (purpose, how to use)	
						Lab manual & model lesson	Lec Group	Sample digital lab manuals and digital model lessons Discussion: How these materials can support teachers and students	
2	18-Feb-08	Mon	QRC	1	1-1	Lab manual development	Lec Group	Storyboard development for lab manual Hands-On: Development of storyboard from lab video	
							Lec Group	How to shoot lab video, how to edit video, how to add narration Hands-On: Editing of and adding narration to video from unedited lab video	

#							Group	Demonstration: Shooting lab video (shooting by instructors)	support from Group B will be needed
						Digital model lesson	Lec	How to shoot & edit model lesson	
3	19-Feb-08	Tue	QRC	1	1-2	Lab manual shooting	Group	Develop 3 digital lab video (1 lab video for each subject: PS, CH, BI) - storyboard, shooting, editing, narration	support from Group B will be needed
4	20-Feb-08	Wed	QRC	1	1-2	Lab manual shooting	Group	continued..	support from Group B will be needed
5	21-Feb-08	Thu	QRC	1	1-2	Lab manual shooting	Group	continued..	support from Group B will be needed

#	2nd Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
6	24-Feb-08	Sun	QRC	1	1-2	Review of videos	Group Lec	Review of the digital lab manuals and storyboards developed by LRC trainees Sharing digital materials and networking of contents sharing among LRCs	support from Group B will be needed
					1-1	Digital model lesson	Group	Hands-On: Editing of model lesson video from unedited video	
7	25-Feb-08	Mon	QRC	3	3-1	Introduction to e-Learning	Lec	What is CMS/LMS? Why CMS/LMS? History of e-Learning. Sample CMS.	
						Introduction to Moodle	Lec Group	What is Moodle? What are the fuctions of Moodle? Hands-On: Installation of Moodle software on local PC	
8	26-Feb-08	Tue	QRC	3	3-1	Functions and configurations of Moodle	Lec Group	Hands-On: Details of Moodle functions (each group explores one function of Moodle) Hands-On: Configure a sample course of SEED Hands-On: How to share course contents between Moodles	

9	27-Feb-08	Wed	Each LRC	3	3-1	Setting up Moodle in LRC	Self-study	Install Moodle on LRC's servers and open it to intranet	
10	28-Feb-08	Thu	Each LRC	3	3-1	Setting up Moodle in LRC	Self-study	Install Moodle on LRC's servers and open it to intranet	

#	3rd Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
11	2-Mar-08	Sun	QRC	5	-	ICT utilization in science edu.	Joint	Categorizing and explanation of methods of ICT utilization in science education	IT staff will join teachers' training
12	3-Mar-08	Mon	QRC	5	-	ICT utilization in science edu.	Joint	ICT utilization in science teaching, and examples from Japan	IT staff will join teachers' training
13	4-Mar-08	Tue						Mid-Term Break or additional days for training if necessary.	
14	5-Mar-08	Wed						Mid-Term Break or additional days for training if necessary.	
15	6-Mar-08	Thu						Mid-Term Break or additional days for training if necessary.	

#	4th Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
16	9-Mar-08	Sun						Mid-Term Break or additional days for training if necessary.	
17	10-Mar-08	Mon	QRC	4	4-1	Introduction to WBQ	Lec	What is WBQ? How to install and configure? How to retrieve results?	
						Configuration of WBQ	Group	Install and configure WBQ on local PC, and set up a sample questionnaire	

#			Venue	Module	Lesson	Summary	Type	Activities	Notes
18	11-Mar-08	Tue	Each LRC	4	4-1	Setting up WBQ in LRC	Self-study	Install and configure WBQ on LRC's servers and open it to intranet	
19	12-Mar-08	Wed	QRC	2	2-1	Develop Web Site for Lab Manual	Lec Group	How to develop a web site for digital lab manual Hands-On: Use HTML, FrontPage to create sample web pages	
20	13-Mar-08	Thu							

#	5th Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
21	16-Mar-08	Sun	QRC	2	2-1	Develop Web Site for Lab Manual	Lec Group	How to develop a web site for digital lab manual Hands-On: Development of digital lab manual web site	
22	17-Mar-08	Mon	Each LRC	2	2-1	Setting up Web Site for Lab manual	Self-study	Install and configure the web site for digital lab manual on LRC's servers and open it to intranet (lab videos are from 3 digital lab manual developed in the training and other videos from SEED)	
23	18-Mar-08	Tue	Each LRC	2	2-1	Setting up Web Site for Lab manual	Self-study	Install and configure the web site for digital lab manual on LRC's servers and open it to intranet (lab videos are from 3 digital lab manual developed in the training and other videos from SEED)	
24	19-Mar-08	Wed	QRC	2	2-2	Develop Portal Site	LecGroup	How to develop a portal site for SEED training using SharePoint(?)?Discussion: How to share contents among LRC?	
25	20-Mar-08	Thu	Each LRC	2	2-2	Setting up Portal Site	Self-study	Configure a portal site in LRC's server and open it to intranet (contents are SEED news, digital model lesson, lesson plan, digital lab manual)	

#	6th Week		Venue	Module	Lesson	Summary	Type	Activities	Notes

#			Venue	Module	Lesson	Summary	Type	Activities	Notes
26	23-Mar-08	Sun	Each LRC	2	2-2	Setting up Portal Site	Self-study	Configure a portal site in LRC's server and open it to intranet (contents are SEED news, digital model lesson, lesson plan, digital lab manual)	
27	24-Mar-08	Mon	QRC	2	2-3	Flash	Lec Group	How to use Flash software.	
28	25-Mar-08	Tue	QRC	2	2-3	Flash	Lec Group	How to use Flash software.	
29	26-Mar-08	Wed	QRC	2	2-3	Flash	Lec Group	How to use Flash software.	
30	27-Mar-08	Thu	Each LRC	2	2-3	Flash	Self-study	Develop simple Flash movie	

#	7th Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
31	30-Mar-08	Sun	Each LRC	2	2-3	Flash	Self-study	Develop simple Flash movie	
32	31-Mar-08	Mon	Each LRC	2	2-3	Flash	Self-study	Develop simple Flash movie	
33	1-Apr-08	Tue	Each LRC	1	-	Shooting model lesson	Joint	Shooting the model lesson conducted by SEED teachers training, and edit the video	IT staff will join teachers' training
34	2-Apr-08	Wed	Each LRC	1	-	Shooting model lesson	Joint	Shooting the model lesson conducted by SEED teachers training, and edit the video	IT staff will join teachers' training
35	3-Apr-08	Thu	Each LRC	1	-	Shooting model lesson	Joint	Shooting the model lesson conducted by SEED teachers training, and edit the video	IT staff will join teachers' training

#	8th Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
36	6-Apr-08	Sun	Each	1	-	Editing and	Self-study	Edit the model lesson videos and share them through Moodle or	

#			Venue	Module	Lesson	Summary	Type	Activities	Notes
			LRC			sharing		SharePoint	
37	7-Apr-08	Mon	Each LRC	1	-	Editing and sharing	Self-study	Edit the model lesson videos and share them through Moodle or SharePoint	
38	8-Apr-08	Tue	Schools	1	-	Shooting model lesson	Joint	Shoot and edit the model lesson videos and share them through Moodle or SharePoint	IT staff will join teachers' training
39	9-Apr-08	Wed	Schools	1	-	Shooting model lesson	Joint	Shoot and edit the model lesson videos and share them through Moodle or SharePoint	IT staff will join teachers' training
40	10-Apr-08	Thu	Schools	1	-	Shooting model lesson	Joint	Shoot and edit the model lesson videos and share them through Moodle or SharePoint	IT staff will join teachers' training

#	9th Week		Venue	Module	Lesson	Summary	Type	Activities	Notes
41	13-Apr-08	Sun	Each LRC	1	-	Editing and sharing	Self-study	Edit the model lesson videos and share them through Moodle or SharePoint	
42	14-Apr-08	Mon	QRC			reserved for additions	Lec Group	additional days for supplementary training	
43	15-Apr-08	Tue	QRC			reserved for additions	Lec Group	additional days for supplementary training	
44	16-Apr-08	Wed	Each LRC			Preparation for presentation	Self-study	Prepare presentation for the closing ceremony.	
45	17-Apr-08	Thu	QRC			Closing Ceremony	Joint	Presentation: What we have learned in SEED Training, and how to apply this in the future. Feedback to the training.	

添付資料 7: SEED 理科教育研修シラバス

SEED Science Teacher Training Syllabus (Final)   2008/07/30

Date	Day	Summary	M O d.	Out puts	Type	Details
Core Training (Theoretical Phase)						
1st Week						
03 Aug. 2008 Sun.	c1	ERfKE	1	1-1	Lec.	・ Objectives Of ERfKE 1 &2
				1-2		・ Out Line Of SEED Project : Concept , Objectives , Phases, & Out comes
				1-3		・Content & Schedule Of Training ・Questionnaire (Motoko San)
04 Aug. 2008 Mon.	c2	Importance For Students To Study Science	2	2-1	Lec. & G. Act	・Discuss: Why do we study science ・ Discuss: What Students Learn From Science Education? (discussion will reach to K.S.A) ・Activity: Select lesson from textbook & identify K.S.A. ・Summary: What does K.S.A mean?
05 Aug. 2008 Tue.	c3	Constructivism		2-2		・ Explain and Discuss: Concept Of Constructivism & Its Significance
				2-3		・Explain and Discuss: The Role Of Constructivism In Teaching Science ・Explain and Discuss: Introduction to SEED science lesson framework based on constructivism
06 Aug. 2008 Wed.	c4	Self Learning				・ Compare Between Constructivism & Behaviorism
07 Aug. 2008 Thu.	c5	Student Centered Learning Strat.	3	3 –1	Lec. & G. Act	・ Discuss: What does S.C. L. Mean? ・ Discuss: What Student Lean From Science Education Using S.C.L
				1-2		・ Identify & Explain S.C.L Strategies (Critical Thinking, Problem Solving, Inquiry, Collaborative learning) part 1
2nd Week						
10 Aug. 2008 Sun.	c6	Student Centered Learning Strat				・ Identify & Explain S.C.L Strategies (Critical Thinking, Problem Solving, Inquiry, Collaborative learning) part 2 ・ Trainers Will Instruct Each Subject group To Choose One Lesson & Plan To Teach This Lesson By There Group's Strat.
11 Aug. 2008 Mon	c7	Utilizing Teaching Tools.		3 –2	Lec. & G. Act	・ Demo. Model Lesson Discuss: (based on Demo.) How Student Learned in The Lesson From a View Point Of S.C.L Strat. & What To Improve. ・Introduce Some Useful Teaching Tools (KJ, Fish Bone, Mind Map Work Sheet)
12Aug. 2008 Tue.	c8	Self Learning				Use Teaching Tools In Your Answering To The Next Q: What is The Most Problem Facing The Science Teacher IN The Field.

13 Aug. 2008 Wed.	c9	New Evaluation Strat.	4	4 –1	Lec. & G. Act	・Introduce & Discus New Evaluation Strat. Based On ERfKE's Definition (Performance, Observation, Pencil & Paper, Communication, Reflection) ・Activity: Choose a Lesson From Text Book & Utilize One Of these Evaluation Strat.
14 Aug. 2008 Thu.	c10	Utilizing New Evaluation Tools		4 –2	Lec. & G. Act	・Introduce & Discus New Evaluation Tools Based On ERfKE's Definition (Check List, Rating Scale, Rubric, Anecdotal Record, Learning Log) ・Activity : Choose a Lesson From Text Book & Utilize One Of These Evaluation Tools (Check List , Rating Scale ,Rubric) ・Discuss: What Are the Difficulties & Solution to use New Evaluation Strat. & Tools (Use Teaching Tools)
3rd Week						
17 Aug. 2008 Sun.	c11	Self Learning (Trainer's' meeting at QRC)				・ Activity : Utilize One Evaluation Strategy & Tool In Order To Evaluate Your Student In a Lesson From Your Specialist (By PPt)
18Aug. 2008 Mon.	c12	Utilizing ICT	5	5 –1	Lec. & G. Act	・ Show Some Soft Ware Media & Discuss: How Can Teachers &
				5 –2	Lec. & G. Act	・ Discuss: How to Use ICT In the following Fields: Self Learning, Educational Tools, Information, Information sources, collaboration.
19 Aug. 2008 Tues.	c13	Utilize Media In Teaching Science		5 –3	Lec. & G. Act	・Demo. By a Lesson Video Of How To Utilize ICT In Teaching. ・Discuss. Of How Did Trainees Utilize ICT In There Model Lesson. ・Discuss: How Student's Learning Can Benefits From Utilizing ICT & Media In Science Education.
Non Core Training (Practical Phase)						
25 Aug. 2008 Mon.	n01	Real Experiment Pre-Experiment	6		Lec. & G. Act	・ Discuss: As a Teacher What Would You Do If You Conducted an Experiment In Front Of Students But You Got No Result? (The Aim Is TO Reach The
					Lec. & G. Act	・Importance Of Pre-Experiment) ・ Activity: Compare The way of presentation (Real experiment, video experiment, Simulation vs. G.W. , Individual , Demonstration) ・Choose some experiment from text book, and then classify them as previous. ・ Discuss: difficulties teachers face when conducting Lab-Activities & How To Solve Them By Using
27 Aug. 2008 Wed.	n02	Development method			Lec	• Steps in developing SEED's model lessons • Explain The SEED Science Lesson Frame Work Based On Constructivism.

		Concept Map			Lec.	• Designing a concept map for the outcome of a lesson (including showing concept map of model lesson and how WG developed and improved it)
					G. Act	• Activity: Designing a concept map for the outcome of a lesson
01 Sep. 2008 Mon.	n03	Flowchart of Lesson			Lec.	• Designing a flowchart of a lesson (including showing flowchart map of model lesson and how WG developed and improved it)
					G. Act	• Activity: Designing a flowchart of a lesson
03 p.eS 2008 Wed.	n04	Development Concept Map and Flowchart			W.G	・Activity: Designing a Concept Map and flowchart of a lesson for trainee's model lesson (Trainer review and give advice during trainees is developing)
08 Sep. 2008 Mon.	n05	Review and Discussion Concept Map and Flowchart			G. Act	・Activity: Review and discussion Concept Map and Flowchart among trainers and trainees
10 Sep. 2008 Wed.	n06	Lesson Plan			Lec.	・Explain the Elements Of Lesson Plan ・How to make Lesson Plan
					G. Act	・Activity: Design a Lesson Plan According To SEED Science Lesson Frame Work Based On
15 Sep. 2008 Mon.	n07	Development Lesson Plan				・Activity: Designing a Lesson plan of a lesson for trainee's model lesson (Trainer review and give advice during trainees is developing)
17 Sep. 2008 Wed.	n08	Review and Discussion Lesson Plan (1)			G. Act	・Activity: Review and discussion Concept Map and Flowchart among trainers and trainees
22 Sep. 2008 Mon.	n09	Review and Discussion Lesson Plan (2)			G. Act	・Activity: Review and discussion Concept Map and Flowchart among trainers and trainees
		Micro teaching / Pre-experiment			Lec.	・How to conduct Micro teaching/Pre-experiment
24 Sep. 2008 Wed.	n10	Micro teaching / Pre-experiemtn			G. Act	・Micro teaching and/or Pre-experiment
29 Sep. 2008 Mon.	n11	Cooperation &Communications Between Science Teachers			Lec. & G. Act	・ Discuss. How to Cooperate Between Science Teachers in the Same School & Different Schools in the Same Region.
06 Oct. 2008 Mon.	n12	Self -learning (Trainer's meeting at QRC)				Preparation of Micro teaching and/or Pre-experiment
08 Oct. 2008 Wed.	n13	Micro teaching / Pre-experiemtn			G. Act	・Micro teaching and/or Pre-experiment
13 Oct. 2008 Mon.	n14	Micro teaching / Pre-experiemtn			G. Act	・Micro teaching and/or Pre-experiment
15 Oct. 2008 Wed.	n15	Micro teaching / Pre-experiemtn			G. Act	・Micro teaching and/or Pre-experiment
		Follow up Training (Lesson Study Phase)				
20 Oct. 2008 Mon.		Self-learning				Preparation of Lesson Study

22 Oct. 2008 Wed.		Preparation			G. Act	・Micro teaching and/or Pre-experiment ・Preparation of Lesson Study
27 Oct. 2008 Mon.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3 Lessons at school))
29 Oct. 2008 Wed.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3 Lessons at school))
3 Nov. 2008 Mon.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3Lessons at school))
5 Nov. 2008 Wed.		Self-learning(Trainer's' meeting at QRC)				
10 Nov. 2008 Mon.		Preparation			G. Act	・Micro teaching and/or Pre-experiment ・Preparation of Lesson Study
12 Nov. 2008 Wed.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3 Lessons at school))
17 Nov. 2008 Mon.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3 Lessons at school))
19 Nov. 2008 Wed.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3 Lessons at school))
24 Nov. 2008 Mon.		Lesson Study at school			G. Act	・Lesson study (lesson demonstration and review meeting (2-3 Lessons at school))
26 Nov. 2008 Wed.		Completion (Closing)			Lct/ G.Act	・Evaluation of model lesson and lesson study ・Further SEED Plan and role of teachers ・Post questionnaire and examination
		Lesson Study Phase (Continue)				

添付資料 8 -1

The Proposed Expansion Training Plan for Science teachers
and Supervisors in Teaching Science Education (Blended
Learning Approach) 2009

Prepared by

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Expansion Plan Teaching Science Education adopting Blended Method (SEED)

Introduction:

In the light of the pedagogical developments, and the need for the ministry to enable the teachers in various areas of specialization to deal with the developed curriculum which considers the recent and new developments in the world.

In view of these technological changes in terms of the changing role of the teacher and the learner from the traditional role where the teacher was known as the source of information, and student as listener and recipient; for the role of the guide and facilitator for the student, and student's role of interacting and communicating information.

Curriculum was built on the educational outcomes and for the first time the (students, teachers, and supervisors) participated. Where the assessment strategies were in harmony (consistent) with the adopted teaching strategies.

In the light of the Educational developments, the Ministry launched the project of teaching science implementing the integrative method in cooperation with and JICA "project to be in consistent with the requirements of the developed curriculum since three years; where planning and preparation of science lessons for grades 4-10" took place . According to this curve by a team of supervisors and educators teachers, with technical assistance from the Japanese team under the supervision of a specialized committee from the ministry and the University of Al-ElBeit.

Rationale:

- Design the new developed Curriculum for the science topics.
- Employment of information technology as source for learning.
- New developed curricula and its content of assessment and educational strategies.

Objectives:

The plan aims that participants should acquire the following skills:

- Implement learning and assessment strategies that are approved in the Curriculum general framework adopting the integrated method in science.
- Prepare specialist educational lessons for each science topic adopting the integrated approach and utilize ICT and the new assessment strategies.
- Train supervisors and teachers on how to build science lessons for science topics adopting the blended learning approach.
- Train supervisors and teachers on how to implement the pre-prepared lessons in the classroom.
- Follow up the training effectiveness in the classroom.

Targeted Category:
Science teachers and supervisors;
Topics (chemistry, physics, biology, earth science)

Phases of the Project's Implementation:
1- Prepare training material with the supervision of the Technical Committee and the assistance of JICA.
2- Train science supervisors and teachers on how to built science lessons for science topics adopting the blended learning approach and implement it in the classroom.
3- Expansion process of implementing the project, this process will be completed in two ways:
First, horizontal expansion by increasing the number of participating teachers within one directorate and;
Second, vertical expansion where each directorate concluded the implementation of project in phase 1 & 2, to train another directorate on how to build lessons adopting the blended learning method and implement it in the classroom.
4- Prepare for initiating vocational learning communities in each directorate for learning.
5- All prepared material to be downloaded on the electronic server ; to enable all concerned directorates to access.
6- Formation of Specialist Technical Committees; to follow up and supervise the function and implementation of the stages on Ministry level and other directorates level.

Implementation Time Table

Activity	Date	Remarks
- Closing Ceremony workshop for concluding the first and second phase and the end of the Japanese experts' support for the project. Workshop includes power point presentation and distribution of certificates and training material.	18th Feb. 2009	
- Uploading produced material by teachers during the previous phases on the electronic servers at QRC and LRC at Ramtha & Mazar.	1st March 2009 to 10thAugust 2009	
- Awareness and definition for the new Participating directorates in the project.	5th April 2006	
- Address the directorates which will participate in the expansion.		
- Train the trainers on personal skills		
- Notify the new directorates about approved criteria regarding the selection participants.		
- Selection of teachers & supervisors participating.		
- Prepare Training Schedule starting as of the first week of August 2009.		
- Prepare field visit program for follow up purposes.		

1. Appoint observers from the core team.
2. Training Supervisors' visits to the training centers.
3. Training Committees' visits in the directorates to the training centers and reports on work process.
4. Officials' Technical reports about the training centers.
5. Special assessment forms for trainees (feedback).

Approximate Cost :

1- Preparation of training material :
   (training material) x 16 hrs x 10 jd   = 160 jd

2- Trainers :
   16 hrs x 2 trainer x 6 jd   x 3 training center   = 5760 jd

3- Managers :
   4 managers x 3 training center x 4 days x 4 jd   = 144 jd

4- Hospitality :
   20 section x 25 trainee x 3 training center x .500 jd = 750 jd

Questionnaire: Evaluation Survey A (Pre for TOT)

1 How old are you?

Under 25, 25-29, 30-39, 40-49, 50-59, 60 or older

2 are you female or male?

Female, Male

3 By the end of this school year, how many years will you have been teaching altogether? (number of years you have taught)

(Preparation to Teach)

4 What is the highest level of formal education you have completed?

5 How many years <pre-service training> did you have? Please round to the nearest whole number.

0 years   1 year   2 years   3 years   4 years   5 years   more than 5 years

6 During your <post-secondary education>, what was your major or main area(s) your study?

Yes, No

a) biology   physics   chemistry   earth science   education-science

b) mathematics   education-mathematics   education-general other

8 Do you have a teaching licence or certificate?

Yes, No

(Teaching Time in your previous school)

10

A In one typical calendar week from Monday to Sunday, what is the total number of single periods for which you were formally <scheduled/time-tabled/assigned>? Count a double period as two periods. Write in number of periods

B Of these formally <scheduled/time-tabled/assigned> periods, how many were you assigned to do each of the following? Write in number of periods

a) Teach <general> science

b) Teach physical science

c) Teach physics

d) Teach chemistry

e) Teach life science/biology

f) Teach earth science

g) Teach mathematics

h) Teach other subjects

i) Perform other duties

Total(Should match number in 10A)

11 Outside the formal school day, approximately how many hours per week did you normally spend on each of these activities? Do not include the time already accounted for in Question10. Please round to the nearest whole number. Write in number of hours per week

a) Grading student tests, exams, or other student work

b) Planning lessons

c) Administrative and record-keeping tasks including staff meetings

d) Other

(Professional Development)

12 How often do you have the following types of interactions with other teachers?

Never or almost never, 2 or 3 times per month, 1-3 times per week, Daily or almost daily

a) Discussion about how to teach a particular concept

b) Working on preparing instructional materials

c) Visits to another teacher's classroom to observe his/her teaching

d) Informal observations of my classroom by another teacher

13 In the past two years, have you participated in professional development in any of the following?

Yes, No

a) Science content

b) Science petagogy/instruction

c) Science curriculum

d) Integrating information technology into science

e) Improving students' critical thinking or inquiry skills

f) Science assessment

（Your Working Place）

15 Thinking about your previous school(or FD or LRC), indicate the extent to which you agree or disagree with each of the following statements.

Agree a lot, Agree, Disagree, Disagree a lot

a) This school (or FD or LRC) facility is in need of significant repair.

b) This school (or FD or LRC) is located in a safe neighbourhood.

c) I feel safe at school (or FD or LRC).

d) This school (or FD or LRC)'s security policies and practices are sufficient.

（Teaching Science）

21 In teaching science to the students, how often did you usually ask them to do the following?

Every or almost every lesson, About half the lessons, Some lessons, Never

a) Watch me demonstrate an experiment or investigation

b) Formulate hypotheses or predictions to be tested

c) Design or plan experiments or investigations

d) Conduct experiments or investigations

e) Work together in small groups on experiments or investigations

f) Write explanations about what was observed and why it happened

g) Put events or objects in order and give a reason for the organization

h) Study the impact of technology on society

i) Learn about the nature of science and inquiry

j) Relate what they are learning in science to their daily lives

k) Present their work to the class

22 In your view, to what extent do the following limit how you teach your previous class?

Not applicable, Not at all, A little, Some, A lot

a) Students with different academic abilities

b) Students who came from wide range of backgrounds (e.g., economic, language)

c) Students with special needs (e.g., hearing, vision, speech impairment, physical disabilities, mental or emotional/ psychological impairment)

d) Uninterested students

e) Low morale among students

f) Disruptive students

g) Inadequate physical facilities

h) High student/teacher ratio

(Resources and technology)

23 Is your previous school's capacity to provide instruction affected by a shortage or inadequacy of any of the following?

None, A little, Some, A lot

a) Instructional materials(e.g., textbook)

b) Budget for supplies(e. g., paper, pencils)

c) School buildings and grounds

d) Heating/cooling and lighting systems

e) Instructional space(e. g., classrooms)

f) Special equipment for handicapped students

g) Science laboratory equipment and materials

h) Computers for science instruction

i) Computer software for science instruction

j) Calculators for science instruction

k) Library materials relevant to science instruction)

l) Audio-visual resources for science instruction

m) Teachers

n) Computer support staff

（Computers）

25 A Did students whom you taught have computers available to use during their science lessons? Yes, No

B Do any of the computers in schools you worked have access to the Internet?

Yes, No

26 In teaching science, how often do you have students use a computer for the following activities?

Every or almost every lesson, About half the lessons, Some lessons, Never

a) Do scientific procedures or experiments

b) Study material phenomena through simulations

c) Practice skills and procedures

d) Look up ideas and information

e) Process and analyze data

（Assessment）

32 How often do you give a science test or examination to your class?

About once a week, About every two weeks, About once a month, A few times a year. Never

33 What item formats do you typically use in your science tests or examinations?
Only constructed-response, Mostly constructed-response, About half constructed-response and half objective (e.g., multiple-choice), Mostly objective, Only objective

34 how often do you include the following types of questions in your science tests or examinations?
a) Questions requiring understanding of concepts, relationships, and processes
b) Questions involving hypotheses and conclusions
c) Questions besed on recall of facts or procedures

Q20 Is your previous school involved in any of the following activities to promote engagement with science among students?
Yes, no
a) Science clubs
b) Science fairs
c) Science competitions
d) Extra curricular science projects (including reserach)
Excursions and field trips

Questionnaire: Evaluation Survey A (Post for TOT)

To what extent do you agree or disagree with each of the following statements about SEED training?　Please choose the appropriate number.

1 Strongly Disagree 2 Disagree 3 To some extent agree 4 Agree 5 Strongly Agree

1.　Level of Knowledge/Skills Acquired at Training

1 Compared with my expectations of training, level of knowledge/skills acquired at training is higher.

2 Compared with the level of knowledge/skills used in my work right before the training, level of knowledge/skills acquired at training is higher.

3 Compared with the level of expected knowledge/skills used in future (3 years later), level of knowledge/skills acquired at training is higher.

2.　General Satisfaction

I am satisfied with the content of the training.

3.　Participants

1 The experience sharing among participants offered you new ideas of teaching.

2 The participants exchanged their ideas in a lively manner.

3 The level of participants' knowledge was sufficient to participate in the training.

4.　Simulated Lesson Presentations/Micro Teaching Presentations

1 Simulated Lesson Presentations/Micro Teaching Presentations were easy to follow.

2 The time spent on Simulated Lesson Presentations/Micro Teaching Presentations was long enough.

3 Simulated Lesson Presentations/Micro Teaching Presentations were useful for experience sharing.

4 Simulated Lesson Presentations/Micro Teaching Presentations were helpful to understand current situations of respective trainees.

5 Discussion sessions after Simulated Lesson Presentations/Micro Teaching Presentations helped me to improve my lessons.

5.　Trainers

1 Selection of trainers was appropriate.

2 Trainers explained printed materials in understandable terms.

3 Trainers explained printed materials in sufficient detail.

4 Trainers' presentations were easy to follow.

5 Trainers' presentations were practical.

6 Trainers' presentations contained new ideas sufficiently.

7 The selection of topics of trainers' presentations was good enough.

8 The number of topics trainers' presentations was enough.

9 Trainers' presentations were presented in a logical order.

10 The time spent on trainers' presentations was long enough.

11 Trainers' presentations covered everything necessary in my work.

6. Workshop on February 13

1 The participants and others exchanged their ideas in a lively manner in Workshop.

2 The topics of discussion of Workshop were appropriate for the purpose of the SEED project.

3 The time spent on Workshop discussion was long enough.

Acquisition of new knowledge/skills

In comparison with my condition before participating in the training, after participating in the training,

1 My knowledge of constructivism in Science education improves.

2 My flow chart writing knowledge/skills improve.

3 My knowledge/skills of implementation of experiment has improved.

4 My ICT knowledge/skills has improved.

5 I have become more interested in acquiring the knowledge of constructivism in science education.

6 I have become more interested in acquiring the flow chart writing knowledge/skills.

7 I have become more interested in acquiring the knowledge/skills of implementation of experiment.

8 I have become more interested in acquiring ICT knowledge/skills.

9 I have become more interested in acquiring other new knowledge and skills.

10 I am able to express my own opinions more.

11 I am able to propose plans more.

12 I am able to critique and provide feedback to participants of SEED training regarding their lessons.

7. Transference of skills to others

In comparison with my condition before participating in the training, after participating

in the training,

1 I have become more interested in sharing the knowledge and skills with collegues/ subordinates in the organization to which I will belong.

2 I have become more motivated to undertake activities contributing to the development of science education.

8. Benefit to participants

In near future,

1 I expect to be assigned more important tasks.

2 I expect to be highly evaluated by colleagues and subordinates.

3 I expect to have more chances to be promoted.

4 I expect to be highly evaluated by superior.

5 I expect to become less likely to lose job.

6 How much of the contents of the SEED training have you mastered?

(Answer)　　%

Questionnaire: Evaluation Survey A (Pre for STT)

Please circle the appropriate choice or fill out your answer.

(Background Information)

Q1. How old are you?	Under 25
	25-29
	30-39
	40-49
	50-59
	60 or older

| Q2. Are you female or male? | Female |
| | Male |

Q3. By the end of this school year, how many years will you have been teaching altogether? (number of years you have taught)	Less than 10 years
	10 yrs to 20 yrs(20 yrs exclusive)
	20 yrs to 30 yrs(30 yrs exclusive)
	30 years or more

| Q4. Approximately how many students does your school have now? | students |

| Q5. Approximately how many teaching teachers (not administrative or IT technician teachers) does your school have now? | teachers |

(Preparation to Teach)

Q6. During your <post-secondary education>, what was your major or main area(s) your study?	biology
	physics
	chemistry
	earth science
	education-science
	mathematics
	education-mathematics
	education-general
	other

(Teaching Time in Your School)

Q7. In one typical calendar week from Monday to Sunday, what is the total number of single periods for which you were formally <scheduled/time-tabled/assigned>? Count a double period as two periods.	Less than 15 periods
	15-20 periods(20 periods exclusive)
	20-25 periods(25 periods exclusive)
	25-30 periods(30 periods exclusive)
	30 periods or more

Q8. Outside the formal school day, approximately how many hours per week did you normally spend on each of these activities? Do not include the time already accounted for in Q8. Please round to the nearest whole number. Circle the number of hours per week.	
a) Grading student tests, exams, or other student work	Less than 2 hours
	2-4 hours (4 hours exclusive)
	4-6 hours (6 hours exclusive)
	6-8 hours (8 hours exclusive)
	8 hours or more
b) Planning lessons	Less than 2 hours
	2-4 hours (4 hours exclusive)
	4-6 hours (6 hours exclusive)
	6-8 hours (8 hours exclusive)
	8 hours or more
c) Administrative and record-keeping tasks including staff meetings	Less than 2 hours
	2-4 hours (4 hours exclusive)
	4-6 hours (6 hours exclusive)
	6-8 hours (8 hours exclusive)
	8 hours or more
d) Other	Less than 2 hours
	2-4 hours (4 hours exclusive)
	4-6 hours (6 hours exclusive)
	6-8 hours (8 hours exclusive)
	8 hours or more

(Professional Development)

Q9 How often do you have the following types of interactions with other teachers?	
a) Discussion about how to teach a particular concept	Never or almost never
	2 or 3 times per month
	1-3 times per week
	Daily or almost daily
b) Working on preparing instructional materials	Never or almost never
	2 or 3 times per month
	1-3 times per week
	Daily or almost daily
c) Visits to another teacher's classroom to observe his/her teaching	Never or almost never
	2 or 3 times per month
	1-3 times per week
	Daily or almost daily
d) Informal observations of my classroom by another teacher	Never or almost never
	2 or 3 times per month
	1-3 times per week
	Daily or almost daily
e) Visits to other schools to observe other teachers' teaching	Never
	1 time in a semester
	2 or 3 times in a semester

	More

Q10. In the past two years, have you participated in professional development in any of the following?	
a) Science content	Yes
	No
b) Science pedagogy/instruction	Yes
	No
c) Science curriculum	Yes
	No
d) Integrating information technology into science	Yes
	No
e) Improving students' critical thinking or inquiry skills	Yes
	No
f) Science assessment	Yes
	No

(School based Professional Development)

Q11. Does your school have any continuous teacher professional development activity implemented by your school?	Yes
	No

(Teaching Science)

Q12. In teaching science to the students, how often did you usually ask them to do the following?	
a) Watch me demonstrate an experiment or investigation	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
b) Formulate hypotheses or predictions to be tested	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
c) Design or plan experiments or investigations	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
d) Conduct experiments or investigations	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
e) Work together in small groups on experiments or investigations	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
f) Write explanations about what was observed and why it happened	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
g) Put events or objects in order and give a reason for the organization	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
h) Study the impact of technology on society	Every or almost every lesson
	About half the lessons
	Some lessons
	Never

i) Learn about the nature of science and inquiry	Every or almost every lesson
	About half the lessons
	Some lessons

	Never
j) Relate what they are learning in science to their daily lives	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
k) Present their work to the class	Every or almost every lesson
	About half the lessons
	Some lessons
	Never

Q13. In your view, to what extent do the following limit how you teach your previous class?	
a) Students with different academic abilities	Not applicable
	Not at all
	A little
	Some
	A lot
b) Students who came from wide range of backgrounds (e.g., economic, language)	Not applicable
	Not at all
	A little
	Some
	A lot
c) Students with special needs (e.g., hearing, vision, speech impairment, physical disabilities, mental or emotional/psychological impairment)	Not applicable
	Not at all
	A little
	Some
	A lot

d) Uninterested students	Not applicable
	Not at all
	A little
	Some
	A lot
e) Low morale among students	Not applicable
	Not at all
	A little
	Some
	A lot
f) Disruptive students	Not applicable
	Not at all
	A little
	Some
	A lot
g) Inadequate physical facilities	Not applicable
	Not at all
	A little
	Some
	A lot
h) High student/teacher ratio	Not applicable
	Not at all
	A little
	Some
	A lot
i) Student's absence	Not applicable
	Not at all
	A little
	Some
	A lot

(Resources and technology)

Q14. Is your previous school's capacity to provide instruction affected by a shortage or inadequacy of the following?	
a) Instructional materials (e.g., textbooks)	None
	A little
	Some
	A lot
b) Budget for supplies (e.g., paper, pencils)	None
	A little
	Some
	A lot
c) School buildings and school grounds	None
	A little
	Some
	A lot
d) Heating/cooling and lighting systems	None
	A little
	Some
	A lot
e) Instructional space (e.g., classrooms)	None
	A little
	Some
	A lot
f) Special equipment for handicapped students	None
	A little
	Some

	A lot
	None
g) Science laboratory equipment and materials	A little
	Some
	A lot

	None
h) Computers for science instruction	A little
	Some
	A lot
i) Computer software for science instruction	None
	A little
	Some
	A lot
j) Calculators for science instruction	None
	A little
	Some
	A lot
k) Library materials relevant to science instruction	None
	A little
	Some
	A lot
l) Audio-visual resources for science instruction	None
	A little
	Some
	A lot
m) Teachers	None
	A little
	Some
	A lot
n) Computer support staff	None
	A little
	Some
	A lot

(Computers)

Q15. A. Did students whom you taught have computers available to use during their science lessons?	Yes
	No
Q15. B. Do any of the computers in schools you worked have access to the Internet?	Yes
	No
Q15. C. Approximately how many computers in your school are connected to the Internet?	Computers
Q15. D. Approximately how many computers for students does your school have?	Computers
Q15. E. Approximately how many computers for teachers' use are available at your school?	Computers
Q15. F. How many functioning data show does your school have?	data shows

Q16. In teaching science, how often do you have students use a computer for the following activities?	
a) Do scientific procedures or experiments	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
b) Study material phenomena through simulations	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
c) Practice skills and procedures	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
d) Look up ideas and information	Every or almost every lesson
	About half the lessons
	Some lessons
	Never
e) Process and analyze data	Every or almost every lesson
	About half the lessons
	Some lessons
	Never

Q17. Do you utilize ICT in classroom when teaching science?	Often
	Occasionally
	Once or Twice before
	Never

Q18. If you have ever utilized, please answer the following 3 questions.	
a) What kind of contents did you use?	PowerPoint
	Picture
	Short Movie
	Experiment simulation software
	Video of experiments
	Word/Excel
	Web page
	Drawing software
	others
b) What are the sources of those contents?	e-Contents from EduWave
	Contents you found on the internet
	Contents you get from other teachers
	Contents you developed by yourself
c) Do you think you are knowledgeable enough to teach other teachers how to use ICT in teaching?	Yes I have taught
	Yes but I have not taught
	Maybe
	No

Q19. In your opinion, to what extent does a lack or shortage of the followings is preventing teachers from using ICT in their classes?	
a) Availability of computers	None
	A little
	Some
	A lot
b) Quality of e-Contents on the EduWave	None
	A little
	Some
	A lot
c) Internet connection at school	None

	A little
	Some
	A lot
d) Availability of digital contents	None
	A little
	Some
	A lot
e) Teachers skill on how to use computer, data show, or software	None
	A little
	Some
	A lot
f) Teachers interest in or willingness of utilizing ICT	None
	A little
	Some
	A lot
g) Technical support	None
	A little
	Some
	A lot
h) Teacher skill and know-how on how to integrate ICT in teaching	None
	A little
	Some
	A lot

i) Students' interest in learning using ICT	None
	A little
	Some
	A lot

(Assessment)

Q20. How often do you give a science test or examination to your class?	About once a week
	About every two weeks
	About once a month
	A few times a year
	Never

Q21. What percentage of your students' grades for the course is based on student's test or exam scores?	0-20%(20% exclusive)
	20-40%(40% exclusive)
	40-60%(60% exclusive)
	60-80%(80% exclusive)
	80-100%

Q22. What item formats do you typically use in your science tests or examinations?	Only constructed-response
	Mostly constructed-response
	About half constructed-response and half objective (e.g., multiple-choice)
	Most objective
	Only objective

Q23. How often do you include the following types of questions in your science tests or examinations?	
a) Questions requiring understanding of concepts, relationships, and processes	Never or almost never
	Sometimes
	Always or almost always
b) Questions involving hypotheses and conclusions	Never or almost never
	Sometimes
	Always or almost always
c) Questions based on recall of facts or procedures	Never or almost never
	Sometimes
	Always or almost always

(Teachers' self evaluation for their classes)
Q24. To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.
1 Strongly disagree, 2 Disagree, 3 To some extent agree, 4 Agree, 5 Strongly agree

No.	Script	5	4	3	2	1
1	Students understand my lessons well.					
2	Students show confidence in science.					
3	I understand science well.					
4	I understand the national science curriculum well.					
5	I have good teaching techniques.					
6	I use teaching techniques efficiently.					
7	I emphasize build-ups of students' knowledge.					
8	I motivate students to study science.					
9	Students participate in my class well.					
10	I enjoy trying different teaching approaches in my lesson.					
11	I have confidence in teaching science.					
12	Students enjoy my lesson.					
13	I enjoy teaching in science.					
14	Students like to ask many questions about my lesson to me in my class.					
15	Students like to ask many questions about my lesson to other students in my class.					
16	Students do a variety of class exercises and homework besides the class exercises and the homework in the textbooks.					
17	Students have a variety of group activities in my class.					

18	Students are encouraged to ask questions about my lesson to me in my class.					
19	Students are encouraged to ask questions about my lesson to other students in my class.					
20	I emphasize students' problem-solving in my lesson.					
21	I solve students' problems in my lesson.					
22	I help students to find problems in my lesson.					
23	I help students to solve problems in my lesson.					
24	I understand students' advantages in science.					
25	I encourage the weak students as well as the talented students in my lesson.					
26	I collect information about students.					
27	I understand academic ability of students.					
28	I cooperate with students' parents for academic achievements of students.					
29	I find students who do not set textbooks and notebooks on desks when my lesson starts.					
30	Teaching and learning materials which I made help students learn better.					
31	Students are encouraged to interact with each other in my class.					
32	I enjoy preparing teaching and learning materials.					
33	I give lots of different teaching and learning					

	materials in my class to use.					
34	I always make a lesson plan before conducting my lesson.					

35	I set objectives to my lesson plan.					
36	I achieve objectives of my lesson plan in my lesson.					
37	I have a chance to share any knowledge or information with teachers from other schools.					
38	I have a chance to share any knowledge or information with teachers in my school.					
39	I observe teachers' lessons in my school.					
40	I observe teachers' lessons in other schools.					
41	I discuss teaching methods/techniques and other issues with teachers of my school.					
42	I discuss teaching methods/techniques and other issues with teachers of other schools.					
43	I discuss classroom management with my head teacher.					
44	I discuss classroom management with teachers (except my head teacher) of my school.					
45	I discuss classroom management with teachers of other schools.					
46	I use academic resources outside of my school to prepare my lesson.					
47	I use academic resources inside of my school to prepare my lesson.					
48	I use ICT in my lesson.					
49	Students use ICT in my lesson.					
50	I show experiments to students in my lesson.					
51	Students conduct experiments in my lesson.					

<u>Questionnaire: Evaluation Survey A including D (Post for STT)</u>

To what extent do you agree or disagree with each of the following statements about SEED training? Please choose the appropriate number.

1 Strongly Disagree 2 Disagree 3 To some extent agree 4 Agree 5 Strongly Agree

1. Level of Knowledge/Skills Acquired at Training

1 Compared with my expectations of training, level of knowledge/skills acquired at training is higher.

2 Compared with the level of knowledge/skills used in my work right before the training, level of knowledge/skills acquired at training is higher.

3 Compared with the level of expected knowledge/skills used in future (3 years later), level of knowledge/skills acquired at training is higher.

2. General Satisfaction

I am satisfied with the content of the training.

3. Participants

1 The experience sharing among participants offered you new ideas of teaching.

2 The participants exchanged their ideas in a lively manner.

3 The level of participants' knowledge was sufficient to participate in the training.

4. Time Spent on Training

1 The time spent on Concept Map was long enough.

2 The time spent on Flow Chart was long enough.

3 The time spent on Lesson plan was long enough.

4 The time spent on Simulated Lesson Presentations/Micro Teaching Presentations was long enough.

5 The time spent on Lesson Study was long enough.

6 The time spent on Evaluation/Assessment was long enough.

5. Trainers

1 Selection of trainers was appropriate.

2 Trainers' presentations were easy to follow.

3 Trainers' presentations were practical.

4 Trainers' presentations contained new ideas sufficiently.

5 Trainers' presentations covered everything necessary in my work.

Acquisition of New Knowledge/Skills

In comparison with my condition before participating in the training, after participating
in the training,

1 My knowledge of constructivism in Science education improves.

2 My knowledge/skills of drawing Lesson Plan improve.

3 My knowledge/skills of implementation of Lesson Study improve.

4 My knowledge/skills of implementation of experiment improve.

5 My ICT knowledge/skills improve.

6 I have become more interested in acquiring the knowledge of constructivism in
science education.

7 I have become more interested in acquiring the knowledge/skills of drawing Lesson
Plan.

8 I have become more interested in acquiring the knowledge/skills of implementation of
Lesson Study.

9 I have become more interested in acquiring the knowledge/skills of implementation of
experiment.

10 I have become more interested in acquiring ICT knowledge/skills.

11 I have become more interested in acquiring other new knowledge and skills.

12 I am able to express my own opinions more.

13 I am able to critique and provide feedback to participants of SEED training regarding
their lessons.

6. Transference of Skills to Others

In comparison with my condition before participating in the training, after participating
in the training,

1 I have become more interested in sharing the knowledge and skills with collegues/
subordinates in the organization to which I will belong.

2 I have become more motivated to undertake activities contributing to the development
of science education utilizing experiments/ICT in Jordan.

7. Benefit to Participants

In near future,

1 I expect to be assigned more important tasks.

2 I expect to be highly evaluated by colleagues and subordinates.

3 I expect to have more chances to be promoted.

4 I expect to be highly evaluated by superior.

5 I expect to become less likely to lose job.

6 How much of the contents of the SEED training have you mastered?

(Answer)　　%

(Teachers' self evaluation for their classes)
To what extent do you agree or disagree with each of the following statements about your lessons and your classes before participating SEED training?　Please select the appropriate number.
1 Strongly disagree, 2 Disagree, 3 To some extent agree, 4 Agree, 5 Strongly agree

No.	Script	5	4	3	2	1
1	Students understand my lessons well.					
2	Students show confidence in science lessons.					
3	I have enough academic knowledge of science well.					
4	I understand teaching subject and curriculum well.					
5	I have good teaching techniques.					
6	I use teaching techniques efficiently.					
7	I emphasize build-ups of students' knowledge.					
8	I motivate students to study science.					
9	Students participate in my class well.					
10	I enjoy trying different teaching approaches in my lesson.					
11	I have confidence in teaching science.					
12	Students enjoy my lesson.					
13	I enjoy teaching in science.					
14	Students like to ask many questions about my lesson to me in my class.					
15	Students like to ask many questions about my lesson to other students in my class.					
16	Students do a variety of class exercises and homework besides the class exercises and the homework in the textbooks.					
17	Students have a variety of group activities in my class.					

18	Students are encouraged to ask questions about my lesson to me in my class.					
19	Students are encouraged to ask questions about my lesson to other students in my class.					
20	I emphasize students' problem-solving method in my lesson.					
21	I solve students' problems in my lesson.					
22	I help students to find problems in my lesson.					
23	I help students to solve problems in my					

	lesson.					
24	I understand students' advantages in science.					
25	I encourage the weak students as well as the talented students in my lesson.					
26	I collect information about students.					
27	I know academic abilities of students.					
28	I cooperate with students' parents for academic achievements of students.					
29	I find students who do not set textbooks and notebooks on desks when my lesson starts.					
30	Teaching and learning materials which I made help students learn better.					
31	Students are encouraged to interact with each other in my class.					
32	I enjoy preparing teaching and learning materials.					
33	I give lots of different teaching and learning materials in my class to use.					
34	I always make a lesson plan before conducting my lesson.					

35	I set objectives to my lesson plan.					
36	I achieve objectives of my lesson plan in my period.					
37	I have a chance to share any knowledge or information with teachers from other schools.					
38	I have a chance to share any knowledge or information with teachers in my school.					
39	I observe teachers' lessons in my school.					
40	I observe teachers' lessons in other schools.					
41	I discuss teaching methods/techniques and other issues with teachers of my school.					
42	I discuss teaching methods/techniques and other issues with teachers of other schools.					
43	I discuss classroom management with my head teacher.					
44	I discuss classroom management with teachers (except my head teacher) of my school.					
45	I discuss classroom management with teachers of other schools.					
46	I use academic resources outside of my school to prepare my lesson.					
47	I use academic resources inside of my school to prepare my lesson.					
48	I use ICT in my lesson.					
49	Students use ICT in my lesson.					
50	I show experiments to students in my science period.					
51	Students conduct experiments in my science period.					

Questionnaire: Evaluation Survey B (Pre for TOT)

To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.

1 Strongly Disagree 2 Disagree 3 To some extent agree 4 Agree 5 Strongly Agree

1 Teachers should use lecturing approaches in the teaching-learning process.

2 Students should engage in teaching-learning activities of subject matters(e.g., discussion, role-playing, group problem solving in the classroom).

3 In the teaching-learning process, teacher should use instructional media (e.g., pictures, photos)

4 In the teaching-learning process, teacher should use equipments for an experiment or a survey.

5 Computers should be used in the teaching-learning process.

6 Textbooks should be used in the teaching-learning process.

7 Library books should be used in the teaching-learning process.

8 Laboratories should be used in the teaching-learning process.

9 Each teacher should prepare detailed lesson plan that include objectives and intended learning outcomes.

10 Individual teachers should develop lessons, tests, handouts, and instructional materials as part of their lesson planning.

11 Evaluations of essays, written reports, and student daily journals should be used in assessing student's progress.

12 Teachers should evaluate oral presentations by students to assess student achievement.

13 Teachers should provide feedback to individual students to assess student achievement.

14 Students should demonstrate skills and knowledge through science experiments and problem solving.

15 Teachers should use checklists for measuring attitude and behaviour, such as student leadership.

Questionnaire: Evaluation Survey B (Post for TOT)

To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.

1 Strongly Disagree 2 Disagree 3 To some extent agree 4 Agree 5 Strongly Agree

1 Teachers should use lecturing approaches in the teaching-learning process.

2 Students should engage in teaching-learning activities of subject matters(e.g., discussion, role-playing, group problem solving in the classroom).

3 In the teaching-learning process, teacher should use instructional media (e.g., pictures, photos)

4 In the teaching-learning process, teacher should use equipments for an experiment or a survey.

5 Computers should be used in the teaching-learning process.

6 Textbooks should be used in the teaching-learning process.

7 Library books should be used in the teaching-learning process.

8 Laboratories should be used in the teaching-learning process.

9 Each teacher should prepare detailed lesson plan that include objectives and intended learning outcomes.

10 Individual teachers should develop lessons, tests, handouts, and instructional materials as part of their lesson planning.

11 Evaluations of essays, written reports, and student daily journals should be used in assessing student's progress.

12 Teachers should evaluate oral presentations by students to assess student achievement.

13 Teachers should provide feedback to individual students to assess student achievement.

14 Students should demonstrate skills and knowledge through science experiments and problem solving.

15 Teachers should use checklists for measuring attitude and behaviour, such as student leadership.

16 In comparison with my idea before starting SEED training, I think more that students should engage in teaching-learning activities of subject matters (e.g., discussion, role-playing, group problem solving in the classroom).

17 In comparison with my idea before starting SEED training, I think more that computers should be used in the teaching-learning process.

18 In comparison with my idea before starting SEED training, I think more that each teacher should prepare detailed lesson plan that include objectives and intended learning

outcomes.

19 In comparison with my idea before starting SEED training, I think more that students should demonstrate skills and knowledge through science experiments and problem solving.

20 In comparison with my idea before starting SEED training, I think more that teachers should use checklists for measuring attitude and behaviour, such as student leadership.

Questionnaire: Evaluation Survey B (Pre for STT)

To what extent do you agree or disagree with each of the following statements when you plan and conduct lessons in school?　　Please select the appropriate number.

1 Acceptably agree, 2 Moderately agree, 3 Agree, 4 Agree very well, 5 Perfectly agree

1 Teachers should use lecturing approaches in the teaching-learning process.

2 Science lessons should be quiet.

3 First and foremost, teachers should establish students' scientific knowledge.

4 Teachers should bring rote learning in their lessons.

5 In science class, teachers should ask students to give reasons for student's answers.

6 In science class, students should talk with classmates about how to solve problems.

7 In science class, students should learn from classmates more than from teachers.

8 In science class, teachers should ask questions that have more than one answer.

9 In the teaching-learning process, teacher should use illustrations.

10 In the teaching-learning process, teacher should use photos.

11 In the teaching-learning process, teacher should use Audio-visual resourses (e.g.short movies).

12 In the teaching-learning process, teacher should use equipments for an experiment or an observation.

13 Students should watch the teacher do experiments in science.

14 In the teaching-learning process, students should use equipments for an experiment or an observation.

15 Students should do experiments in science.

16 Computers should be used in the teaching-learning process.

17 "Data Shows" should be used in the teaching-learning process.

18 Internet should be used in the teaching –learning process.

19 Experiment simulations should be used in the teaching-learning process.

20 Textbooks should be used in the teaching-learning process.

21 Experiments in textbooks should be done in the teaching-learning process.

22 Exercises in textbooks should be done in the teaching-learning process.

23 Books (excluding library books) should be used to collect scientific information in the teaching-learning process.

24 Laboratories in schools should be used in the teaching-learning process.

25 Laboratories in LRCs should be used in the teaching-learning process.

26 Experiments should be done in classrooms.

27 Each teacher should prepare detailed lesson plan.

28 Lesson plans should include objectives and intended learning outcomes.

29 Teachers should implement their lessons in keeping with their lesson plans.

30 Individual teachers should develop tests as part of their lesson planning.

31 Individual teachers should develop handouts as part of their lesson planning.

32 Individual teachers should develop instructional materials as part of their lesson planning.

33 Evaluation of the result of quizes should be used in assessing student's progress.

34 Evaluations of essays should be used in assessing student's progress.

35 Evaluations of written reports should be used in assessing student's progress.

36 Evaluations of student daily memos in their notebooks should be used in assessing student's progress.

37 Evaluations of oral presentations by students should be used in assessing student's progress.

38 Students should demonstrate skills through science experiments and problem solving.

39 Students should demonstrate knowledge through science experiments and problem solving.

40 Students should demonstrate attitudes through science experiments and problem solving.

41 Teachers should use checklists for measuring attitude and behaviour, such as student leadership.

42 Teachers should use rubricks for measuring attitude and behaviour, such as student leadership.

43 Teacher should provide feedback to individual students to assess student achievement.

Questionnaire: Evaluation Survey B (Post for STT)

To what extent do you agree or disagree with each of the following statements when you plan and conduct lessons in school?   Please select the appropriate number.

1 Acceptably agree, 2 Moderately agree, 3 Agree, 4 Agree very well, 5 Perfectly agree

1 Teachers should use lecturing approaches in the teaching process.

2 Science lessons should be silent.

3 First and foremost, teachers should establish students' scientific knowledge.

4 Teachers should bring rote learning in their lessons.

5 In science class, teachers should ask students to give reasons for student's answers.

6 In science class, students should talk with classmates about how to solve problems.

7 In science class, students should learn from classmates more than from teachers.

8 In science class, teachers should ask questions that have more than one answer (open questions).

9 In the teaching-learning process, teacher should use illustrations.

10 In the teaching-learning process, teacher should use photos.

11 In the teaching-learning process, teacher should use Audio-visual resourses (e.g.short movies).

12 In the teaching-learning process, teacher should use equipments for an experiment or an observation.

13 Students should watch scientific experiments conducted by their teacher.

14 In the teaching-learning process, students should use equipments for an experiment or an observation.

15 Students should do scientific experiments.

16 Computers should be used in the teaching-learning process.

17 "Data Shows" should be used in the teaching-learning process.

18 Internet should be used in the teaching-learning process.

19 Experimental simulations should be used in the teaching-learning process.

20 Textbooks should be used in the teaching-learning process.

21 Experiments in textbooks should be done in the teaching-learning process.

22 Exercises in textbooks should be done in the teaching-learning process.

23 Books (excluding library books) should be used to collect scientific information in the teaching-learning process.

24 Laboratories in schools should be used in the teaching-learning process.

25 Laboratories in LRCs should be used in the teaching-learning process.

26 Experiments should be done in classrooms.   very low XXXXXXX

27 Each teacher should prepare detailed lesson plan.

28 Lesson plans should include objectives and intended learning outcomes.

29 Teachers should implement their lessons in keeping with their lesson plans.

30 Individual teachers should develop tests as part of their lesson planning.

31 Individual teachers should develop handouts as part of their lesson planning.

32 Individual teachers should develop instructional materials (e.g. softwares, experimental tools, etc.) as part of their lesson planning.

33 Evaluation of the result of exams (e.g. end-of term exam) should be used in assessing student's progress.

34 Evaluation of the result of quizes should be used in assessing student's progress.

35 Evaluations of essays should be used in assessing student's progress.

36 Evaluations of written reports should be used in assessing student's progress.

37 Evaluations of the contents of students' notebooks should be used in assessing student's progress.

38 Evaluations of oral presentations by students should be used in assessing student's progress.

39 Students should demonstrate skills through science experiments and problem solving.

40 Students should demonstrate knowledge through science experiments and problem solving.

41 Students should demonstrate attitudes through science experiments and problem solving.

42 Teachers should use checklists for measuring attitude and behaviour, such as student leadership.

43 Teachers should use rubricks for measuring attitude and behaviour, such as student leadership.

44 Teachers should provide feedback to individual students to assess student achievement.

Questionnaire: Evaluation Survey C (Pre for TOT)

To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.

Acceptably agree	Moderately agree	Agree	Agree very well	Perfectly agree
1	2	3	4	5

1 I make a preparation of science lessons.	1	2	3	4	5
2 I review science lessons.	1	2	3	4	5
3 I ask question in science lessons.	1	2	3	4	5
4 I participate in experimental activities in science lessons.	1	2	3	4	5
5 I take notes of important points on science lessons.	1	2	3	4	5
6 I listen to teachers' explanation in science lessons.	1	2	3	4	5
7 I listen to friends' opinions in science lessons.	1	2	3	4	5
8 I have interest in learning science lessons.	1	2	3	4	5
9 I understand this science lesson better in comparison with other science lessons.	1	2	3	4	5
10 I like this science lesson more in comparison with other science lessons.	1	2	3	4	5
11 I am interested more in this science lesson in comparison with other science lessons.	1	2	3	4	5
12 This science lesson is a new type.	1	2	3	4	5
13 I engage in group discussion, role playing, and problem solving in this science lesson.	1	2	3	4	5
14 I actively participate in experimental activities in this science lesson.	1	2	3	4	5
15 The teacher explains the purpose of lesson at the beginning of this science lesson.	1	2	3	4	5
16 The teacher starts this science lesson after reviewing of last lesson.	1	2	3	4	5
17 The teacher uses words and signs in this science lesson, which we have not learned yet.	1	2	3	4	5
18 The teacher's hands writing on blackboard is clear in this science lesson.	1	2	3	4	5
19 The teacher gives explanation by drawing pictures or using graph and chart in this science lesson.	1	2	3	4	5
20 The teacher gives general examples (daily things) for us to understand in this science lesson.	1	2	3	4	5

21 The teacher demands student opinion (don't speak by one way) in this science lesson.	1	2	3	4	5
22 The teacher lets us tell our opinion fairly in this science lesson.	1	2	3	4	5
23 The teacher listens properly my ideas in this science lesson.	1	2	3	4	5
24 The teacher responds to students' questions in this science lesson.	1	2	3	4	5
25 The teacher checks the comprehension of student at each step in this science lesson.	1	2	3	4	5
26 The teacher gives us explanation of experiment when it is over in this science lesson.	1	2	3	4	5
27 The teacher gives us time to consider and to take notes in this science lesson.	1	2	3	4	5
28 The teacher keeps schedules of times in this science lesson.	1	2	3	4	5
29 Every student has each equipment in this science lesson.	1	2	3	4	5
30 The Work Sheet which teacher gives me helps me to understand this science lesson.	1	2	3	4	5
31 The teacher gives us enough time to do tasks in the worksheet in this science lesson.	1	2	3	4	5
32 The textbook is used in this science lesson.	1	2	3	4	5
33 Computer is used in this science lesson.	1	2	3	4	5
34 The teacher demands our demonstrations on blackboards in this science lesson.	1	2	3	4	5
35 The teacher demands our demonstrations on PC in this science lesson.	1	2	3	4	5

Questionnaire: Evaluation Survey C (Post for TOT)

To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.

Acceptably agree	Moderately agree	Agree	Agree very well	Perfectly agree
1	2	3	4	5

	1	2	3	4	5
1 I make a preparation of science lessons.	1	2	3	4	5
2 I review science lessons.	1	2	3	4	5
3 I ask questions in science lessons.	1	2	3	4	5
4 I participate in experimental activities in science lessons.	1	2	3	4	5
5 I enjoy experimental activities in science lessons.	1	2	3	4	5
6 I want to find something new about what I have already studied in science lessons.	1	2	3	4	5
7 I take notes of important points on science lessons.	1	2	3	4	5
8 I listen to teachers' explanation in science lessons.	1	2	3	4	5
9 I listen to friends' opinions in science lessons.	1	2	3	4	5
10 I have interest in learning science lessons.	1	2	3	4	5
11 I like reading about broad science.	1	2	3	4	5
12 I would like to work on broad science projects as an adult.	1	2	3	4	5
13 I understand this science lesson better in comparison with other science lessons.	1	2	3	4	5
14 I like this science lesson more in comparison with other science lessons.	1	2	3	4	5
15 I am interested in this science lesson more in comparison with other science lessons.	1	2	3	4	5
16 I understand this science lesson better in comparison with Hanan's lesson in February.	1	2	3	4	5
17 I like this science lesson more in comparison with Hanan's lesson in February.	1	2	3	4	5
18 I am interested in this science lesson more in comparison with Hanan's lesson in February.	1	2	3	4	5
19 This science lesson is a new type.	1	2	3	4	5
20 The teacher explains the purpose of lesson at the beginning of this science lesson.	1	2	3	4	5
21 The teacher lets us tell our opinion fairly in this science lesson.	1	2	3	4	5

22 The teacher responds to students' questions in this science lesson.	1	2	3	4	5
23 The teacher checks the comprehension of student at each step in this science lesson.	1	2	3	4	5
24 We watch the teacher demonstrate an experiment or investigation in this science lesson.	1	2	3	4	5
25 I watch experimental activities on PC in this science lesson.	1	2	3	4	5
26 I formulate hypotheses or predictions to be tested in this science lesson.	1	2	3	4	5
27 The teacher gives us time to consider and to take notes in this science lesson.	1	2	3	4	5
28 I engage in group discussion, role playing, and problem solving in this science lesson.	1	2	3	4	5
29 Students are asked to do an investigation to test out their own ideas in this science lesson.	1	2	3	4	5
30 Every student has each equipment in this science lesson.	1	2	3	4	5
31 I participate in experimental activities in this science lesson.	1	2	3	4	5
32 The worksheet which teacher gives me helps me to understand this science lesson.	1	2	3	4	5
33 The teacher gives us enough time to do tasks in the worksheet in this science lesson.	1	2	3	4	5
34 I write explanations about what was observed and why it happened in this science lesson.	1	2	3	4	5
35 Computer is used in this science lesson.	1	2	3	4	5
36 I search the internet or the saved data in PC for information in this science lesson.	1	2	3	4	5
37 The teacher demands our demonstrations on PC in this science lesson.	1	2	3	4	5
38 I present my work to the class in this science lesson.	1	2	3	4	5
39 The teacher gives us explanation of experiment when it is over in this science lesson.	1	2	3	4	5
40 The teacher keeps schedules of times in this science lesson.	1	2	3	4	5

Questionnaire: Evaluation Survey C (Pre for STT)

To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.

Acceptably agree	Moderately agree	Agree	Agree very well	Perfectly agree
1	2	3	4	5

1 I make a preparation of science lessons.	1	2	3	4	5
2 I review science lessons.	1	2	3	4	5
3 I ask questions to my teacher in science lessons.	1	2	3	4	5
4 I ask questions to our classmates in science lessons.	1	2	3	4	5
5 I participate in experimental activities in science lessons.	1	2	3	4	5
6 I enjoy experimental activities in science lessons.	1	2	3	4	5
7 I want to find something interesting related to what I have already studied in science lessons.	1	2	3	4	5
8 I take notes of important points on science lessons.	1	2	3	4	5
9 I have interest in learning science lessons.	1	2	3	4	5
10 I like reading about broad science.	1	2	3	4	5
11 I would like to work on broad science projects as an adult.	1	2	3	4	5
12 I understand this science lesson better in comparison with other science lessons.	1	2	3	4	5
13 I like this science lesson more in comparison with other science lessons.	1	2	3	4	5
14 I am interested in this science lesson more in comparison with other science lessons.	1	2	3	4	5
15 This science lesson is a new type.	1	2	3	4	5
16 The teacher explains the objective of lesson at the beginning of this science lesson.	1	2	3	4	5
17 The teacher lets us tell our opinion fairly in this science lesson.	1	2	3	4	5
18 We watch the teacher demonstrate an experiment or investigation in this science lesson.	1	2	3	4	5
19 I watch experimental activities on PC in this science lesson.	1	2	3	4	5
20 The teacher use PC in this science lesson.	1	2	3	4	5

21 Some phenomena are demonstrated for us to consider why they occur in this science lesson.	1	2	3	4	5
22 The teacher makes us groups to do brainstorming in this science lesson.	1	2	3	4	5
23 I formulate hypotheses or predictions to be tested in this science lesson.	1	2	3	4	5
24 The teacher gives us time to consider in this science lesson.	1	2	3	4	5
25 I engage in group discussion in this science lesson.	1	2	3	4	5
26 Students are asked to do an investigation to test out their own ideas in this science lesson.	1	2	3	4	5
27 Every group of students has equipment in this science lesson.	1	2	3	4	5
28 Experimental equipments and materials are casual (not special in a laboratory).	1	2	3	4	5
29 I participate in experimental activities in this science lesson.	1	2	3	4	5
30 I use a worksheet in this science lesson.	1	2	3	4	5
31 The teacher gives us enough time to do tasks in the worksheet in this science lesson.	1	2	3	4	5
32 I write explanations about what was observed and why it happened in this science lesson.	1	2	3	4	5
33 I use PC in this science lesson.	1	2	3	4	5
34 I search the internet or the saved data in PC for information in this science lesson.	1	2	3	4	5
35 The teacher demands our demonstrations on PC in this science lesson.	1	2	3	4	5
36 I present my work to the class in this science lesson.	1	2	3	4	5
37 There is a class debate or discussion in this science lesson	1	2	3	4	5
38 The teacher gives us explanation of experiment when it is over in this science lesson.	1	2	3	4	5
39 The teacher makes this science lesson finish within 45 minutes.	1	2	3	4	5

Questionnaire: Evaluation Survey C (Post for STT)

To what extent do you agree or disagree with each of the following statements? Please select the appropriate number.

Acceptably agree	Moderately agree	Agree	Agree very well	Perfectly agree
1	2	3	4	5

Statement	1	2	3	4	5
1 I make a preparation of science lessons.	1	2	3	4	5
2 I review science lessons.	1	2	3	4	5
3 I ask questions to my teacher in science lessons.	1	2	3	4	5
4 I ask questions to our classmates in science lessons.	1	2	3	4	5
5 I participate in experimental activities in science lessons.	1	2	3	4	5
6 I enjoy experimental activities in science lessons.	1	2	3	4	5
7 I want to find something interesting related to what I have already studied in science lessons.	1	2	3	4	5
8 I take notes of important points on science lessons.	1	2	3	4	5
9 I have interest in learning science lessons.	1	2	3	4	5
10 I like reading about broad science.	1	2	3	4	5
11 I would like to work on broad science projects as an adult.	1	2	3	4	5
12 I understand this science lesson better in comparison with other science lessons.	1	2	3	4	5
13 I like this science lesson more in comparison with other science lessons.	1	2	3	4	5
14 I am interested in this science lesson more in comparison with other science lessons.	1	2	3	4	5
15 I understand this science lesson better in comparison with this teacher's lesson in September.	1	2	3	4	5
16 I like this science lesson more in comparison with this teacher's lesson in September.	1	2	3	4	5
17 I am interested in this science lesson more in comparison with this teacher's lesson in September.	1	2	3	4	5
18 This science lesson is a new type.	1	2	3	4	5
19 The teacher explains the objective of lesson at the beginning of this science lesson.	1 post very low	2	3	4	5
20 The teacher lets us tell our opinion fairly in this science lesson.	1 post very low	2	3	4	5

21 We watch the teacher demonstrate an experiment or investigation in this science lesson.	1	2	3	4	5
22 I watch experimental activities on PC in this science lesson.	1	2	3	4	5
23 The teacher use PC in this science lesson.	1	2	3	4	5
24 Some phenomena are demonstrated for us to consider why they occur in this science lesson.	1	2	3	4	5
25 The teacher makes us groups to do brainstorming in this science lesson.	1	2	3	4	5
26 I formulate hypotheses or predictions to be tested in this science lesson.	1	2	3	4	5
27 The teacher gives us time to consider in this science lesson.	1	2	3	4	5
28 I engage in group discussion in this science lesson.	1	2	3	4	5
29 Students are asked to do an investigation to test out their own ideas in this science lesson.	1	2	3	4	5
30 Every group of students has equipment in this science lesson.	1	2	3	4	5
31 Experimental equipments and materials are casual (not special in a laboratory).	1	2	3	4	5
32 I participate in experimental activities in this science lesson.	1	2	3	4	5
33 I use a worksheet in this science lesson.	1 very low	2	3	4	5
34 The teacher gives us enough time to do tasks in the worksheet in this science lesson.	1 very low	2	3	4	5
35 I write explanations about what was observed and why it happened in this science lesson.	1 very low	2	3	4	5
36 I use PC in this science lesson.	1	2	3	4	5
37 I search the internet or the saved data in PC for information in this science lesson.	1	2	3	4	5
38 The teacher demands our demonstrations on PC in this science lesson.	1	2	3	4	5
39 I present my work to the class in this science lesson.	1	2	3	4	5
40 There is a class debate or discussion in this science lesson	1	2	3	4	5
41 The teacher gives us explanation of experiment when it is over in this science lesson.	1	2	3	4	5
42 The teacher makes this science lesson finish within 45 minutes.	1	2	3	4	5

Questionnaire: Evaluation Survey D (Post for TOT)

Questions on the training itself. Please check the box or write your answer to the questions below.

1. Overall, were you satisfied with the contents of the training?

    Disappointed (   ), Not so satisfied (   ), it was good (   ), Satisfied (   ), Very Satisfied (   )

2. Did the training offer you new ideas or new ways of thinking about teaching?

    None (   ),   A Little (   ),   Some (   ),   Many (   ),   Great Many (   )

3. How did you think about the training skills of the trainers?

    Poor (   ), Not so good (   ), OK (   ), Good (   ), Very Good (   )

4. Do you think you can put into the practice the ideas you learned in the training?

    Not at all (   ), Yes but only a few (   ), Yes some of them (   ), Yes most of them (   ), Yes all of them (   )

5. Which topics of the training were most interesting or useful for you? (list 2)

    _____

    _____

6. Which topic of the training was least interesting or useful for you? (list 1)

    _____

7. Was the time allocation (schedule) for each topic in the training appropriate?

    Very inappropriate (   ), sometimes inappropriate (   ), it was ok (   ), appropriate for the majority of part (   ), very appropriate (   )

8. During the latter half part of the training (model lesson, experiment), do you think developing lesson plan development and conducting model lessons at school helped you to deepen the understanding?

    Not much (   ),   A little (   ), Some degree (   ), A Lot (   ), Very much (   )

9. Among the topics and activities of the training, on which topics or activities do you

think you wanted to have more time for training (list 2)?

_____ , _____

10. Please give us your suggestion for future improvements on anything regarding the training.

_____

_____

11. How do you think about training materials (Textbook and PowerPoint)
Poor ( ), Not so good ( ), OK ( ), Good ( ), Very Good ( )
Please give us your suggestion for future improvements of Training Materials.

_____

_____

12. What do you thing about diffidence between ordinary training and SEED LRC Training.?

_____

_____

13. What kind of training do you want to take?

_____

_____

Endline survey A
Simple Questionnaire for SEED Project (for Schoolmaster or Supervisor)

Questions on the training itself. Please check the box or write your answer to the questions below.

Ferld Directorate_____School/ Position _____

Name_____

1. How do you think of SEED science Training for teachers?

    Poor (   ), Not good nor Useful (   ), Good and useful (   ), Very good and useful (   ) , I don't have enough information to answer. (   )

2. How do you think capability of science teacher who join the SEED Training is improved?

    None (   ),   A Little (   ),   Some (   ),   Many (   ),   Great Many (   ) , I don't have enough information to answer. (   )

3. Do you want other your theaters to join further SEED project training?

    None (   ), if MOE asks (   ), willing (   ), very willing (   ), I don't have enough information to answer. (   )

4. Is the time allocation (schedule) for each topic in the training appropriate?

    Very inappropriate (   ), sometimes inappropriate (   ), it was ok (   ), appropriate for the majority of part (   ), very appropriate (   )

5. Please give us your suggestion for future improvements on anything regarding the training.

    _____

    _____

    _____

添付資料 10: QRC での総合的理科グループの形成

Recommendation and suggestion: **04-Feb-2009**

SEED Project have enhanced science education in Jordan by the trainings including Lesson study , Lab. activity and utilizing ICT and is trying to establish Teacher' Community in Ramtha and Mazar as pre-pilot. The project is getting excellent result with cooperation between JICA, Jordan MOE and QRC, but there is still room for both improvement of science education system and enhancement of utilizing ICT for not only science but also and other subjects.
At the end of project, Japanese experts hope QRC expands and continue SEED activates and suggest further programs (Show in Table 1). According to organization for these, QRC already has Lab. Group and SEED working group A (science teacher), Japanese experts also recommend to formulation new comprehensive science group based two and the new group should cooperate with other divisions/groups at QRC such as Research division, LRC division, Develop/ e-Contents division, Technical support (Helpdesk) division. (Japanese experts think MOE and QRC should conduct practical and subject - oriented activity in ERfKE2 and the new group must become a model of subject - oriented group for other subjects)

Table 1 New program and activity for new comprehensive science group   **P: Priority XXX: High XX: Middle X:Low**

Category	Program	P	Activities	Output	Related group	Comment
Enhancement of Usage of e-science	Enhancement of Usage of e-science	XXX	Development of model lesson with e-science	Model lesson plan with e-science in QRC science portal site	Technical support, e-Contents division	Method and procedure are similar to SEED project, but lesson plan and WS should focus on e-science. The points of design of lesson are: To consider environment, 1 pc or IT lab; To blend with experiment or not; To prepare slide and quiz.
		XXX	Development and conducting Workshop for utilizing e-science	3 or 4 days Workshop	Technical support, e-Contents division	
		X	Development and conducting e-learning for utilizing e-since	e-learning contents and virtual training room	Technical support, e-Contents division	
	Modification of e-science (Support)	XX	Supporting modification of current e-science for Jordanian teacher	Supporting design and review of modification of e-science for e-Contents division	e-Contents division	Based on MOE standard curriculum and needs and convenience for science teacher
Supporting FD/LRC Teacher community	Screening and dissemination of output from FD/LRC	XXX	Definition and Conducting Screening lesson plan and education materials	Regulation of screening Information of good contents (Contents of QRC portal)	LRC division, e-Contents division	To approve FD/QRC output as MOE materials Selected lesson plans and materials should be contains in QRC science portal site
		XX	Paining and Conducting award for the materials	Regulation of Award Regular Award ceremony	LRC division	SEED project will select best 3 lesson plan at final WS.
	Central level Community	XXX	Conducting meeting for leaders and champions of FD/LRC community.	Regular QRC Teacher community meeting	LRC division	After Pre-Pilot in Ramtha and Mazar and other FD/LRC level Teacher's communities are established.
		X	Planning and conducting Association for Jordan Science education	Association for Jordan Science education Regular conference	LRC division,	SEED preject made draft plan of conference of Association for Jordan Science education
Recourses and Knowledge Management for science	Movie and photo library for science education	XXX	Development and collection of real movie and photo for science lesson	Movies and photo in QRC portal	LRC division, e-Contents division	Week point of e-science is not to contain real movie and photo. the group also enhance FD/LRC to develop these materials. because teacher can't develop digital materials such as graphic and Flash, But movie and photo are easy to develop and SEED project also had a training for digital Lab. manual

education		XXX	Management and maintenance of QRC portal site as science contents	Science contents in QRC portal site and management of Web forum	Technical support, e-Contents division	QRC should make trial portal site by end of Feb., 2009.
	Tips	XX	Making and collecting of Tips for science education	Collection of Tips	LRC division	Tips is small and useful knowledge and skill. Award of Tisps form FD/LRC should be needed. WG A will present sample of Tips in final WS.
Timely Workshop for supporting FD/LRC	New issue of science	XXX	Development and conducting Workshop for utilizing e-science	1 to 4 days Workshop	(DCT and other specialist)	New MOE's curriculum already contains new issues such as environment problem, space development and biotechnology. Every teacher needs opportunity to learn new science issues.
	Precise procedure of Lab. activity	XXX	Development and conducting Workshop for Preside procedure of experiments	1 to 4 days Workshop		Some or Almost teacher's doesn't know right and precise procedure of experiment. they need re-training of experiments.
	Essential of SEED training	XX	Development and conducting Workshop for development of lesson plan	1 to 4 days Workshop		For cluster style training, a short training that contains basic knowledge and procedure for development of lesson plan is needed.
	(Related new small project and activity)			1 to 4 days Workshop		(Refer to Category: New small project and activity, see below)
New small project and activity (Research and development new method)	New style of science lesson and new usage of ICT	XXX	Conducting and supporting International Collaboration science lesson	International collaboration at school as ordinals lesson	(IEARN and Jordan iERAN, USAID?)	iEARN is the biggest NGO for International collaboration lesson. 20,000 schools are joining and Over 1,000,000 students each day are engaged in collaborative project work worldwide. iEARN has many science collaboration project. (Annual conference will be held in this summer in Morocco) http://www.iearn.org/ Ota recommends lesson of 'solar cooking'.
		X	Planning and conduction Collaborative lesson with specialist in Univ. or private company	Lesson at schools by specialist		This type of lesson should be shot and contained in portals site to share.
		X	Development of science lesson with google earth	Lesson plan with google earth		google earth is powerful tool for science , especially earth science.
Expansion of SEED training	Expansion to other FD/LRC	XXX	Planning and conduction expanded SEED training for other FD/LRC	Expanded SEED training	(DTQS)	QRC support DTQS to plan , then the group mainly conduct and manage the trainings
	Survey of effect of SEED training	XX	Planning and conduction to survey for SEED training	Survey report	Research division	Evaluation for effect of SEED training method in long term including monument by science score of students.
	Super Science High School	X	Planing and conducting the trining for Talented school teachrs	Training at Talented schools		After training, Teachers at talented school develop lesson plan that include issue of new and high science technology.

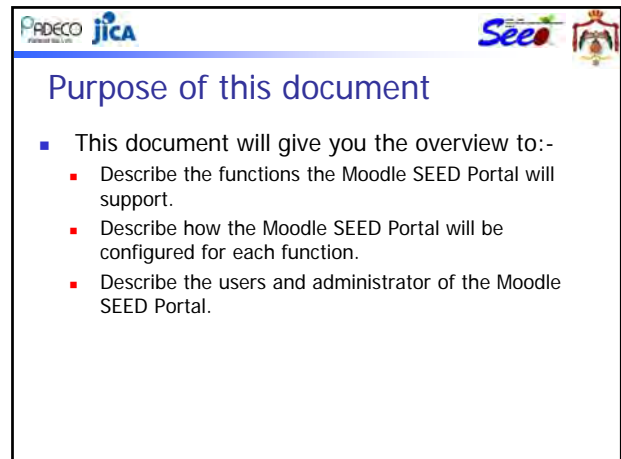## Moodle SEED Portal

SEED Project
Queen Rania Center

31.August.2008
Ver 1.0

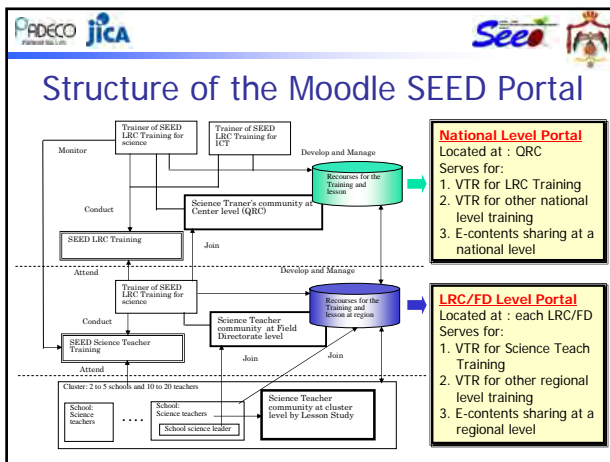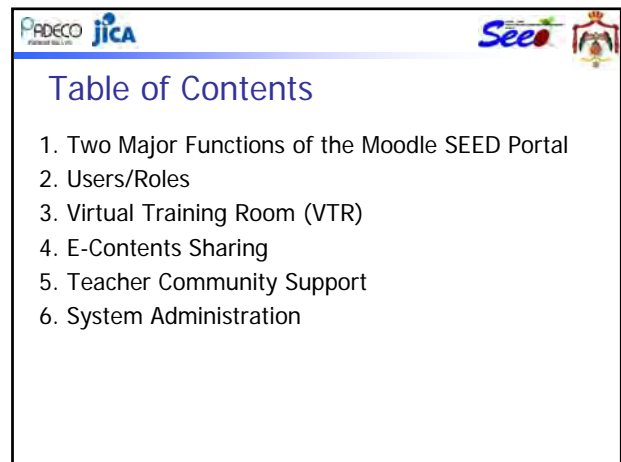## Purpose of this document

- This document will give you the overview to:-
  - Describe the functions the Moodle SEED Portal will support.
  - Describe how the Moodle SEED Portal will be configured for each function.
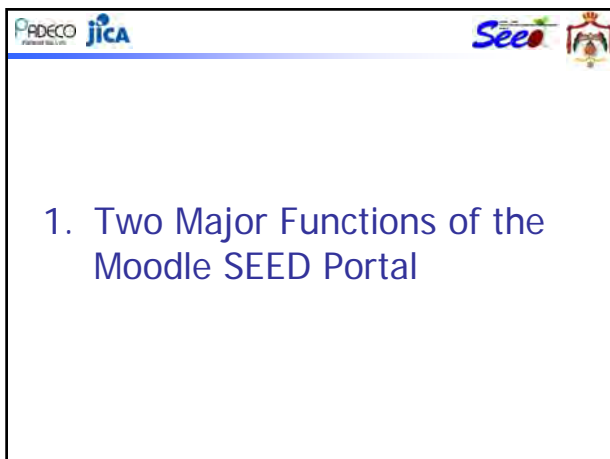 - Describe the users and administrator of the Moodle SEED Portal.

Structure of the Moodle SEED Portal

National Level Portal
Located at : QRC
Serves for:
1. VTR for LRC Training
2. VTR for other national level training
3. E-contents sharing at a national level

LRC/FD Level Portal
Located at : each LRC/FD
Serves for:
1. VTR for Science Teach Training
2. VTR for other regional level training
3. E-contents sharing at a regional level

Table of Contents

1. Two Major Functions of the Moodle SEED Portal
2. Users/Roles
3. Virtual Training Room (VTR)
4. E-Contents Sharing
5. Teacher Community Support
6. System Administration

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1. Two Major Functions of the Moodle SEED Portal

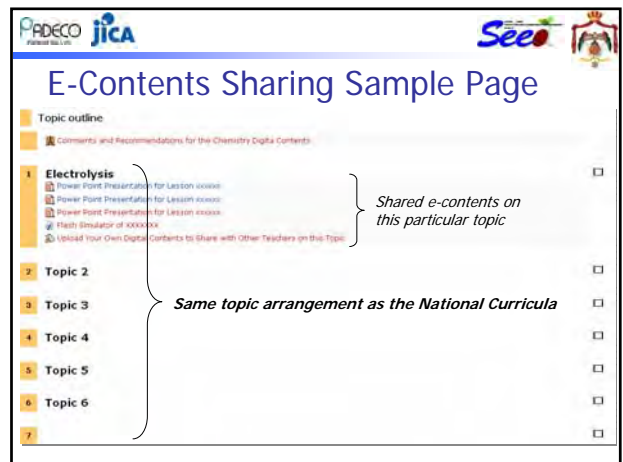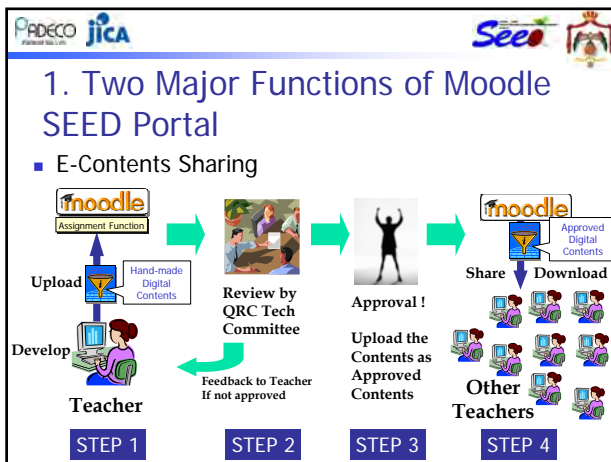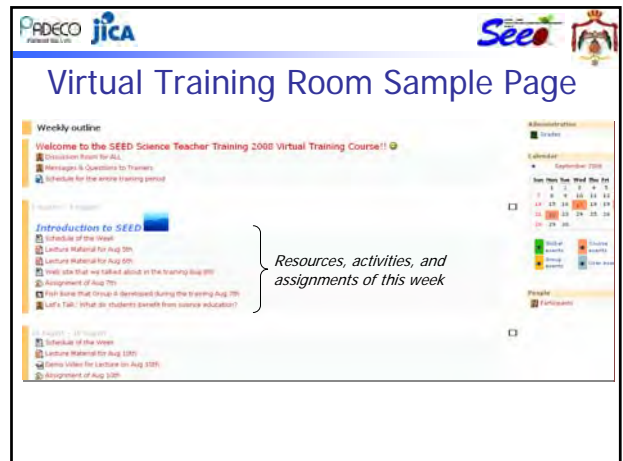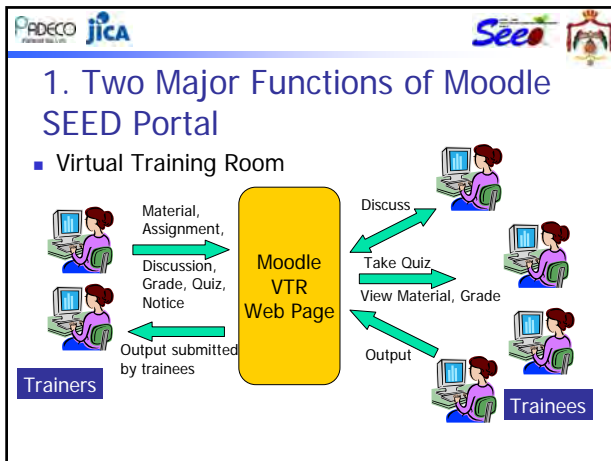## 1. Two Major Functions of Moodle SEED Portal

- Virtual Training Room
  - Course Management System to support SEED LRC Training, SEED Science Teacher Training, or any other kind of Teacher In-Service Training conducted by the Ministry of Education

- E-Contents Sharing
  - Virtual space to distribute digital contents developed by QRC or LRC to all the teachers in the Kingdom
  - Virtual space to share digital contents developed by teachers themselves with other teachers in the Kingdom

1. Two Major Functions of Moodle SEED Portal

- Virtual Training Room

Virtual Training Room Sample Page

Resources, activities, and assignments of this week

1. Two Major Functions of Moodle SEED Portal

- E-Contents Sharing

Upload | Hand-made Digital Contents

Develop

Teacher

Feedback to Teacher If not approved

STEP 1 | STEP 2 | STEP 3 | STEP 4

Review by QRC Tech Committee

Approval !

Upload the Contents as Approved Contents

Approved Digital Contents

Share | Download

Other Teachers

E-Contents Sharing Sample Page

Electrolysis

Shared e-contents on this particular topic

Topic 2
Topic 3
Topic 4
Topic 5
Topic 6

Same topic arrangement as the National Curricula

2. Users/Roles

2. Users/Roles：Type

Moodle Role	User	Role
Administrator	System admin	- Monitor and manage the entire system HW/SW - Supervise the contents/Support Teacher users
Course Creator	Supervisor	- Create course itself - Assign Teacher (Trainer) User to course
Teacher	Trainer	- Populate course with resources and activities - Communicate with Student (Trainee) Users - Give grades to assignments and quizzes
Student	Trainee	- View, download course contents - Upload assignments, Do Activities - Communicate with Teacher (Trainer) Users
Guest	Non-trainee	- Not allowed to enter the virtual training room - Download E-Contents from E-Contents Sharing

2. Users/Roles : Self-Registration

- User ID registration
  - All First time Users have to register themselves through Moodle's E-mail based Self-Registration Function from the Log On Page of the Moodle SEED Portal

  - Steps
    1. Users register themselves from the Log On Page
       (*USER ID MUST BE USER'S EMPLOYEE ID NUMBER)
    2. Users receive e-mail from the Moodle SEED Portal to confirm his/her user ID
    3. Click on the link shown in the confirmation e-mail
    4. Users have been registered

2. Users/Roles : After Registration

- Users Make User Profile more attractive
  - After logging on, click on user's name appeared on the right-side top of the Front page
  - Click on Edit Profile tab
  - On the Edit Profile Page, at least user MUST edit:-
    - Picture (Upload your picture)
    - Field Directorate Name
    - School Name
    - Employee Type

3. Virtual Training Room (VTR)

3. VTR : Course Registration

- Course Registration
  - Course itself will be registered by "Course Creator" user. Course Creator users are supervisors or leaders of SEED Training.

  - Course Creator, after registering a course, assigns "Teacher" role to trainer users and to Course Creator himself/herself.

3. VTR : Student (Trainee)

- Course Enrollment as Student (Trainee)
  - Trainees will enroll themselves into a course he/she is participating.
  - Course Enrollment requires a "Enrollment Key" which will be provided to trainees by trainers
  - To enroll him/herself, trainee clicks on Course Name, then enter "Enrollment Key".
  - ONLY After enrolling, trainees can start engaging in activities and downloading materials on the course.
  - Preferably, trainees enroll themselves at an orientation session under trainers instruction.
  - ("Enrollment Key" is CONFIDENTIAL to non-trainees)

3. VTR : Student (Trainee)

- Trainees can do the following using VTR
  - Downloading resources and training materials
    - Lecture presentation materials, output from a class, useful information, useful e-contents, training related information, etc
  - Doing Activities
    - Participating Forum (Discussion)
    - Uploading Assignment
    - Taking short quizzes and questionnaires
    - Communicating with other trainees and trainers
  - Viewing Grade
    - Seeing trainee's own grade
  - Seeing Schedule
    - Utilizing calendar function to know about the upcoming events

3. VTR : Teacher (Trainer)

- Trainees can do the following using VTR
  - Uploading resources and training materials
    - Presentation PowerPoint, Handout Document, e-Contents used in the training, Output from the training, useful links, etc
  - Creating Activities
    - Create Forum (Discussion) to facilitate exchange of ideas
    - Create Assignment to trainees and Download submitted output
    - Create short quizzes and questionnaire, and analyze results
    - Communicate with trainees and other trainers
  - Giving Grade
    - Give grade to assignments, quizzes or comments in forums
  - Updating Schedule
    - Notify trainees on training schedule using calendar function

3. VTR : Teacher (Trainer)

- Also, Teachers should:-
  - Promote frequent use of the Portal among trainees
  - Upload as many materials as possible creatively
  - Give as many assignment as possible through VTR
  - Create as many activities as possible on VTR
  - Utilize VTR in Face-to-Face training as much as possible
  - Adapt blended learning approach effectively
  - Facilitate discussion / communication among trainees
  - Reply promptly to trainees' requests or messages

3. VTR : Contents

- Resources / Materials Trainers can upload are:-
  - Word / Excel / Notepad Document
  - PowerPoint Presentation Document
  - Video and Flash movie
  - Link to other web sites
  - *(*there is a limitation on the size of a file uploaded - 16MB)*

- Activities Trainers can create are:-
  - Forum (Discussion)
  - Assignment with Uploading Function
  - Short Quiz
  - (Feedback Questionnaire * additional component*)

3. VTR : Sample page

4. E-Contents Sharing

4. E-Contents Sharing : Type

- Types of E-Contents to be Shared
  - Lesson Plan / Work Sheet (Word, PDF)
  - Simulation Experiment (Flash)
  - Short Movie (Flash)
  - Lecture Presentation (PowerPoint)
  - Experiment Video (.wmv)
  - Pictures / Scanned File (.jpg)
  - Links to Useful Contents on the Internet
  - Links to websites useful for students self-study or assignment work
  - (* there is a upper-limitation on the size of a file uploaded)

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4. E-Contents Sharing : Distribution

- How Contents are Organized on the Portal
  - Topic Based Structure Based on the National Curriculum
  - E-Contents Sharing Pages are <u>divided by Subject and Grade</u> (e.g. Physics Grade 5)
  - In each Page, there will be <u>a Section for each unit</u> (topic) of the curriculum. (details will be decided by QRC)
  - Under <u>a Section</u>, relevant E-Contents will be posted.
- Important Consideration on Copyrights
  - All the E-Contents uploaded on the E-Contents Sharing Page MUST be cleared for Copyrights.
  - Never upload contents from the Internet (put link instead)
  - Contents teacher created are regarded as the MoE's (?)

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4. E-Contents Sharing : Collection

- E-Contents to be shared will be Collected from:-
  - QRC itself (probably from e-contents division)
  - Other department of the MoE (DCT, IT, LRC, F/D)
  - Supervisors (must go through approval procedure)
  - Teachers (must go through approval procedure)

- 3 Ways to Collect E-Contents
  - On-Line Upload (*recommended)
    - Using Upload Function of Moodle on the E-Contents Sharing Page
  - E-Mail Attachment
    - E-Mail to QRC staff members (e-contents division, SEED trainers)
  - CD-ROM, USB Memory Key
    - Put the Contents in CD-ROM or USB, and submit it to QRC staff

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4. E-Contents Sharing : Collection

- Promotion of E-Contents Development
  - The MoE should promote the development of E-Contents by teachers and supervisors:-
    - Promotion through SEED Training
    - National Competition for E-Contents Development

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5. Teacher Community Support

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5. Teachers Community Support

- Supports Teacher Community with:-
  - On-Line Discussion Forum
    - Teachers can discuss any issue
    - Teachers can request for e-contents from other teachers
  - On-Line Bulletin Board
    - Organizers can make announcements
  - Mass Email to Community members
    - Organizers can easily send email to all members
- Using "Social forum" Course type
  - This is a simple Forum Based Course
  - Use "Social forum" when creating a course

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5. Teachers Community Support

- On the Moodle SEED Portal, Teacher Community Support page appears as Forum Based Course:-

sample

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6. System Administration

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6. System Administration

- System Administrator
  - QRC Staff (e-Contents Division) at the National Level
  - LRC IT Staff at the LRC/FD Level

- Main Tasks for System Administrators
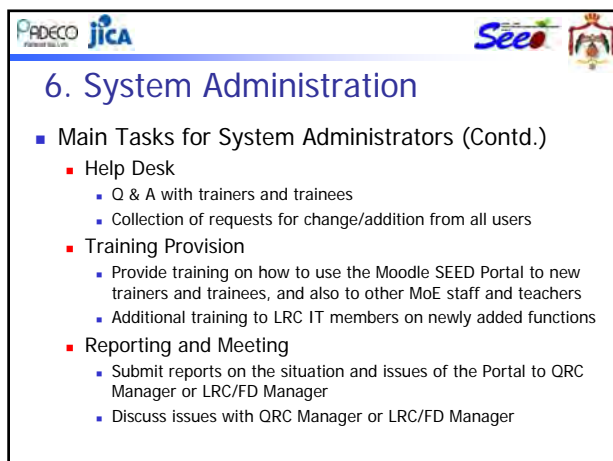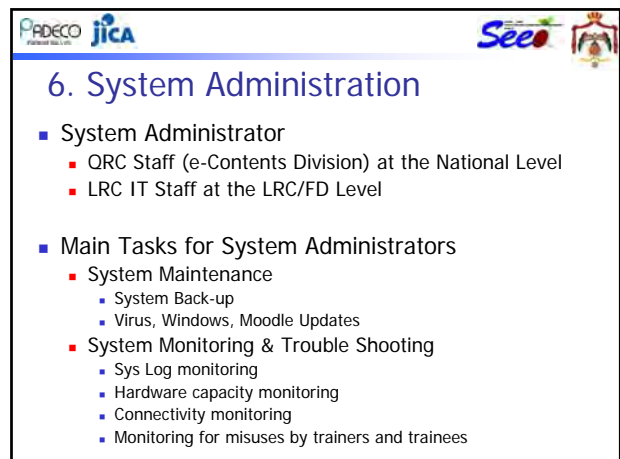 - System Maintenance
    - System Back-up
    - Virus, Windows, Moodle Updates
  - System Monitoring & Trouble Shooting
    - Sys Log monitoring
    - Hardware capacity monitoring
    - Connectivity monitoring
    - Monitoring for misuses by trainers and trainees

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6. System Administration

- Main Tasks for System Administrators (Contd.)
  - Help Desk
    - Q & A with trainers and trainees
    - Collection of requests for change/addition from all users
  - Training Provision
    - Provide training on how to use the Moodle SEED Portal to new trainers and trainees, and also to other MoE staff and teachers
    - Additional training to LRC IT members on newly added functions
  - Reporting and Meeting
    - Submit reports on the situation and issues of the Portal to QRC Manager or LRC/FD Manager
    - Discuss issues with QRC Manager or LRC/FD Manager

添付資料 12: SEED の理科授業の基本的な考え方

<u>Lesson style of new science education and development of lesson plan</u>
1 Science method based on constructivism

1.1 Primary science method of SEED project

0. General teaching and learning method by Constructivism

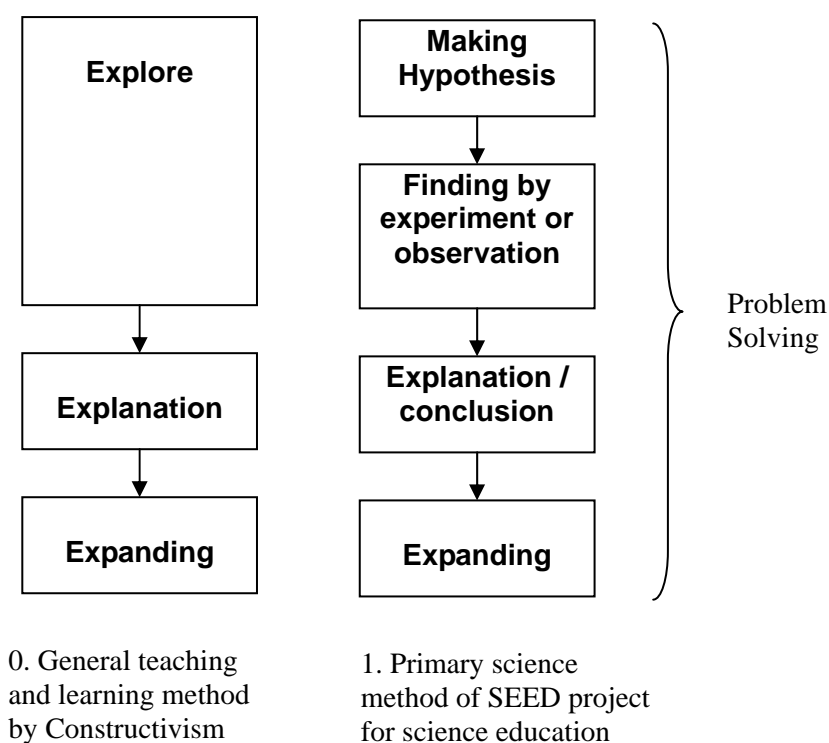1. Primary science method of SEED project for science education

Figure 1-1 Science method based on Constructivism

Constructivism is becoming a popular concept in education and many countries apply this theory to develop materials and conduct lessons in science education. SEED project also regards Constructivism as main theory of science education in Jordan, and during TOT and science teacher, trainee learns this method by development of model lesson.

Figure 1-1 shows a flow of science lesson based on Constructivism, Figure 1-1 0. is the general teaching and learning method by Constructivism and SEED project defined Primary method to focus on' Make Hypothesis ' as Figure 1-1   1. Primary method consists of following steps;

- Making Hypothesis:
  Students explain phenomena, account events and make predict as hypothesis.
- Finding by experiment or observation:
  Students explore and test their ideas (hypothesis) by experiment and observation.
- Explanation/Conclusion:
  Students reflect their ideas (hypothesis) by comparing with result of experiment or observation. Then students 'construct' science concepts and meanings
- Expanding:
  Students develop their ideas further through additional physical and mental activity. Or students assimilate their ideas certainly by additional practices.

ERfKE wants to apply new educational method such as Problem solving, Critical thinking, Group work and Learning by Activity. If science teacher applies this science method, it means that teacher uses method of Problem solving in lesson.

1.2 Basic Method of SEED project

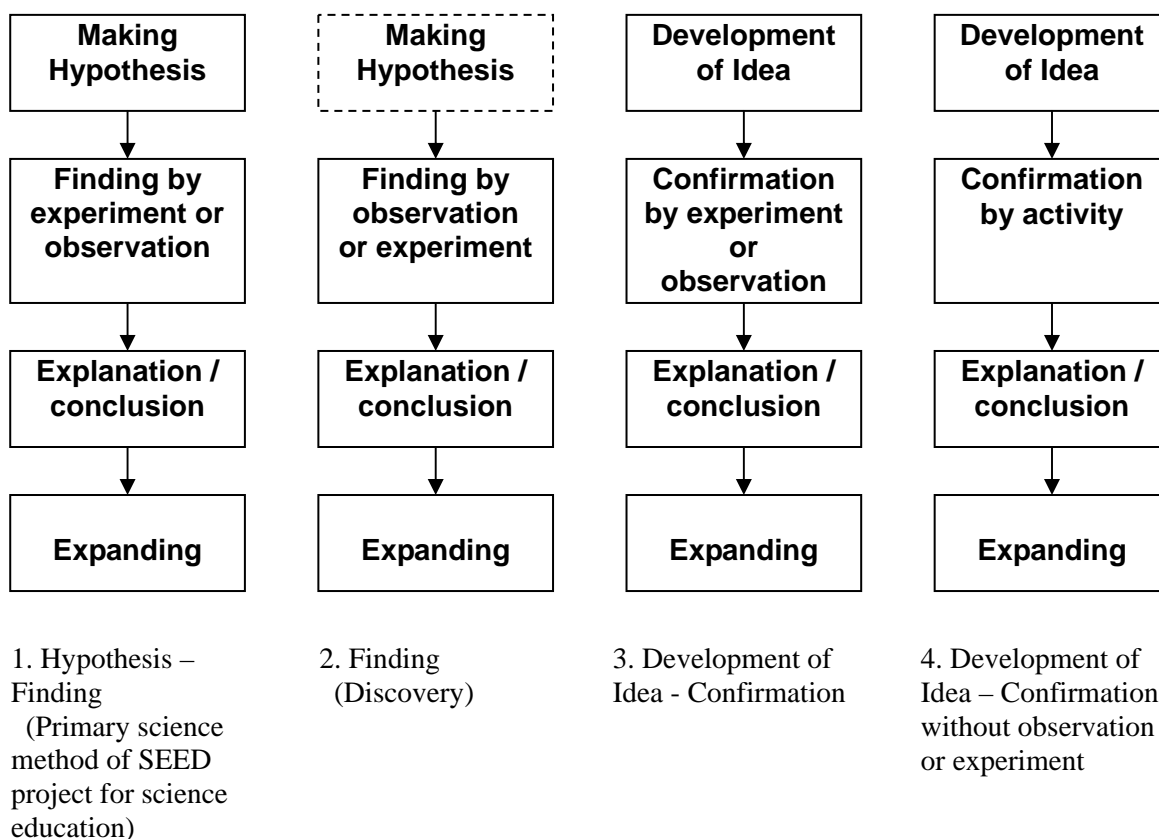| Making Hypothesis	Making Hypothesis	Development of Idea	Development of Idea
↓	↓	↓	↓
Finding by experiment or observation	Finding by observation or experiment	Confirmation by experiment or observation	Confirmation by activity
↓	↓	↓	↓
Explanation / conclusion	Explanation / conclusion	Explanation / conclusion	Explanation / conclusion
↓	↓	↓	↓
Expanding	Expanding	Expanding	Expanding
1. Hypothesis – Finding (Primary science method of SEED project for science education)	2. Finding (Discovery)	3. Development of Idea - Confirmation	4. Development of Idea – Confirmation without observation or experiment

Figure 1-2Basic science method of SEED project

SEED defined four types of basic science methods including Primary science method (See Figure 1-2). If possible, teachers apply Primary science method. But from the viewpoint of real situation, there are some reasons not to do so.

- Some theory and rules, especially in Biology and Earth Science, don't fit making hypothesis. Observation or experiment only discover and find them without hypothesis.
- Because experiments and observations are difficult to conducts or theory and rules are complicated for students to make hypothesis, teachers want to explain theories and rules first.
- Senior students in grade 7, 8, 9 and 10 can think as adult, in other word, they acquire formal and abstract thinking power. These abilities make students make hypothesis and plan and conduct experiment more efficiently and effectively than junior students. Contrary, the Students can understand and acquire science theories and roles from some recourse such as textbooks and Web site without experiments or observations.

Deference of characteristics of four models is explained below;
- Hypothesis – Finding:
  At first students make hypothesis, then plan and conduct experiment or observation to find

whether their hypothesis is correct or not.

- Finding:
  Students don't make hypothec first. They sometimes make guessing. During experiment or observation students find and discover theories and rules.
- Development of Idea - Confirmation
  At first teacher gives some idea of theories and rules to students or student got ideas from some recourse such as textbooks and Web site. Then students recognize them by experiment or observation.
- Development of Idea – Confirmation without observation or experiment
  At first teacher gives some idea of theories and rules to students or student got ideas from some recourse such as textbooks and Web site. Then students recognize them by some activates such as inquiry, critical thinking and discussion among students.

SEED project doesn't intent to ask teachers apply four methods to all periods. Because each school has deferent learning environment and each lesson has different feature of topics. SEED project recommends that teachers should know four methods and can apply to their lessons, then arrange and combine the methods. For example a lesson has two of the four methods in one period or have both confirmation by experiment and by inquire.

2   General Procedure for Development of Lesson Plan

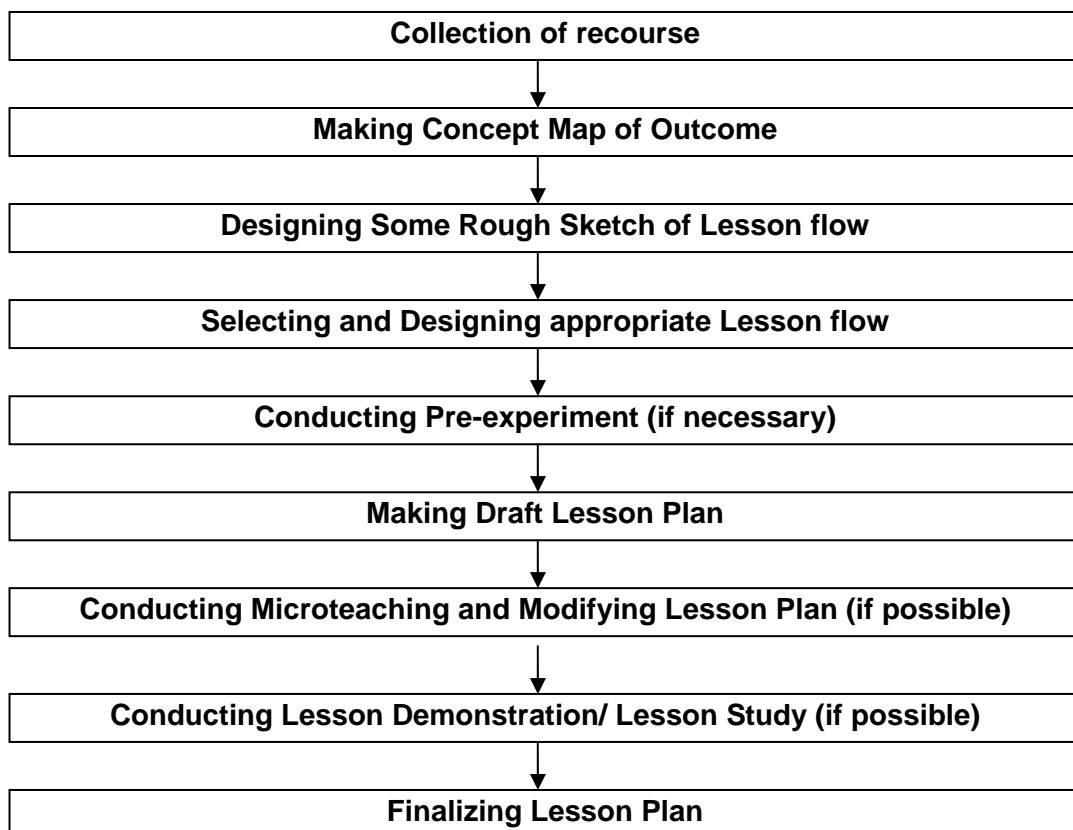## 2.1   Development Flow of Model Lesson Plan

Figure 2-1 Development Flow of Model lesson of SEED

Figure 2-1 shows a development flow of model lesson. SEED project instruct trainee of TOT or science teacher training to develop model lesson and conduct lesson demonstration following the flow. Ordinal flow doesn't have concept map of outcome and lesson flow, but they help teacher to identify outcome and strategy of lesson and to review by oneself or among college. Also Pre-experiment and Microteaching make sure the feasibility of lesson.

（1）　　Collection of recourse

At first teacher collects information about a target lesson and can find many science educational rescues such as textbooks, Teacher's Guide, e-science and any science Web site. Teacher should check the previous Grades' textbooks and Teacher's Guide to know what kind of skill and knowledge student already acquired before the lesson.

（2）　　Making Concept Map of Outcome

This is the most important step of development, teacher. Outcome is the goal of lesson, teacher should identify the goal, otherwise both teacher and student lose the way at period. Teacher should start to put outcome in Teacher's guide into the map.
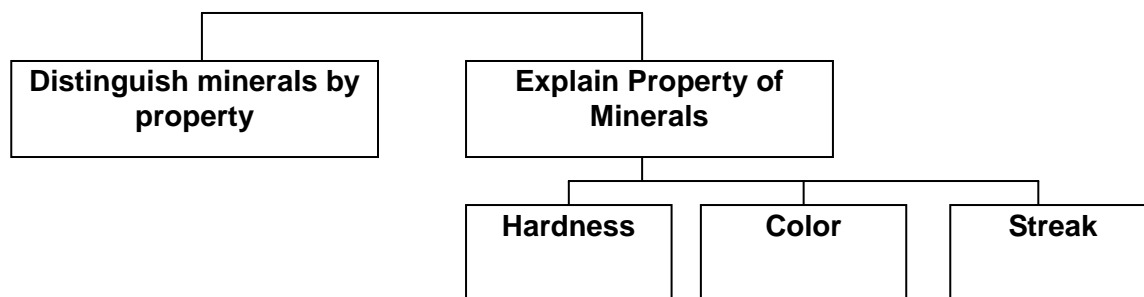
Distinguish minerals by property	Explain Property of Minerals		
	Hardness	Color	Streak

Figure 2-2 Sample of Concept Map of Outcome

One period usually has tow to five outcomes. Expression of outcome should have an appropriate verb such as understand, explain, conduct, and calculate and, if necessary, outcome can have attribute (attribute doesn't need a verb)(See Figure 2-2).

Key points of making concept map of outcome are following;
- Distinguish between concept map of theory and concept map of outcome of lesson
- Put outcome related the period, don't put outcome of other period
- Don't put the method of lesson.

（3）　　Designing Some Rough Sketch of Lesson flow

As mention before, outcome is a goal and lesson is method, teacher can design many kind of lesson according to one concept map of outcome. In this step teacher make some rough sketch, and then these sketches can have different strategies such as making hypothesis and development idea and different media such as real experiment and using ICT. Teacher should consider that lesson flow could reach all of outcome in the concept map. If possible , Discussion with other teacher make good idea of lesson flow.

（4）　　Selecting and Designing appropriate Lesson flow

Teacher selects on lesson flow among sketches and completes lesson flow. During this step, teacher should review with college or supervisor.

Key points of Selecting and Designing appropriate Lesson flow are following;
- If possible, apply the strategy including finding by experiment or observation. In other word, include task for students to make hypothesis.
- Make students have curiosity and question.
- Have enough time for students to thinking
- Make question appropriate for students to think, (not simple question)
- Conduct discussion and presentation among students.
- Have enough practice or activity for students to assimilate the new knowledge and skill
- Use appropriate media among ordinal materials and ICT materials
- Have activity for students to make note and report.
- Keep time in a period

（5） Conducting Pre-experiment (if necessary)

Teacher doesn't familiar with the experiment he/she will apply at the lesson, Teacher should conduct pre –experiment. It will make clear that time of experiment, result of experiment and difficulty of experiment for students. Sometimes experiment doesn't make expected result, in this case, teacher should adjust conditions and procedures of experiment or design another experiment.

（6） Making Draft Lesson Plan

Assembling output of pervious steps, teacher make draft lesson plan by using the template document. If teacher completed previous stops carefully, this step is not difficult. In mean time teacher prepare or develop all materials for teacher and students. SEED project insists that meaning of development of model lesson is not development of materials such as worksheet or Power point slide, but development of lesson itself, in other word , teacher should use time to design a lesson flow and activity. The many teacher in Jordan don't have enough time to make materials, less development of materials is better as model lesson, otherwise many teachers will misunderstand that good model lesson needs development of good materials and it takes a lot of time.
Note: it is a new proverb for ICT software development: Buy of make, if possible buy is better.

（7） Conducting simulated lesson (Microteaching) and Modifying Lesson Plan (if possible)

If possible, a teacher conducts simulated lesson with other teachers as simulated students. During simulated lesson, teacher can confirm the feasibility of the lesson plan and get simulated response of students. After the lesson, if the teacher finds any problem about the lesson plan, he/she can modify the plan. Beside simulated lesson is useful to acquire teaching skill for young teachers. Microteaching is one of the method of simulated lesson, teacher has part of simulated lesson and continue to conduct and evaluation it.

（8） Conducting Lesson Demonstration (if possible)

If possible, a teacher conducts Lesson Demonstration at real school. Lesson Demonstration consists of two activity, the first is to conduct lesson based on the plan and the second is to conduct review meeting about the plan. The teacher should invite other teachers to see the lesson and join the review meeting.

（9） Finalizing Lesson Plan

After lesson demonstration or ordinal lesson (it means that lesson with only the teacher and students without other teachers), the teachers should finalize the lesson plan according to result of schedule of lesson, response of students and evaluation for students.

2.2   Design of Blended Learning in SEED

Main purpose of SEED project is to enhance science education in Jordan by utilizing ICT and Lab. activity.   In other word, the purpose is to make teachers plan and conduct a blended learning with utilizing ICT and Lab. Blended learning sounds difficult, but if teacher good at planning the lesson based on the science methods and the procedure of development of model lesson in SEED, teacher can conduct the blended lesson easily.

There are two generally two meaning used for "Blended Learning", one is narrow meaning and the other is wide. In the narrow meaning of "Blended Leaning" known as "Media Blended Learning" is actually famous that mixes virtual (ICT) activities and conventional (real) activities such as reading printed textbook and experiment in a lab.

However, the purpose of blend is to enhance the problem solving capability for students and then "Media Blended Learning" is not enough to maximize students' capability. SEED project uses wide meaning of "Blended Learning" that mixes various ideas such as "Pedagogy Blended Learning" and "Activity Blended Leaning" to achieve goals (See Figure 2-3).
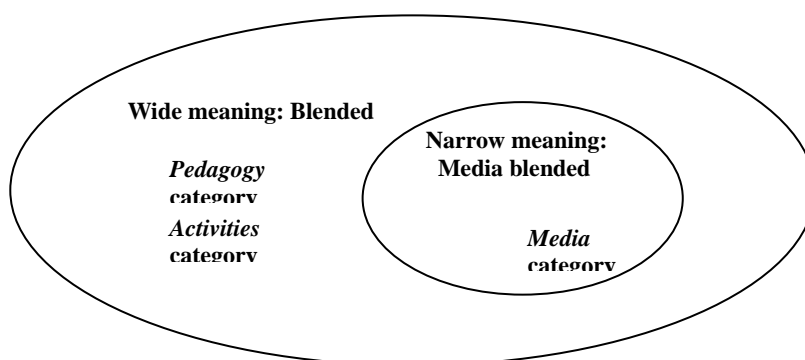

Figure 2-3 Meaning of Bended

Table 2-1 Components of Blended learning

Pedagogy category	Activities category	Media category
Constructivist Theory (Constructivism) Key theory of science education	Problem solving	ICT and Multimedia
	Critical thinking	Digital material
	Inquiry	Simulation
	Collaboration	Web
Hypothesis>Experiments>Conclusion (SEDD proposes four basic science methods)	Direct teaching	Virtual environment
	Project based leaning	Movie and photo
	Question and Answer	WBT, CBT
Situated Theory	Visiting Guest/Guest's speech	Class room
Group work/ Collaboration	Note/Report	Text and Blackboard
Learning from Social and life	Debate/Discussion	Worksheet and note
Behaviorism	Reading	Action such as Role playing
Motor – censoring skill	Presentation	Real experience
Process skills for experiments	Exercises	Experiment and observation
Repeated Training/ Practice	Research	Field's experience
Calculation	Experiment	etc.
	Observation	
	Game	
	Create model	
	etc.	

Table 2-1 shows component of Blended leaning. From viewpoint of the components, development of lesson plan is an activity to select and assemble appropriate components that fit the lesson. Generally speaking, this activity proceeds in two kind of method;

- Top down approach:
  At first, teacher analyzes characteristics of lesson and students and identifies outcome, then selects Pedagogy method including the basic science method and activates. At last, media is selected.
- Bottom up approach
  Teacher sometimes finds good materials such as simulation software, real experiment and movies. In this case, teacher can designs a lesson according to utilize their media and activities.

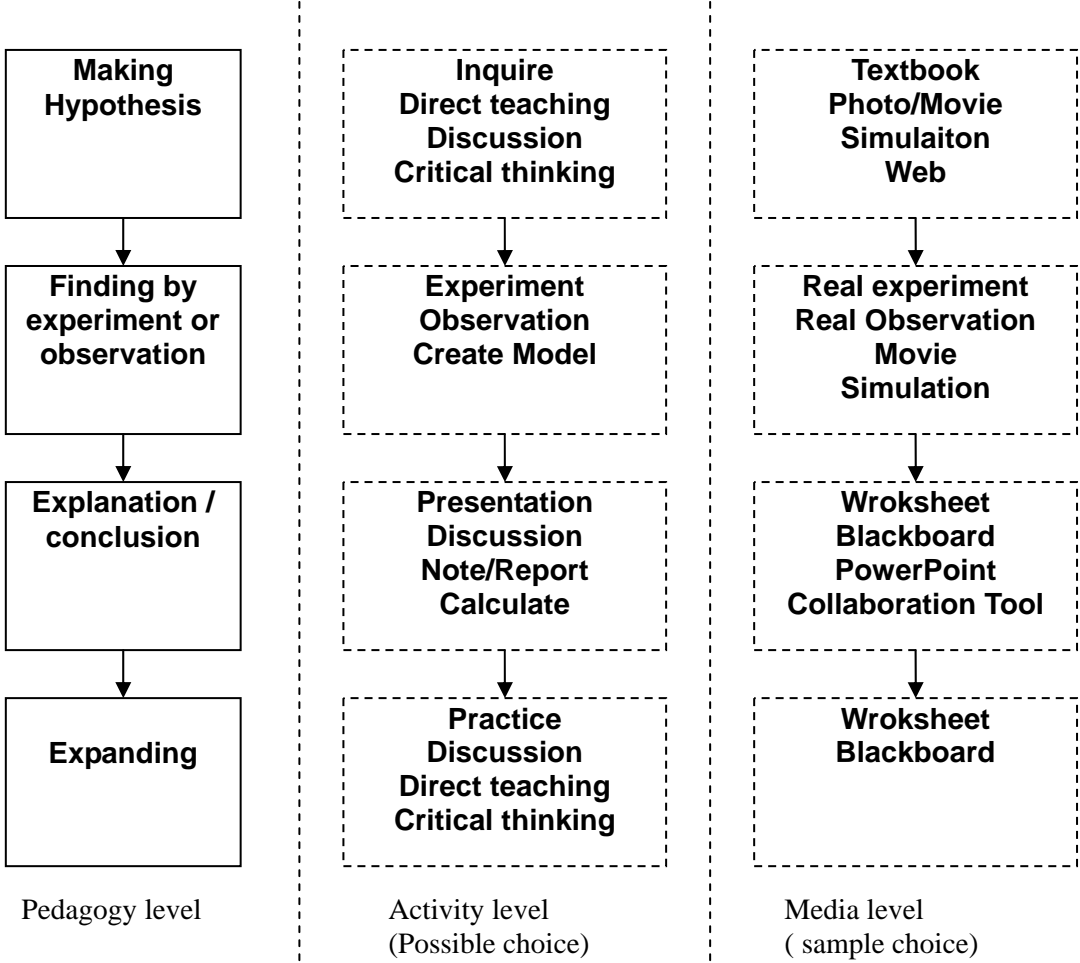Teachers often apply both approaches to plan lesson gradually.

Pedagogy level	Activity level (Possible choice)	Media level (sample choice)
Making Hypothesis	**Inquire** **Direct teaching** **Discussion** **Critical thinking**	**Textbook** **Photo/Movie** **Simulaiton** **Web**
Finding by experiment or observation	**Experiment** **Observation** **Create Model**	**Real experiment** **Real Observation** **Movie** **Simulation**
Explanation / conclusion	**Presentation** **Discussion** **Note/Report** **Calculate**	**Wroksheet** **Blackboard** **PowerPoint** **Collaboration Tool**
Expanding	**Practice** **Discussion** **Direct teaching** **Critical thinking**	**Wroksheet** **Blackboard**

Figure 2-4 Conceptual example: Relation among categories

Figure 2-4 shows the conceptual example of relation among categories. For example, teacher designs to have making hypothesis step in lesson, the step can use many kind of activity and media.

Introduction to Lesson Study in SEED

1. What is Lesson Study?

Lesson Study is a collaborative action by teachers to improve the quality of lessons through a process whereby teacher colleagues review and discuss a lesson conducted by one of their member. Indeed, Japanese teachers have developed their capability to develop and conduct lesson thought Lesson Study for a long time. Nowadays not only developing counties but also developed countries is applying Lesson Study, especially JICA has been promoting this method in many educational project.

The advantages of Lesson Study are followings:

- Practical training;
  It is based on development and implementation of real lesson. Meeting of lesson study can discuss problem and issues related school management.
- Teacher oriented training;
  Teachers study, learn and collaborate themselves. It is fit for school/community based and cluster training.

SEED project recommends Jordan MOE, QED, FD, LRC and schools to apply Lesson Study activity in Teacher's community.

2. Outline of Stage of Lesson Study?

Lesson study consists of three elements, namely "lesson design," the "lesson implementation", and the "lesson discussion meeting".

(1) Lesson design stage

Output of lesson design stage is Lesson Plan including concept map of lesson output and outcome and lesson flowchart. SEED Science Teacher Training has lesson how to make this design for teachers. Summary of this procedure is followings:

- Selection of topics
- Detailed analysis of the content of textbooks
- Making concept map of lesson output and outcome and lesson flowchart
- Making detail lesson plan

Usually lesson plan in this stage is not perfect, during implementation of lesson, teacher should modify the plan

(2) Lesson implementation stage

Teacher prepares and develops appropriate materials such as Lab. experiment, worksheet, poster, reference PPT slide and digital materials in this stage and then teacher make sure the feasibility of plan during pre -experiment and microteaching.

(3) Lesson discussion meeting stage (Lesson Study in narrow meeting)

At first School and teacher plan lesson study day and invite appropriate teachers and supervisors. On lesson study day, the teacher conducts lesson at real class. When the lesson is over, "lesson discussion (exchange of opinions concerning the lesson)" is organized with all participants of the lesson study. The discussion normally starts with an explanation of the lesson objectives given by the teacher. After this, the observing participants all express their opinions or ask questions in turn, clarifying the lesson objectives, or commenting, on the basis of their own experience, about such issues as the learning activities of the students during the experimental lesson, the role of the teacher, other teaching methods, and so on, so that a lively, wide-ranging discussion organized.

3. Basic Procedure of Lesson Study

(1) Type of Lesson Study

Lesson study can be conducted in many size, 1) in school, 2) in cluster, 3) Field Directorate, 4) in special school attached Univ. In the case of Japan, each Filed directorate selects one school as Lesson Study School for all subjects in every year or every half of year, and asks the school to conduct lesson study. And in the case of other JICA educational projects, each committee of clusters select Lesson Study School for specific subject such as math and science in every month or every another month.

(2) Process of Lesson Study

Note: Following explanation expects Field Directorate or cluster size

Step1: Selection of Lesson Study School
Field Directorate or committee of cluster selects Lesson Study School at least three months before the day of Lesson Study. Then school manager assigned one or a few teachers to prepare lesson.
Step2: Development and preparation of lessons(s)
The teacher starts development and preparation of lesson. In teacher needs, he/she asks other teachers and supervisors to check lesson plan and see microteaching and pre-experiment
Step3: Information of conducting Lesson Study
The schoolmaster invites teachers in other schools and related person to Lesson Study at the school
Step4: Holding Lesson Study
The schoolmaster and teacher(s) hold lesson study and lesson discussion meeting.

(3) Discussion point of lesson discussion meeting
The participants of lesson study should conceder following point to review and modify the lesson:
- Content of lesson is accurate as science knowledge and theory
- Plan of lesson correspond to output/outcome MOED defined
- Lesson makes sure that student achieve the outcome/output
- Students learn and study themselves
- If lesson has a experiment or observation, procedure is accurate.
- Interaction between teacher and students and among teachers are appropriate
- Interest and curiosity of students are increased
- Task level for students is appropriate (not easy nor difficult)
- Time management of lesson is appropriate
- Materials are appropriate

4) Discussion attitude of lesson discussion meeting
The participants of lesson study should keep following point in mind to have good communication and effective and efficient discussion.
- To criticize lesson itself, don't criticize personal of teacher.
- Focus on lesson; don't tell own experience a lot.
- Don't speak for a long time, these are many participants. Tell the points.
- Don't tell impression a lot, tell the logical comment.

Draft 0: New QRC for Local Learning and Excellence Center (LEC) Plan

1　Introduction

ErfKE is improving the quality and quantity of the education system in Jordan. Yet, many things have be done ahead . The reformation of the education system is so rapid and radical in the current organizations of MOE; schools and teachers doesn't keep up with the reformation. MOE should plan and implement new measures to make education system more efficient and effective.

Because QRC and LECs are possible organization that complement for luck of roles and functions in current MOE Organization, a reformation of QRC and LEC will be worth challenging for MOE during ERfKE 1&2.

2　Background

QRC accomplished good progress, but still have a lot to conclude. any significant output since it came and nowadays LECs seem not to have clear function and role, for example in 1990' many LECs conducted own training and supported schools, but now LRCs' main task is only conducting the teacher training related ICT.

QRC was established to solve some problems and give some new output for new education system, but problems still exist to appear;

a) Teachers need to understand the deep meaning of new education methods and know how to apply it in their lesson

b) Teachers need to have more opportunities to develop their capacity and to exchange information among other teachers.

c) MoE needs an appropriate organization to support and enhance school-based education system..

d) Activities of donors' projects overlap sometime, that require coordination consistently among donor's projects.

3　Vision of QRC & LECs

In order to achieve the new education system and network in Jordan, QRC and LECs should play the following roles;

a) Coordination of Projects and Directorates' activities related to these projects.

b) Evaluation of the output of project and Directorates activities related to these

projects.

c) Promotion and dissemination of new education strategy and method;

d) Supporting of school–based development programs.

e) Provision of materials and resources to schools;

f) Provide facilities for capacity building of teachers, schools principals and other educators.

g) Promotion and enhancement of communication among teachers and other educators

h) Planning, monitoring the learning system and e-content.

i) Planning, development and publishing of support educational resources.

j) Research and development of new educational method and knowledge.

k) Model of resource center for other LRCs

4 Strategy of Implementation

QRC will adopt the following organization styles.

a) QRC will get some functions and departments from other current local directorates.

b) QRC needs enough staff to plan and implement their functions and roles.

c) QRC and LECs should have staff for coordination with other directorates.
When QRC and LECs plan and implement project that is not related to the current Structure, they should formulate the appropriate project team or committee under QRC Or LECs management.

d) QRC and LECs will employ new staff and formulate organization structure.
QRC and LECs have staff for ICT and Science education and lab technician, they will keep these groups and enhance their capacity to reform the new functions.

5 Function of New QRC

	Functions	Roles	Related Directorate
1	coordination	Coordination of MOE's and central & local activities	Steering committee, And Technical Committee need to be formulated in QRC and LECs and local Directorates
		Management of educational Data	
2	Promotion and dissemination	Award and contest organization	
		Conference and association management	
		Publishing of educational materials	
3	Innovative Projects	Super subject projects	

		School – professional/ Private sector projects	
4	School-based development	School development service	
		LEC development service	
		Teacher's community association	
		School oriented project	
5	Technology invention/ provision	Help desk/ Technical support of Technical Training	
6	Learning resources	e-Library service	
		e-Resource Publishing	
9	Subject oriented	Model of Science. Lab activities and training	
		Subject Lab training Subject services	

6   Pre-Effective stage

MoE should conduct an analysis and assessment of the QRC and LRCs to identify:

a- to identify the needs for developing capacity at QRC and LECs

b- Assess the structure of Local Directorates with relation to learning Resources divisions ,to reformulate new structure for LECs in each Directorate.
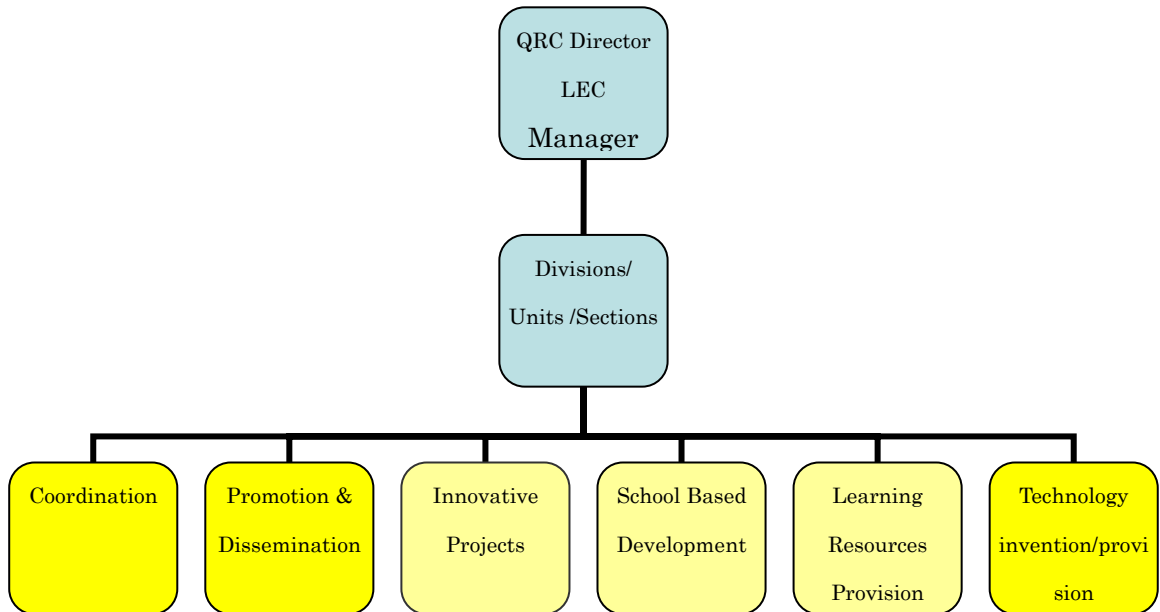
7   Organization Structure

A 1 Logical structure of Education Network in Jordan (School, Cluster, Local LECs, And QRC

2   Physical structure of Education Network in Jordan (School – MOE).

3   New Organization Structure of QRC and LECs. Hierarchal structure director, manager division header, specialist in subject areas ,IT and lab Technician.

B-Hierarchy

```
                          ┌──────────────┐
                          │  QRC Director │
                          │     LEC      │
                          │   Manager    │
                          └──────┬───────┘
                                 │
                          ┌──────┴───────┐
                          │  Divisions/  │
                          │Units /Sections│
                          └──────┬───────┘
        ┌──────┬──────┬──────┬──────┬──────┐
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| Coordination | Promotion & Dissemination | Innovative Projects | School Based Development | Learning Resources Provision | Technology invention/provision |

C - Forming of the following committees:

1- QRC : Steering Committee for facilitation and coordination
Including Senior Staff from MoE, Universities and private sectors.

2- LECs : Local Steering Committee
Including, local Directorates and staff , Private Sector and specialist.

3- Technical Committee in QRC and LECs to go through and review the educational
materials; to control the quality of these materials and then to approve them for publishing
to be accessed and shared between users.