付　属　資　料

1. 協議議事録（ミニッツ）／合同評価報告書
2. プロジェクト・デザイン・マトリックス（PDM）和文
3. PDM 各指標の詳細（ASEI/PDSI チェックリスト他）
4. 活動工程表（PO）
5. 質問項目
6. 質問票（英文）
7. ベースライン調査結果（英文・添付資料なし）
8. 第 1 回地方研修報告書（英文・添付資料なし）
9. 評価ツール

MINUTES OF MEETING BETWEEN THE JAPANESE MID-TERM REVIEW TEAM AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF MALAWI ON JAPANESE TECHNICAL COOPERATION FOR STRENGTHENING OF MATHEMATICS AND SCIENCE IN SECONDARY EDUCATION (SMASSE) INSET MALAWI PHASE II

The Japanese Mid-term Review Team (hereinafter referred to as " the Team"), organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Satoru Takahashi, visited the Republic of Malawi from 11th to 29th October 2010 for the purpose of the Mid-term Review of the Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II (hereinafter referred to as "the Project").

During its stay in Malawi, the Team exchanged views through a series of discussions with the Ministry of Education, Science and Technology (hereinafter referred to as "the Malawian side") on the improvement of the Project. As a result of the discussions, both the Malawian side and the Team agreed upon the matters refered to in the document attached hereto.

Lilongwe, 28th October, 2010

Moffat J. Chitimbe
Principal Secretary
Ministry of Education, Science and Technology
Republic of Malawi

Satoru Takahashi
Leader
Japanese Mid-term Review Team
Japan International Cooperation Agency
Japan

STRENGTHENING OF MATHEMATICS AND SCIENCE IN SECONDARY EDUCATION (SMASSE) INSET MALAWI PHASE II

Joint Mid-term Review Report

Lilongwe, 26 October 2010

ATTACHED DOCUMENTS

TABLE OF CONTENTS

List of Abbreviations and Acronyms

ASEI	Activity, Student, Experiment and Improvisation
CDSS	Community Day Secondary School
CEED	Central East Education Division
CWED	Central West Education Division
DCE	Domasi College of Education (teacher-training college)
DTED	Department of Teacher Education and Development
DT	Divisional Trainer
EDM	Education Division Manager
EMAS	Education Method Advisory Services
INSET	In-Service Education and Training
JCE	Junior Certificate of Education
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteers
M & E	Monitoring and Evaluation
MoEST	Ministry of Education, Science and Technology
M/S	Mathematics and Science
MSCE	Malawi School Certificate of Education
NED	Northern Education Division
NT	National Trainer
PEMA	Principal Education Method Advisor
PDM	Project Design Matrix
PDSI	Plan, Do, See and Improve
PRESET	Pre-service Education and Training
SEED	South East Education Division
SEMA	Senior Education Method Advisor
SHED	Shire Highlands Education Division
SMASSE	Strengthening of Mathematics and Science in Secondary Education
SMASE-WECSA	Strengthening of Mathematics and Science Education in Western, Eastern, Central and Southern Africa
SWED	South West Education Division

1. INTRODUCTION

1-1. Preface

The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II (hereinafter referred to as "the Project") has been ongoing since August 2008. JICA dispatched the Japanese Mid-term Review Team (hereinafter referred to as " the Team") to the Republic of Malawi for the purpose of conducting the Mid-term Review which has been undertaken jointly by the Team and Malawian authorities concerned.

1-2. Objectives of the Review

The objectives of the Mid-term Review are as follows:

(1) To review and evaluate the inputs, activities and achievements of the Project, and to summarize the achievement of the Project;

(2) To execute a comprehensive review on the achievement of the Project from the viewpoint of the five evaluation criteria of Development Assistance Committee (DAC) in OECD;

(3) To make recommendations on the measures to be taken in order that the Project will achieve the project purpose; and

(4) To review and revise Project Design Matrix (PDM), as the needs arises.

1-3. Schedule of the Team

The Mid-term Review has been conducted as below, from October 11th to 29th, 2010.

Date	Day	Activities
11 Oct	Mon	12:20 Arrive at Lilongwe (Mr. Yanagida and Ms. Tanaka) 15:30 Courtesy Call to the Coordinator of DTED 17:00 Interview with SMASSE Secretariat officials
12 Oct	Tue	8:00 Interview with National Coordinators 11:15 Interview with National Trainers (DTED) 14:30 Meeting with the Deputy Director of Secondary Education 15:40 Meeting with the Acting Director of EMAS and PEMAs 17:00 Interview with JOCV Coordinator 18:20 Interview with National Trainers (DCE)
13 Oct	Wed	10:45 Interview with the headteacher, the deputy headteacher, Divisional Trainers, M&S teachers, and JOCV at Balaka INSET centre (SEED) 14:00 Interview with the Principal and National Trainers (DCE) at Domasi College of Education, and visit at National INSET Centre
14 Oct	Thu	7:30 Lesson observation on science, and interview with the headteacher, Divisional Trainer and M&S teachers at Songani CDSS (SEED) 10:50 Meeting with EDM and Divisional Trainers at SEED Office

14 Oct	Thu	13:30 Visit at Mulungzi INSET Centre (SEED) 15:30 Interview with the headteacher, Divisional Trainers and M&S teachers at Blantyre INSET centre (SWED)
15 Oct	Fri	8:00 Meeting with EDM, PEMA, and SEMA at SWED Office 11:15 Interview with the headteacher, Divisional Trainers and M&S teachers at Mwanza INSET Centre (SWED)
16 Oct	Sat	Data and information analysis and drafting evaluation grid
17 Oct	Sun	Data and information analysis and drafting evaluation grid
18 Oct	Mon	Morning: Modifying evaluation grid at JICA office 14:25 Interview with the official of USAID-funded project (MTPDS)
19 Oct	Tue	8:50 Interview with the headteacher, the deputy headteacher, and the science teacher at Minga CDSS (CWED) 10:45 Interview with the headteacher and M&S teachers at Chigoneka CDSS (CWED) 12:30 Arrive at Lilongwe (Mr. Takahashi) 15:40 Meeting with the Director of Finance (MoEST)
20 Oct	Wed	9:00 Courtesy Call to the Principal Secretary with the official of Planning Department (MoEST) 10:30 Modifying evaluation grid at JICA office 14:30 Meeting with the Coordinator of DTED 16:00 Interview with the senior accountant (DTED)
21 Oct	Thu	7:15 Lesson observation on science, and interview with the headteacher, Divisional Trainer, and the science teacher at Lilongwe Girls INSET centre (CWED) 10:30 Meeting with EDM and SEMAs at CWED Office 14:00 Interview with the headteacher and Divisional Teachers at Namitete INSET centre (CWED)
22 Oct	Fri	9:40 Meeting with the Director of Human Resource Management (MoEST) 11:00 Modifying evaluation grid 15:00 Meeting with National Coordinator (DTED) 16:00 Internal Meeting
23 Oct	Sat	Morning: Drafting Evaluation Report 14:30 Modifying evaluation grid
24 Oct	Sun	Drafting Evaluation Report and Minutes of Meetings
25 Oct	Mon	8:30 Meeting with DTED officials Afternoon: Drafting Evaluation Report and Minutes of Meetings
26 Oct	Tue	9:45 Steering Committee
27 Oct	Wed	Internal Meeting
28 Oct	Thu	9:00 Signing of Minutes of Meetings Afternoon: Report to JICA Malawi Office Report to the Embassy of Japan
29 Oct	Fri	Leave Malawi

1-4. Members Concerned to the Mid-term Review

The Mid-term Review was jointly conducted by both Malawian and Japanese parties. The result was shared at National Steering Committee on 26th October, 2010. The members are shown below.

1-4-1. Malawian side

Ministry of Education, Science and Technology

M.J. Chitimbe	Principal Secretary
J.S.D. Mwamlima	Principal Planning Offcier
R.Z.G. Agabu	Acting Director, EMAS
L.V. Magreta	Director, Secondary Education
D.Z. Mbewe	Coordinator of DTED
R.J.B Nthengwe	Education Division Manager (CEED)
Sr. E. Dambo	Education Division Manager (SWED)
Dr. E.W.J. Chakwera	Principal, DCE
Dr. Godfrey Kajere	Deputy Director, Technical and Vocational Training
Dorica B. Ayanu	Operations Manager, Malawi National Educations Board (MANEB)
Ernest Matengo	Senior Education Method Advisor (CWED)
Paul Miamba	Senior Education Method Advisor (CWED)
J.Z. Kamkuza	Principal Education Method Advisor (SEED)
I.S. Kamphonda	Senior Education Method Advisor (SEED)

1-4-2. SMASSE Secretariat

Mr. Alfred Kamoto	National Coordinator, DTED, MoEST
Mr. Godwin Jere	National Coordinator, DTED, MoEST
Ms. Lucia Chidalengwa	National Trainer (Biology), DTED, MoEST
Mr. Livati Potiphar	National Trainer (Mathematics), DTED, MoEST
Mr. Hikaru Kusakabe	Expert (INSET Management)
Ms. Ayumi Kikuchi	Expert (Mathematics and Science Education)

1-4-3. Japanese side

(1) Mid-term Review Team

Mr. Satoru Takahashi	Leader Visiting Senior Advisor (Education), JICA
Mr. Yukinori Yanagida	Cooperation and Coordination Associate Expert, Basic Education Division II, Human Development Department, JICA

Ms. Erika Tanaka	Evaluation and Analysis Senior Researcher, Global Link Management, Inc.

(2) JICA Malawi

Mr. Katsuro Saito	Resident Representative
Ms. Minako Shiotsuka	Assistant Resident Representative
Ms. Akane Totani	Project Formulation Advisor (Education)
Mr. Kiyoshi Uchizono	JOCV Coordinator (Education)
Mr. Lingstone Chiona	Programme Officer (Education)

1-5. Methodology of the Review

Based on the Project Design Matrix (PDM) and Plan of Operation (PO), the review is designed to verify the following aspects:

1) Achievements of the Project based on the PDM indicators;
2) Implementation process; and
3) Five evaluation criteria of DAC

Definitions of the criteria are as follows:

Relevance	Relevance of the project plan was reviewed in terms of the validity of the project purpose and the overall goal in connection with the development policy of the Government of Malawi, aid policy of the Government of Japan, needs of beneficiaries, and by logical consistency of the project plan.
Effectiveness	Effectiveness was assessed by evaluating the extent to which the Project had achieved its purpose and by clarifying the relationship between the purpose and outputs.
Efficiency	Efficiency of the project implementation was analysed by focusing on the relationship between outputs and inputs in terms of timing, quality and quantity of inputs.
Impact	Impact of the Project was assessed on the basis of both positive and negative influences caused by the Project.
Sustainability	Sustainability of the Project was assessed in terms of policy, institutional, financial and technical aspects by examining the extent to which the achievements of the Project would be sustained or expanded after the Project period.

Conclusions were drawn from the result of the Review, and recommendations were made by both parties.

2. REVIEW

2-1. Achievements of the Project

2-1-1. Project Purpose

Quality INSETs for secondary mathematics and science teachers at Divisional level are provided.

【Index】 Divisional INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the 'INSET Quality Index'.

【Result】 score 3.3 (2010 Divisional INSET)

2-1-2. Outputs

(1) Capacity of Divisional Trainers is strengthened.
(2) National INSET centre and divisional INSET centre as resource centre are strengthened.
(3) National and Divisional INSETs and M&E are implemented.
(4) Sustainable INSET management system is strengthened at all levels.

(1) Capacity of Divisional Trainers is strengthened.

【Index a】 Over 240 Divisional Trainers undergo appropriate trainings.

【Result】 232 Divisional Trainers

【Index b】 National and Divisional Training obtain mean of over 3 on the scale of 0 to 4 in the 'Trainer Capacity Index'.

【Result】 score 3.4 (2010 National INSET), score 3.3 (2010 Divisional INSET)

(2) National INSET centre and divisional INSET centre as resource centre are strengthened.

【Index a】 National INSET centre and 19 divisional INSET centres are rehabilitated and equipped.

【Result】 National and Divisional INSET centres were rehabilitated and equipped.

【Index b】 Guideline to improve physical and material environment for INSET centres is developed.

【Result】 The guidelines for rehabilitation and maintenance of equipment were made, and that for maintenance of facility is under developing.

【Index c】 Physical and material environment for Divisional INSETs reach the level shown by INSET Centre guideline.

【Result】 Many INSET Centres do not fulfill the standard as INSET Centres as they are conventional secondary schools.

【Index d】 INSET material and equipment are fully utilised for activities of teacher professional development.

【Result】 INSET materials and equipment are utilised at INSET Centres, and teachers at nearby schools are utilising them in accordance with the guideline for equipment.

(3) National and Divisional INSETs and M&E are implemented.

【Index a】 Every year, one INSET is conducted at 19 Divisional INSET centres.

【Result】 1st Divisional INSET was conducted in May 2010.

【Index b】 National INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the 'INSET Quality Index'.

【Result】 score 3.45 (2009 National INSET), score 3.37 (2010 National INSET)

【Index c】 Over 75% of all M/S teachers (3400 estimated) in Public Secondary Schools attend Divisioal INSETs.

【Result】 86% (2931 teachers attended in 2010 Divisional INSET)

【Index d】 9 INSET write-ups per cycle are developed. (SEED: 5; other divisions: 4)

【Result】 9 write-ups were developed in 2010 Divisional INSET.

【Index e】 Divisional INSET M&E Reports are submitted for each INSET.

【Result】 M&E Report on 2010 Divisional INSET was submitted.

(4) Sustainable INSET management system is strengthened at all levels.

【Index a】 Malawian contribution to Divisional INSET fund is increased.

【Result】 The budgets for SMASSE were, MK 20 million (2008/9), MK 35 million (2009/10), MK 33 million (2010/11, planned)

【Index b】 Headteachers and divisional and ministry officials participate training sessions for

strengthening their administrative capacity.

【Result】 31 members participated in trainings in Japan.

2-2. Results of the Review

2-2-1. Implementation Process

Overall project implementation process is good. DTED has the initiative to implement the Project, and stakeholders are smoothly communicating with each other, and are actively involved in the Project in general. The SMASSE budget has been secured by the Malawian side, but its disbursement was not made timely, causing logistic difficulties especially in implementing Divisional INSET nation-wide in May 2010. Some Divisional Trainers and participants were unsatisfied with the conditions of INSET such as out-of-pocket allowance and hostels, and this affects smooth implementation of INSET to some extent.

2-2-2. Review by the Five Criteria

Results of the review by the Five Criteria are summarized below.

Relevance: High
INSET for M/S teachers in secondary education is listed as one of priority areas in the Malawian education policy document, such as the National Education Sector Plan (NESP) 2007-2017 and the Education Sector Implementation Plan (ESIP) 2009-2013. In Japan's Rolling Plan for Malawi, assistance in basic education (primary and secondary) is one of its priority areas. The approach of INSET applied in SMASSE is appropriate. INSET addresses both content knowledge and teaching methodology of student-centred approach (ASEI/PDSI). The cascade model is adopted to reach all the secondary school M/S teachers nation-wide. The teacher education cooperation experiences of other countries such as Kenya are appropriately utilised.
Effectiveness: Medium
The INSET Quality Index, the Indicator of the Project Purpose, is 3.3 for 2010 Divisional INSET. This score is already far above the expected level of 2.5. Both management and contents of INSET are appropriate in general, but further improvement is necessary to implement quality INSET. The lowest score out of seven items in the Index is that of Facilities & Welfare. To enhance the effectiveness of INSET, the needs of careful attention to

underqualified teachers is identified.

All four Outputs are important to produce the Project Purpose, and the logic from Output to Project Purpose is appropriate. It is noted, however, that the current Indicator is based on self-evaluation by participants.

Efficiency: Relatively Low

The Outputs are being produced as expected in general.

The Malawian side provides the office for SMASSE Secretariat and assigned counterparts. Local human resources and existing facilities of secondary schools are utilised. The expenditures necessary for Project implementation have been covered by the budget of DTED. However, its disbursement was not timely implemented for 2009 and 2010 National INSETs and 2010 Divisional INSET. This caused extra work burden to those involved especially in 2010 Divisional INSET, such as DTED officials and headteachers at INSET Centres. The disbursement is expected to be improved.

The Inputs of the Japanese side, i.e., dispatch of experts, training in Japan and third countries, and equipment provision, were executed as planned.

At some INSET Centres, INSET sessions were not started as scheduled because there were complaints of participants on out-of-pocket allowance and hostels. The hostels are not in a good sanitary condition. In addition, meal provision was delayed at some INSET Centres, causing delay of INSET sessions.

Due to the change of the school calendar, it became impossible to hold a two-week INSET as was initially planned. Therefore, it is necessary to formulate the contents of INSET so that sufficient contents can be accommodated in one-week session.

Impact: Relatively Low (Uncertain at present)

It may be still difficult to prospect the achievement of the Overall Goal, as Divisional INSET was conducted only once in May 2010. The results of monitoring and evaluation show that the scores of ASEI/PDSI checklist are slightly improving from the level of the baseline survey. It is expected to be further improved if INSET is continuously conducted. Teachers consider that their capacity has been improved through INSET. Some of them are trying to utilise ASEI/PDSI approach in their classes with some difficulties. Other teachers mentioned that the students are enjoying their classes with higher level of participation and interaction after INSET. To achieve the Overall Goal, continuous implementation of INSET is necessary as

well as follow-up activities such as cluster-based and school-based trainings.
Some other influences are reported. Other subject teachers show interest of student-centred approach introduced in SMASSE INSET. National Trainers teaching at Domasi College of Education are utilising experiences of SMASSE in teaching PRESET classes.

Sustainability : Relatively High

In policy aspect, strengthening secondary M/S education is clearly prioritised in NESP 2008-2017. MoEST is committed to continuing SMASSE INSET. In organizational and financial aspects, INSET is already internalised as one of regular activities of DTED and Education Division Office. Headteachers are also supporting teachers to participate in INSET, and headteachers at INSET Centres are aware of the importance of maintenance of facilities, materials, and equipment. But it is still necessary to secure the budget for maintenance and to improve the management capacity of teachers at INSET centres to maintain facilities properly. MoEST has already secured the budget for SMASSE INSET, and it is incorporated in MoEST annual plan (Plan of Works). In technical aspect, National and Divisional Trainers enhanced their knowledge on ASEI/PDSI approach, and improved their various capacities as trainers, such as facilitation and INSET management. However, further capacity development is necessary to continuously provide quality INSET.

2-2-3. Conclusion

The Project has been smoothly implemented in general. Inputs have been made as planned and utilised to produce Outputs. The Indicator of the Project Purpose has been achieved. The capacity of National and Divisional Trainers has been improved. Teachers started utilising ASEI/PDSI in their classrooms, and students show more interest and higher level of participation. MoEST is committed to continuing SMASSE INSET and has already secured the implementation budget.

To continuously strengthen quality INSET, it is necessary to further improve management and contents of SMASSE INSET and to develop the capacity of National and Divisional Trainers. It is also important to conduct follow-up activities to complement SMASSE INSET, such as cluster- and school-based trainings with the initiative of Education Division Office.

3. RECOMMENDATIONS

3-1. Human Resources

(1) Capacity Development

1) National Trainers and Divisional Trainers (Academic aspect)

Through on-the-job training in Malawi and training abroad, the capacity development of National Trainer and Divisional Trainer should continuously be focused. It is also desirable that the knowledge and experience of National Trainers at Domasi College of Education will be utilised continuously and effectively as valuable resources.

2) DTED (Managerial aspect)

With the initiative of DTED, it is important to conduct National and Divisional INSET smoothly. In particular, proactive budget planning and timely budget disbursement should be done with DTED's responsibility.

(2) Status and Motivation of Trainers

1) Status of National Trainers

The status of National Trainers in DTED is secondment from secondary schools. The decision of establishing new posts for National Trainers in DTED is expected to be made soon.

2) Motivation of Divisional Trainers

Divisional Trainers are in a position to train other teachers directly, so their role in improving teaching and learning in mathematics and science in Malawi is of great importance. Consequently, it is desirable that Divisional Trainers whose performances are outstanding in Divisional INSET should be given priority of taking an opportunity of training abroad as many times as possible, in order to enhance their motivation. Furthermore, it is expected that MoEST will take into consideration skills and experiences gained in the SMASSE INSET in their career development.

3-2. Budget

(1) Securing of SMASSE Budget

With the commitment of MoEST, the budget for SMASSE has been steadily secured so far, and 33 million MK has been secured in FY 2010/11 as a part of the Other Recurrent Transaction (ORT). Given the termination of JICA's assistance in August 2012, and the nature of SMASSE Program as the Malawian own program, it is desirable to secure the budget successively.

(2) Maintenance of INSET Centres

Keeping INSET Centres clean and comfortable is particularly important. It is recommended that the maintenance budget of facilities and equipment in INSET Centres be covered by the Malawian side. In addition, in order to save the maintenance cost, it is necessary that headteachers in INSET Centre sensitise students, parents, and the community on how to use and maintain facilities properly.

(3) Issue of Out-of-Pocket Allowance

In 2010 Divisional INSET, some participants complained about out-of-pocket allowance. However, some Divisional INSET Centre headteachers convinced participants through dialogues, and INSET was implemented without much confusion. Participants in the next Divisional INSET are the teachers who have already known the amount of out-of-pocket allowance of SMASSE INSET. However, the same complaints may arise again, so the situation is still unpredictable. It is necessary to sensitise Divisional Trainers and teachers on the importance of INSET, and to develop training contents that will meet the needs and satisfaction of the participants.

3-3. INSET System

(1) Development of New Training Curriculum for Six Divisions

Currently, there are different training contents and materials between SEED and other five divisions. Even so, in terms of quality control and sustainability of INSET, it is recommended to develop new training curriculum for six divisions during the Project period.

(2) Implementation of Additional INSET Evaluation

National and Divisional INSET have been evaluated by participants and trainers. This evaluation is not very objective. From this point, in addition to the current evaluation, it is proposed that additional evaluation is separately carried out by EMAS officials and/or National Trainers.

(3) Strengthening of Cluster- and School-based Trainings

The Project is aiming at building a sustainable system to provide National and Divisional INSET. Therefore, it is strongly expected to strengthen cluster- and school-based trainings with initiative of the Malawian side, through which teachers continuously and properly actualise what they learned in SMASSE INSET in a classroom. In some clusters, such trainings have

already started, and are expected to be scaled up. It is desirable to utilise Divisional Trainers as human resources and INSET materials in those trainings.

(4) Provision of Optional and Flexible Courses

Since there are no optional courses in Divisional INSET so far, qualified teachers and underqualified teachers are learning at the same sessions. Despite the advantage of interaction among them, it is recommended to provide both core and optional courses that participants could choose upon their needs. Careful attention is being paid to underqualified teachers, but provision of optional courses will respond to the different needs of teachers. However, this issue should be tackled by the Malawian side with a long-term perspective.

3-4. Revision of PDM

Current PDM has the following shortfalls, and needs to be revised: 1) the indicator of Overall Goal is unavailable. The possibility of data sharing from EMAS is uncertain. If it continues, this indicator will be deleted; 2) some indicators of the Outputs are needed to be changed in accordance with the current situation; and 3) the Activity 4-4 is unnecessary because MoEST has secured the sufficient SMASSE budget.

4. LESSONS LEARNED

1. Internalisation of SMASSE Program by a Counterpart Country

SMASSE Program, which started with eagerness of the Malawian side, is their own program. They have taken the initiative of planning and implementing activities whereas the JICA experts have provided technical support to them in academic and managerial terms. This stance has been consistent since the inception of the Program. In the course of the Program, unexpected things happened, but it was the Malawian side which had explored solutions through open and persistent dialogue. Therefore, it can be said that the internalisation of the program by a counterpart country will naturally entail their responsibility.

2. Sharing of Knowledge and Experiences with Other African Countries

The training in other African countries (especially in Kenya) seems to be quite beneficial and stimulating for the Malawian participants. They felt deeply impressed and inspired by actually seeing with their own eyes how Kenyan and other African M/S trainers are strongly committed to the improvement of teaching skills for their own countries. Thus, the exposure to

neighboring countries is quite useful for a counterpart country's stakeholders to change their mind-sets and developing their capacity.

3. Proper Setting of Target Level and Target Group

The SMASSE Program targets INSET at the national and divisional level. This level setting is appropriate as contents of INSET reach all M/S teachers. Another important point is that the Program selected a cadre of capable and motivated teachers (especially divisional trainers) as a core target group. Then the instruction was given from a teacher to a teacher. Such a form of learning among teachers creates an opportunity where both facilitators and participants can learn together in the true meaning of the word.

ANNEXES

Annex 1: Project Design Matrix ver. 1.0

Annex 2: Evaluation Grid

Annex 3: Summary of Project Inputs and Outputs

- 3-1. List of Japanese Experts
- 3-2. List of Assigned Counterparts
- 3-3. List of Trainings
- 3-4. Summary of Project Activities
- 3-5. Summary of Project Outputs
- 3-6. List of Equipment Provided
- 3-7. List of Materials Provided (for INSET Centres)
- 3-8. Budget for Implementation of INSETs

Annex 4: Project Design Matrix ver. 2.0 (Draft)

Annex 1: Project Design Matrix ver 1.0

Project Title: Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II
Executing Bodies: Ministry of Education, Science and Technology (MoEST) and Japan International Cooperation Agency (JICA)
Target Teachers: All mathematics and science teachers in public secondary schools (3,400 teachers) and headteachers in public secondary schools
Target Area: 6 Divisions
Duration: 4 years (2008 - 2012)

Version 1.0 (19th May, 2008)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Super goal The abilities of secondary school students in mathematics and science are improved in Malawi.	National Examination pass rate both at JCE and MSCE levels	National Examination results	The minimum number of M/S lessons/ periods per week is maintained. The learning environment of student is maintained.
Overall goal The quality of teaching & learning of mathematics and science is improved in secondary schools in Malawi.	(a) Secondary maths/science lessons sampled nationally obtain mean of over 3.0 on the scale of 1 to 5 in the Teaching & Learning Quality Index administered by the EMAS of MoEST. (b) Secondary maths/science lessons sampled nationally obtain mean of over 2.5 on the scale of 0 to 4 in the ASEI/PDSI checklist administered by the project M&E team.	(a) EMAS M&E reports (b) Project M&E reports	The stability of the teaching force within schools is maintained.
Project Purpose Quality INSETs for secondary mathematics and science teachers at Divisional level are provided.	By the end of the project, Divisional INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the INSET Quality Index through Pre- and Post-INSET, Session and Overall INSET evaluation instruments administered by the Monitoring and Evaluation Team.	Project M&E reports	Stability of Divisional trainers within divisions is maintained.

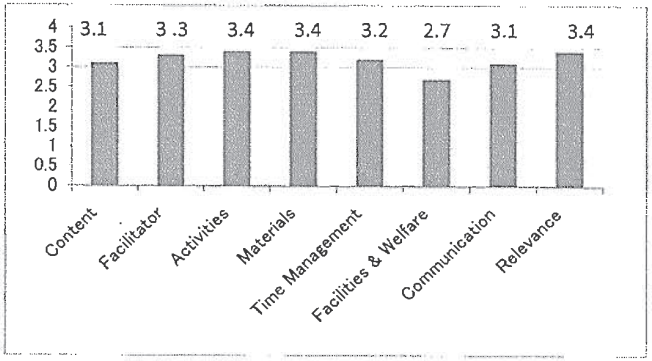
Output(s): 1. Capacity of Divisional Trainers is strengthened.	By the end of the project, 1(a) Over 240 divisional trainers undergo appropriate training. 1(b) National and Divisional Trainers obtain mean of over 3 on the scale of 0 to 4 in the Trainer Capacity Index administered by the Monitoring and Evaluation Team.	Project M&E reports	Stability of National trainers is maintained.
2. National INSET centre and Divisional INSET centre as resource centre are strengthened.	2(a) At least 1 national INSET centre and 19 divisional INSET centres are rehabilitated and equipped. 2(b) Guideline to improve physical and material environment for INSET centres is developed. 2(c) Physical and material environment for Divisional INSETs reach the level shown by INSET centre guideline. 2(d) INSET material and equipment are fully utilized for activities of teacher professional development.		
3. National & Divisional INSETs and M&E are implemented.	3(a) Every year, one INSET is conducted at over 19 INSET centres in Malawi. 3(b) National INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the INSET Quality Index through Pre- and Post-INSET, Session and Overall INSET evaluation instruments administered by the Monitoring and Evaluation Team. 3(c) Over 75% of all M/S teachers (2,500) in Public Secondary Schools attend Divisional INSETs. 3(d) 9 INSET write-up per cycle (SEED 5: 4 subject & 1 general issue; and 4 for other divisions: 3 subject & 1 general issue) are developed. 3(e) Divisional INSET M&E Reports are submitted for each INSET.		Other educational activities will not interfere with the project activities.
4. Sustainable INSET management system is strengthened at all levels.	4(a) Malawian's contribution to Divisional INSET Fund is increased. 4(b) Over XXX headteachers and over XXX divisional and ministry officials participate training sessions for strengthening their administrative capacity.		Stability and cooperation of leadership at all levels are maintained. INSET activities will be priority assignment for officers involved.

Activities: 1-1 Set TORs and recruitment criteria for National Trainers. 1-2 Recruit National Trainers. 1-3 Train National Trainers. 1-4 Sensitize M/S teachers for recruitment of Divisional Trainers. 1-5 Set TORs and recruitment criteria for Divisional Trainers. 1-6 Recruit Divisional Trainers. 1-7 Train Divisional Trainers. 1-8 Conduct Trainers' meetings. 2-1 Set designation criteria for INSET centres. 2-2 Designate and equip DCE and (to be decided) as National INSET Centres. 2-3 Designate schools as Divisional INSET centres. 2-4 Set minimum standards for INSET centres. 2-5 Conduct a survey on current physical and material environment at designated schools. 2-6 Carry out necessary maintenance and rehabilitation of the designated centres. 2-7 Equip INSET centres with T/L materials and facilities. 2-8 Set up guidelines for maintenance of equipment and facilities at INSET centres. 3-1 Conduct the baseline survey for M/S teachers. 3-2 Develop curriculums for INSETs. 3-3 Conduct National INSET. 3-4 Conduct monitoring and evaluation of National INSET. 3-5 Conduct Divisional INSET. 3-6 Conduct monitoring and evaluation of Divisional INSET. 4-1 Set TORs for different INSET committees. 4-2 Sensitize all stakeholders such as PTA, School Management Committee, and MoEST officials. 4-3 Establish INSET committees at different levels. 4-4 Establish Divisional INSET fund. 4-5 Strengthen leadership at all levels through trainings, workshops and study tours. 4-6 Publicize INSET activities through newspapers, newsletters, radio and TV.	**Inputs:** 1. Malawian side: (a) Office space and facilities necessary for the Project (b) Expenses for monitoring and evaluation (c) Assignment of National Coordinator from DTED (d) Assignment of full time National Trainers to the Project (e) Expenses necessary for the implementation of the Project (Running cost for INSETs) 2. Japanese side: (a) Training of counterpart personnel in Japan, Kenya and other countries (b) Provision of equipment, materials and maintenance of facilities(if necessary) (c) Dispatch of short / long term experts (d) Expenses necessary for the implementation of the Project		

Annex 2: Evaluation Grid

Mid-Term Review
The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II

Evaluation Criteria		Evaluation Questions		Results
		Main Questions	Sub-questions	
Achievements	Extent to which Super Goal is achieved (Expected)	The abilities of secondary school students in mathematics and science are improved in Malawi.	National Examination pass rate both at JCE and MSCE levels.	* It is difficult to tell the prospect of achievement of this Indicator at the moment. This is because: 1. Divisional INSET was just completed in May 2010. 2. The average score of the National Examination is considerably fluctuated year by year. * Students show more interest in maths and science (M/S) subjects, participate more in class, and enjoy M/S study. At schools in SEED, it is reported that scores in the National Examination is getting improved. It is especially noted that some students became able to solve applied questions which they could not before.
	Extent to which Overall Goal is achieved (Expected)	The quality of teaching & learning of mathematics and science are improved in Malawi.	(a) Secondary maths/science lessons sampled nationally obtain means of over 3.0 on the scale of 1 to 5 in the Teaching & Learning Quality index administered by the EMAS of MoEST.	* SMASSE Secretariat is currently collecting data for this indicator and planning to analyze them with EMAS.
			(b) Secondary maths/science lessons sampled nationally obtain mean of over 2.5 on the scale of 0 to 4 in the ASEI/PDSI checklist administered by the project M&E team.	* In classroom observation conducted after Divisional INSET in 2010, scores of all the items in ASEI/PDSI checklist are improved from baseline. The mean score is 1.6, which is 0.5 up from that of 1.1 at the baseline, but scores of all eight items are below 2.5. The items included in the checklist are Attitude, Activity, Student-centred, Experiment, Improvisation, Planning, Seeing, and Improving. The item scored highest in the results after 2010 Divisional INSET is Planning of 2.26, and the item scored lowest is Student-Centred of 1.12. * Teachers utilize what they learned at INSET at their actual class, giving questions to students, arousing participation, and introducing more experiments, for example. But not many teachers implement new methodology in class on a daily basis.

Achievements	Extent to which Project Purpose is achieved (Expected)	Quality INSETs for secondary mathematics and science teachers at Divisional level are provided.	Divisional INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the INSET Quality Index through Pre- and Post- INSET, Session and Overall INSET evaluation instruments administered by the Monitoring and Evaluation Team.	* Mean of INSET Quality Index for 2010 Divisional INSET is 3.3, which is already above the targeted level. The breakdown of scores are: INSET Evaluation Index of Overall INSET Evaluation Instrument by Participants: 3.2 INSET Evaluation Index of Overall INSET Evaluation Instrument by Facilitators: 3.4 INSET Evaluation Index of INSET Session Evaluation Instrument by Participants: 3.5 INSET Evaluation Index of Post INSET Evaluation Instrument by Participants: 3.0 An example of the breakdown of INSET Evaluation INDEX is shown below. INSET Evaluation Index of Overall INSET Evaluation Instrument by Participants  * Some issues to be improved are pointed out, however. Concerning management, information on INSET did not come timely, facilities are not well maintained in some INSET Centres, and budget was not disbursed in time.
	Extent to which Outputs are achieved	(1)Capacity of Divisional Trainers is strengthened.	(a) Over 240 Divisional Trainers undergo appropriate training.	* A total of 232 Divisional Trainers underwent training. In SEED, TOT and Intensive Training were organized for Divisional Trainers and currently 41 Divisional trainers who received training are involved in the Project. In other five Divisions, a total of 192 Divisional Trainers participated in 1st National INSET (2009) and 177 in 2nd National INSET (2010). * Some Divisional Trainers are not currently involved in SMASSE activities mainly because they are on study leave for a higher degree.
			(b) National and Divisional Training obtain mean of over 3 on the scale of 0 to 4 in the Trainer Capacity Index administered by the Monitoring and Evaluation Team.	* Means of the scale in the Trainer Capacity Index is 3.5 in 2009 National INSET and 3.4 in 2010 National INSET. * Means of the scale in the Trainer Capacity Index in 2010 Divisional INSET is 3.3. * Capacity of Divisional Trainers have been improved in terms of understanding of ASEI/PDSI, facilitation method, peer teaching, and delivery method. Many of those interviewed commented that the perception that M/S education is difficult is changed. Most of them are now confident as trainer though not perfectly. Some Divisional Trainers are not fully confident in their capacity as trainer yet.
		(2)National INSET Centre and Divisional INSET Centre as resource Centre are strengthened.	(a) At least 1 Ntional INSET Centre and 19 Divisional INSET Centres are rehabilitated and equipped.	* Maintenance and rehabilitation work was made at National INSET Centre at Domasi College of Education (DCE), including provision of photocopier, supply of rehabilitation materials, and supply stationeries. * 19 Divisional INSET Centres were rehabilitated and equipped with facilities and teaching and learning materials. However, the initial conditions are different among each INSET Centre and some INSET Centres need further rehabilitation.

Achievements	Extent to which Project Purpose is achieved (Expected)	(2)National INSET Centre and Divisional INSET Centre as resource Centre are strengthened.	(b) Guideline to improve physical and material environment for INSET Centres is developed.	* Guideline for maintenance of equipment has been developed. * Guideline for maintenance of facilities is under development. As for rehabilitation of facilities, the material "Minimum Standard & Checklist" was developed and is used as Guideline.
			(c) Physical and material environment for Divisional INSETs reach the level shown by INSET Centre guideline.	* Rehabilitation has been done and materials have been provided to 19 Divisional INSET Centres. Many INSET Centres do not fulfill the standard as INSET Centres yet as they are conventional secondary schools. * Headteachers at most INSET Centres consider that further improvement is necessary to make the facilities appropriate as INSET Centre, including sanitation, especially water facilities.
			(d) INSET material and equipment are fully utilized for activities of teacher professional development.	* INSET materials and equipment are utilized at INSET Centre. * Materials and equipment can be utilized for teacher development activities among nearby schools in accordance with the Guideline for equipment. Teachers at schools around INSET Centre utilize materials and equipment, when necessary. * In Balaka, INSET Centre was utilized for INSET of English. At Mchiji INSET Centre, rehabilitated hostels are used for other INSET courses.
		(3)National & Divisional INSETs and M&E are implemented.	(a) Every year, one INSET is conducted at over 19 INSET Centres in Malawi.	* In SEED, 4th Divisional INSET was held for 2 weeks in December 2008. * 1st Divisional INSET was conducted for 1 week in May 2010.
			(b) National INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the INSET Quality Index through Pre- and Post- INSET, Session and Overall INSET evaluation instruments administered by the Monitoring and Evaluation Team.	* Mean of scale of INSET Quality Index in 2009 National INSET is 3.45. Its breakdown is; Overall INSET Evaluation Instrument by Participants: 3.3 Overall INSET Evaluation Instrument by Facilitators: 3.7 INSET Session Evaluation Instrument by Participants: 3.7 Post INSET Evaluation Instrument by Participants: 3.1 * Mean of scale of INSET Quality Index in 2010 National INSET is 3.37. Its breakdown is; Overall INSET Evaluation Instrument by Participants: 3.3 Overall INSET Evaluation Instrument by Facilitators: N/A INSET Session Evaluation Instrument by Participants: 3.6 Post INSET Evaluation Instrument by Participants: 3.2 * As to contents, the sessions are basically highly evaluated. Some report that methodology of a part of National Trainers was not very interactive and not fully appropriate in terms of time management of session. * Divisional Trainers interviewed commented that they learned subject content and new teaching methodology such as promoting participation and interaction, facilitation skill, and communication skill through National INSET. Many Divisional Trainers feel that they are more confident than before as trainers while they recognize
			(c) Over 75% of all M/S teachers (2,500) in Public Secondary Schools attend Divisional INSETs.	* In 2010 Divisional INSET, out of 3400 teachers expected at 19 INSET Centres, 2931 teachers (209 trainers and 2722 participant teachers) participated, representing 86% of attendance rate. The number of all M/S teachers is estimated at 3400 in PDM Ver. 1.0.
			(d) 9 INSET write-up per cycle (SEED 5: 4 subjects & 1 general issue; and 4 for other Divisions: 3 subjects & 1 general issue) are developed.	* 5 kinds of write-ups (4 subjects & 1 general) were developed for 4th and 5th SEED INSET (in 2008 and 2010), respectively. * 4 kinds of write-ups (3 subjects & 1 general) were developed for 2010 Divisional INSET. For details of breakdown of topics, see Annex 3-5.
			(e) Divisional INSET M&E Reports are submitted for each INSET.	* M&E was conducted from June to August and Divisional INSET M&E Reports were submitted for each INSET.
		(4)Sustainable INSET management system is strengthened at all levels.	(a) Malawian contribution to Divisional INSET Fund is increased.	* The total amount of SMASSE budget of MoEST (DTED) is increasing from MK20,000,000 in fiscal 2008/09 to MK35,000,000 in 2009/10. For the year 2010/11, a total budget of MK33,000,000 is secured.

Achievements		(4) Sustainable INSET management system is strengthened at all levels.	(b) Over XXX headteachers and over XXX Divisional and Ministry officials participate training sessions for strengthening their administrative capacity.	* 31 headteachers and Divisional and Ministry officials participate in training in Japan. * Target level of this Indicator should be defined.
	Implementation of Inputs	Japanese side (a) Training in Japan, Kenya, and third country (b) Equipment provision (c) Dispatch of long- and short- term experts (d) Project local cost	Are inputs made as planned in terms of quality, quantity, and timing?	* Inputs of Japanese side were made based on PO. Quality, quantity, and timing were appropriate in general. (a) See Annex 3-3. (b) See Annex 3-6 & 3-7. (c) See Annex 3-1. (d) The total amount of local cost covered by Japanese side is: 16,648,000 yen in fiscal 2008, 53,014,000 yen in 2009, and 29,048,000 yen (planned) in 2010. For details, see Annex 3-8.
		Malawian side (a) Office space (b) CP (c) Facilities and equipment (d) Project implementation cost	Are inputs made as planned in terms of quality, quantity, and timing?	* Inputs of Malawian side were made based on PO. (a) DTED provided office space for SMASSE secretariat. (b) CPs are allocated at DTED and each Education Division. For details, see Annex 3-2. (c) Existing facilities are provided as INSET Centres. (d) Budget for National and Divisional INSET is born by NoEST. All the expenditures for National INSET are born by MoEST. Running cost for Divisional INSET is born by MoEST, except out-of-pocket allowance for all schools and transport for teachers at schools of cost-centre. Disbursement of cost for National INSET and Divisional INSET was not provided timely as planned. For details of project implementation cost, see Annex 3-8.
	Implementation of Activities	1-1 Set TORs and recruitment criteria for National Trainers.		* Criteria defined in the Project Document in the Minutes of Meeting signed on 15 July 2008 with R/D were applied.
		1-2 Recruit National Trainers.		* Three Subject Administrators in Phase 1 were assigned as National Trainers. As they were dispatched to Japan for a long-term training, four National Trainers were newly recruited in June 2010. * Lecturers at Domasi College of Education (DCE) in Phase 1 are assigned as part-time National Trainers.
		1-3 Train National Trainers.		* National Trainers are dispatched to training in Japan, Kenya, Uganda, and Malaysia. Three National Trainers are being trained, taking an opportunity of long-term training. They are in constant contact with SMASSE Secretariat and being supported by Japanese Experts when necessary. * National Trainers are also being trained through OJT, including facilitation of 2009 and 2010 National INSET.
		1-4 Sensitize M/S teachers for recruitment of Divisional Trainers.		* Sensitization workshop was held in February 2009 in five Divisions except for SEED.
		1-5 Set TORs and recruitment criteria for Divisional Trainers.		* Criteria defined in the Project Document were applied.
		1-6 Recruit Divisional Trainers.		* 43 Divisional Trainers selected in Phase 1 were assigned in SEED. * A total of 192 Divisional Trainers were selected in five Divisions except for SEED.
		1-7 Train Divisional Trainers.		* National INSET were conducted in 2009 and 2010. In addition, ToT courses for specific topics such as computer were held. For SEED, two Intensive training courses were organized. * Some trainers were dispatched to training in Kenya and Malaysia. For details, see Annex 3-3.
		1-8 Conduct Trainers' meetings.		* ToT courses were held in six Divisions. For details, see Annex 3-4.
		2-1 Set designation criteria for INSET Centres.		* Selection criteria were defined at Stakeholder workshop in September2008.
		2-2 Designate and equip DCE and (to be decided) as National INSET Centres.		* DCE was selected as National INSET Centre. Rehabilitation works were done and necessary equipment was supplied.

Achievements	Implementation of Activities	2-3 Designate schools as Divisional INSET Centres.	* Three Divisional INSET Centres in Phase 1 were designated in SEED. Additional 16 Divisional INSET Centres were selected through DEOs. * 19 INSET Centres above mentioned were recognized at the National Steering Committee in September 2009.
		2-4 Set minimum standards for INSET Centres.	* Minimum standard checklist was developed.
		2-5 Conduct a survey on current physical and material environment at designated schools.	* Baseline survey was conducted from October to December in 2009 with PEMA/SEMA at Education Division Office.
		2-6 Carry out necessary maintenance and rehabilitation of the designated centres.	* Based on the results of the baseline survey, necessary materials equipment were procured and rehabilitation works were implemented at 19 Divisional INSET Centres.
		2-7 Equip INSET Centres with T/L materials and facilities.	* Equipment necessary for training, including laptop computer and photocopier, was provided. Teaching and learning materials such as books and stationeries were also provided. Materials necessary to rehabilitate facilities such as paint and glass were provided. Supplies for hostels, such as mattresses and mosquito nets were also included in procurement. For details, see Annex 3-7.
		2-8 Set up guidelines for maintenance of equipment and facilities at INSET Centres.	* Guideline for maintenance of equipment were developed by SMASSE Secretariat. The Guideline was distributed to Education Division Office, Divisional Trainers, and Divisional INSET Centres. Guideline for facilities is under development.
		3-1 Conduct the baseline survey for M/S teachers.	* Baseline survey was conducted from August to September in 2009 for 97 schools in five Divisions except SEED. The results were compiled in report.
		3-2 Develop curriculums for INSETs.	* Curriculum was developed for National INSET in 2009 and 2010 and the same curriculum was used for 2010 INSET. * Curriculum was developed for 4th Divisional INSET (2008) and 5th Divisional INSET (2010) in SEED.
		3-3 Conduct National INSET.	* 1st and 2nd National INSET were conducted in May 2009 and January 2010, respectively.
		3-4 Conduct monitoring and evaluation of National INSET.	* Monitoring was conducted during National INSET and the results were compiled in report.
		3-5 Conduct Divisional INSET.	* 4th SEED INSET was conducted in December, 2008. * 1st Divisional INSET was conducted in May 2010.
		3-6 Conduct monitoring and evaluation of Divisional INSET.	* Monitoring was conducted during Divisional INSET. In addition, monitoring was conducted in June and July at 73 schools (10% of government schools). The results of monitoring were compiled in report.
		4-1 Set TORs for different INSET committees.	* Criteria defined in the Project Document were applied.
		4-2 Sensitize all stakeholders such as PTA, School Management Committee, and MoEST officials.	* Sensitization workshop for recruitment of Divisional Trainers was held in February 2009 in five Divisions except SEED, where headteachers were also invited. * Sensitization Workshop for headteachers and PTA members was held in December 2009. * The Project take several occasions such as closing ceremony of INSET as an opportunity to sensitize related stakeholders.
		4-3 Establish INSET committees at different levels.	* The National Steering Committee was held in September 2009. * The Divisional Coordinating Committee was held in each 6 Division. For details, see Annex 3-4.
		4-4 Establish Divisional INSET fund.	* Implementation of this activity is still under discussion.
		4-5 Strengthen leadership at all levels through trainings, workshops and study tours.	* Stakeholder Meetings for PEMA/SEMA were held. * Trainings in Japan, Kenya, and Botswana are conducted for capacity development of CPs. For details, see Annex 3-3.
		4-6 Publicize INSET activities through newspapers, newsletters, radio and TV.	* Project invited the press, including newspapers, radio, and TV, to the National Launch Ceremony of 2008 SEED INSET as well as the closing ceremony of 2010 National INSET.

Implementation process	Relations among stakeholders	Are relations among stakeholders of the Project smooth?	Are communications between Japanese experts and Malawian CPs smooth?	* Communications between Japanese experts and Malawian CPs are generally smooth. Both sides work together in close communication at the SMASSE Secretariat at DTED.
			Are communications between SMASSE Secretariat and related stakeholders smooth?	* Necessary information is shared among all the stakeholders through various meetings, including the National Steering Committee and Stakeholder Meetings. National Trainers both at DTED and DCE have meetings and discussions when necessary. * Information on INSET are delivered to stakeholders through existing administrative network via the Education Division Office. Information on INSET is delivered through radio and newspapers as well because even mobile phones do not function at some schools. * In spite of various efforts to facilitate communications among stakeholders, some Divisional Trainers report that information on National INSET was delivered to school just a few days before National INSET.
	Ownership of CP organizations	Is MoEST actively involved in planning and implementation of the Project?	Does MoEST have sufficient information on the Project progress?	* DTED has initiative to implement the Project and all the officials at DTED fully share information on the Project. Other departments concerned at MoEST also get sufficient information on the Project. * In terms of effective monitoring and evaluation of INSET, more close communication may be necessary with EMAS headquarters.
			Is allocation of CPs by MoEST appropriate?	* Two CPs as National Coordinators, seven full-time National Trainers, and seven part-time National Trainers are allocated at the personnel cost by MoEST. Three National Trainers are currently participating in long-term training in Japan and four National Trainers were recruited in June 2010, making fruitful contribution to the Project. National Trainers currently participating in long-term study in Japan are exchange information with related stakeholders via Email, and expected to make positive contribution when returning to Malawi. * Currently seven National Trainers at DTED are seconded from secondary school. Procedures to establish official posts as National Trainer at DTED are under way. * One National Coordinator left DTED in March 2010. Another official at DTED was appointed as National Coordinator in September 2010. * At Education Division Office, two PEMA/SEMA are allocated as Divisional Coordinator, except in SEED, where only one position for PEMA/SEMA is currently available.
			Are CPs actively participating in Project activities?	* Ownership of stakeholder organization is emphasized and respected. * CPs currently assigned are actively participating in the Project in general. * The role of CPs at DCE has been somewhat changed because SMASSE Secretariat was transferred from DCE to DTED at the start of the Phase 2. Some of part-time National Trainers at DCE expected that they would be more actively involved in the Project, and they obtain necessary information and participate in meetings and discussions when necessary.
			Is Malawian budget secured and disbursed as planned?	* Malawian budget necessary for the Project is secured and disbursed although there was delay in disbursement. * Actual disbursement rate of MoEST against planned budget is increasing. For details, see Annex 3-8. * Disbursement of actual cost necessary for each INSET is sometimes delayed due to procedural matters and this affected scheduled implementation of INSET. Disbursement procedure is improving.
	Project management system	Is management and monitoring system of the Project appropriate?	Is management and monitoring system of the Project functioning?	* Monitoring for the overall Project implementation is conducted mainly by the SMASSE Secretariat. The overall Project implementation process is generally good. * Monitoring for INSET (classroom observation) was conducted for some sampled schools by the Project monitoring team by National Trainers and PEMA/SEMA.
			Is PDM appropriately utilized and referred?	* The Secretariat at DTED are referring to PDM as a monitoring tool of the overall project implementation. Progress of Activities and achievements of Indicators are constantly monitored based on PDM. The Project Document is also referred to among National Trainers.

Implementation process			Is collaboration with JOCV appropriately implemented?	* Information on SMASSE is shared among Japanese experts, Japanese Overseas Cooperation Volunteers, and JOCV Coordinator (education) so that cluster-based activities supported by JOCV are conducted in the same direction and concept as SMASSE. * JOCV of maths and science teachers participate in Divisional INSET to grasp the idea of SMASSE INSET. * JOCV are assisting cluster-based training to follow up SMASSE INSET in one cluster in Central West Education Division and in two clusters in SEED. * JOCV Coordinators facilitating communication between the Project and JOCV.
	Contributing and inhibiting factors	Are there any contributing and inhibiting factors for smooth implementation of the Project?	Do headteachers have appropriate understanding toward expenditures on INSET?	* Through sensitization workshops, headteachers and PTA representatives agreed to send teachers to INSET with allowance and transport cost born by school. According to interviews during the Mid-term Review, most headteachers have appropriate understanding toward expenditures on INSET and take necessary measures. * When disbursement of expenditures by MoEST was delayed, most of headteachers at INSET Centres supported smooth implementation of INSET by temporary disbursement of INSET expenditures by school budget.
			Are there any difficulties for CPs and teachers to be actively involved in the Project and/or INSET?	* Some management issues are reported. Arguments on allowance and hostels are especially serious even though SMASSE Secretariat explained about allowance and use of hostels beforehand. * Participants in SMASSE INSET are provided with MK500 as allowance. Apart from allowance, they are provided with meals and accommodation at hostels of INSET Centre. Many participants complain that the allowance is too small. Some also mentioned that allowance for INSET should be the same as the government standard. Actually the government rate is also MK500 if accommodation and meals are provided. * The physical conditions of hostels are not satisfactory to participants. This is because hostels are intended for students of secondary schools. In addition, hostels at some INSET Centres have sanitation problem such as lack of water supply. * At some INSET Centres, provision of meals were delayed, which delayed the start of INSET. * Most Divisional Trainers and teachers do not find difficulties to participate in Divisional INSET as Divisional INSET are held during holidays. Headteachers are cooperative and encourage teachers to participate * Divisional Trainers had to attend National INSET during the academic term as National INSET was held during
			Is INSET cost appropriately disbursed at non-cost centre CDSSs?	* Most CDSS managed to provide the INSET cost. According to interviews, some CDSS (non-cost centre) did not dispatch teachers to Divisional INSET due to shortage of fund. The Project held sensitization workshops and disseminated information on INSET beforehand so that CDSS could secure budget necessary for INSET. But some CDSS did not have budget left due to financial management as INSET was held after the termination of academic term.
			Is the mechanism of MoEST to disburse the budget for National and Divisional INSET appropriately functioning?	* Some activities were delayed, including 2009 and 2010 National INSET, and 2010 Divisional INSET, because of procedural matters of budget disbursement. * Disbursement of budget has been improved since two Senior Accountants were allocated to DTED in May 2010. This is because Senior Accountant has more power in his own discretion than Junior Accountant.
			Are there any contributing and inhibiting factors in regard to smooth Project implementation?	* Some Divisional Trainers are not satisfied with conditions such as allowance and accommodation and this sometimes affects smooth Project implementation. In one Division, Divisional Trainers did not attend Intensive Training. In another Division, the start of Divisional INSET was delayed for some hours due to complaints by participants over allowance, although there was not much confusion thanks to explanations by Education Division Office, headteachers, and Divisional Trainers. In addition, National Trainers at DCE did not participate in monitoring of Divisional INSET because of allowance issue. * During Presidential Election in 2009, Japanese Experts had to stay in Lilongwe due to security code of JICA. However, it did not affect smooth implementation as INSET was prepared with the initiative of CPs.

Relevance	Needs	Is the Project Purpose consistent with the needs of Malawi?	Is support for INSET of secondary M/S teachers consistent with the Malawian needs?	* Before SMASSE, INSET was not regularly conducted although some gathering took place among teachers on an ad hoc basis in some Divisions. * There are quite a number of underqualified teachers in secondary schools, especially at CDSS, and INSET is required to improve capacity of them. * Strengthening of maths and science education is considered necessary because many teachers and students think that maths and science are difficult.
			Are the contents of Divisional INSET consistent with the needs of secondary M/S teachers?	* In SMASSE INSET, both subject contents and methodology are covered, which is appropriate in the needs of secondary M/S teachers. * Many M/S teachers were not confident in teaching methodology, therefore, methodology in SMASSE INSET is useful. The methodology introduced by INSET is consistent with their needs. Student-centred approach has been already recommended by MoEST. * Some teachers, especially underqualified teachers, have more needs to increase content knowledge on the subject. SMASSE INSET is responding to this needs. Some underqualified teachers feel that they need more training on content knowledge in SMASSE INSET.
	Priority	Is the Overall Goal consistent with the Malawian development policy?	Is strengthening Mathematics/Science teachers through INSET priority in Malawian education policy?	* In the National Education Sector Plan (NESP) 2007-2017, institutionalization of INSET and continuous professional development (CPD) for teachers for secondary education is pointed out as one of priorities (Priority 2-Quality and relevance). * In the Education Sector Implementation Plan (ESIP) 2009-2013, conducting INSET in maths and science is listed in secondary teacher education in the Teacher Education Activity Matrix. * In the National Strategy for Teacher Education and Development 2007-2017, CPD is emphasized. SMASSE is considered as a part of CPD. * Secondary education is considered as important at MoEST as education is a continuous process and secondary education functions as bridges between basic education and higher education.
			Are there any other plan and strategy at policy level in regard to secondary M/S education?	* In the Strategic Direction of the Ministry of Education, Science & Technology for Improving Quality of Education in Malawi, strategies to intensify teaching and learning of science subjects and mathematics are described, including inspection and curricula.
		Are the Overall Goal and the Project Purpose consistent with the Japanese ODA policy?	Are the Overall Goal and the Project Purpose consistent with priority areas in the Japanese ODA policy and JICA's program toward Malawi?	* In Japan's Rolling Plan for Malawi, the priority areas are; agricultural and rural development, basic education (primary and secondary), water resource development, improvement of health and medical services, transport infrastructure development, rural electrification, improvement of governance. * JICA's assistance policy for Malawi is the same as the Rolling Plan.
	Relevance of approach	Is the Project approach appropriate?	Is INSET appropriate as an approach to respond to development issues in M/S education in Malawi?	* In ESIP, INSET for maths and science is pointed out. * INSET focused on teaching methodology is appropriate in terms of improvement of quality of teaching. ASEI/PDSI introduced in SMASSE is an appropriate approach as student-centred approach. Student-centred approach is already promoted at MoEST. * Some underqualified teachers have more urgent needs for support in understanding contents of subjects rather than methodology. Some teachers feel that teaching methodology introduced by SMASSE is not easy sometimes in implementing in actual classroom every day as the size of class is large, sometimes more than 60 in one class. They also feel that student-centred methodology takes time to finish all the necessary syllabus. * Development of lesson plan introduced by SMASSE INSET is also recommended by MoEST, although it is not always utilized in daily class yet in other subjects in secondary education.

Relevance	Relevance of approach		Is implementation method of INSET appropriate?	* Cascade system that SMASSE INSET adopts is appropriate to reach all the schools. In order for cascade system to function, capacity development of Divisional Trainers is important as well as appropriate INSET monitoring. * Existing education management system is utilized to implement INSET. As Education Division Office is the key in education management at local level, INSET implementation system through Division Education Office is appropriate. * Divisional Trainers are selected among secondary school teachers. This is appropriate in that Divisional Trainers are familiar with practical issues taking place at classroom level and can incorporate them into Divisional INSET. In addition, Divisional Trainers and participants can stimulate each other through peer training. One concern is that sometimes Divisional Trainers are not fully respected. This problem occurs especially when Divisional Trainers are younger than most participants or when Divisional Trainers have lower academic qualification than participants, i.e., Divisional Trainer has a diploma while some participants have a degree.
			Is target group appropriately selected, including the scale of target group?	* It is important to target all M/S teachers nation-wide, including both qualified and underqualified, in rolling out SMASSE in Phase 2. The number of teachers is estimated about 3400. It is expected to reach 3400 teachers with two-layered cascade system.
		Is there comparative advantage in Japanese technical cooperation?	Are experiences of Japanese cooperation in M/S education implemented in other countries utilized?	* The experiences in SMASSE in Kenya is basically introduced in SMASSE in Malawi, including the fundamental concept of ASEI/PDSI, INSET implementation system of cascade, and promotion of counterpart ownership. * The experiences of SMASSE Projects in countries other than Kenya are also shared by stakeholders.
		Is cooperation with other development partners appropriate?	Are there collaborative relations with other development partners? Is there any duplication in cooperation?	* Currently, JICA is major development partner in improvement of secondary teachers. As majority of external support is focused on primary education, JICA's assistance is considered important. * Currently, there is not direct cooperation with other development partners. Secreatriat members attend the Technical Working Group Meeting for teacher training and the information of SMASSE program is shared among all Development Partners supporting teacher training. JICA Office shares information on SMASSE with other development partners at DP meetings. In addition, JICA Office attend the Technical Working Group meeting for secondary education when necessary.
		Are there any political, economic, and social changes after ex-ante evaluation?	Are there any political, economic, and social changes that may affect Project implementation?	* No major change are found.
Effectiveness	Achievement of Project Purpose (Expected)	To what extent is the Project Purpose achieved?	Is the Project Purpose likely to be achieved?	* INSET Quality Index is 3.3 for 2010 Divisional INSET. It is already above the expected level of 2.5. The item with lowest score is Facilities and Welfare. This is because the conditions of hostels are not satisfactory and many participants feel that the amount of allowance is not sufficient. * According to interview, both management and contents of INSET are adequate in general although further improvement is required.
			Is the level of the Objectively Verifiable Indicators of the Project Purpose appropriately defined?	* As target of Indicators are already fulfilled, it may be appropriate to review the level of the target. * Also it may be effective to review the methodology of quality control of checklist and to examine qualitative evaluation method. The currently defined Index is based on self-evaluation and not completely objective indicator. The Project is discussing the introduction of additional evaluation by personnel within MoEST other than participants.
	Causality of Outputs and Project Purpose	Are achievements of Outputs contributing to achievement of the Project Purpose?	Is the Project Purpose likely to be achieved as a result of achievement of Outputs? Is the logic between Outputs and the Project Purpose appropriate?	* All four Outputs are important to achieve the Project Purpose. Logic from Output to the Project Purpose is appropriate. * Indicators to examine management capacity of DTED are not defined in current PDM.

Effectiveness	Causality of Outputs and Project Purpose	Are achievements of Outputs contributing to achievement of the Project Purpose?	Are there any other factors that contribute to the achievement of the Project Purpose?	* SMASSE INSET is the only INSET for secondary M/S education. Therefore, the achievement of the Project Purpose can be attributed to the implementation of the Project. * At INSET Centre supported by the World Bank, facilities are in desirable conditions, and this contributes to quality INSET. Rehabilitation of INSET Centres by the budget of MoEST will contribute to the achievement of the Project Purpose.
		Are there any factors inhibiting the achievement of the Project Purpose?	Are Divisional trainers maintained within Divisions? (Important Assumptions)	* Teachers are transferred to another schools usually within their Division. Therefore it is expected that a majority of Divisional Trainers stay within their Division. Even through there occurs a turnover of teachers, major problems are not expected. This is because Divisional INSET takes place nation-wide and teachers can receive the same INSET wherever they are. It should be noted that the balance of allocation of Divisional Trainers may be affected. DTED can have discussion with the Department of Human Resources when transferring Divisional Trainers beyond Division. * According to the regulations of MoEST, teachers have to stay in teaching position. * Currently some Divisional Trainers do not participate in SMASSE because they are on study leave for higher qualification such as degree. It is expected that they will make further contribution to SMASSE when they complete their study.
			Are there any other inhibiting factors?	* No major inhibiting factors.
Efficiency	Achievement of Outputs	Is each Output produced as planned? What are inhibiting factors, if any?		* Outputs are being produced as expected in general.
		Is the level of each Indicator of Output appropriately defined?		* Currently defined Indicators are based on self-evaluation and more objective Indicators may be necessary. The Project is planning to introduce evaluation by external personnel within MoEST to conduct evaluation on a trial basis.
	Causality of Inputs, Activities, and Outputs	Are sufficient activities implemented to produce Outputs?	Are the results of baseline survey appropriately utilized?	* They are utilized as a basis of monitoring as well as reference for development for contents of INSET.
			Do training in Japan and in third countries contribute to strengthening capacity of CPs and Divisional Trainers?	* A majority of participants of training in Japan and in third countries enhanced their motivation. * According to interviews, participants in training in Japan learned attitude as administrators/teachers/trainers, student-centred approach, and education management, and so forth. * Experiences and knowledge in training in Kenya were useful and can be adapted in Malawian context. Also participants are inspired by other trainers and experiences of neighboring African countries. * Participants in training in Malaysia comment that IT training was useful in developing teaching materials and that exposure to different environment gave inspiration in developing science class.
			Do National and Divisional INSETs contribute to strengthening capacity of Divisional Trainers?	* Divisional Trainers developed their capacity as trainers through National INSET and other trainings.
			Do Divisional INSET contribute to improving teaching methods of M/S teachers?	* There are reports that INSET improved teachers' methods but it is difficult to clearly examine the improvement of teaching methods as only one Divisional INSET was conducted in May 2010.
			Do sensitization workshops contribute to promote understanding and cooperation among stakeholders involved in the Project?	* At CDSS (non-cost centre), it is important to secure cooperation of PTA in terms of understanding of importance of INSET and fund-raising for it. Sensitization workshops were useful to raise awareness among headteachers and parents. However, interviews reveal that some CDSS did not dispatch teachers to INSET due to lack of financial management. Another problem is that information disseminated at sensitization workshop sometimes is not fully shared with those who did not attend the workshop.
		Are quality, quantity, and timing of Inputs appropriate?	Are quantity, specialty, and dispatched period of Japanese experts appropriate?	* Technical advice by Japanese Experts to CPs in both managerial and academic aspects is appropriate.

Efficiency	Causality of Inputs, Activities, and Outputs	Are quality, quantity, and timing of Inputs appropriate?	Are specification, quantity, and supplied timing of provided equipment by Japan appropriate?	* All the equipment and teaching materials have been provided in a timely manner and they have been fully utilized by to INSET Centres.
			Are contents and timing of training in Japan and third countries appropriate?	* The contents of the training are appropriate. Participants in training in Japan and third countries are trying to utilize their experiences in future INSET activities. Many of them are sharing their experiences with other colleagues among their organizations. * Trainees to be dispatched are selected based on the criteria of motivation and performance.
			Is local cost of the Japanese side appropriately disbursed?	* Local cost of the Japanese side is appropriately disbursed.
			Are CP allocation and budget allocation and disbursement of the Malawian side appropriate?	* DTED has been securing budget for SMASSE. Expenditures necessary for Project implementation have been covered. Disbursement of budget took time until 2010 Divisional INSET but it has been improving since Senior Accountants were allocated to DTED. * DTED appointed their staff as National Coordinators. One National Coordinator, who participated in training in Japan, left his position in March 2010.
	Contributing and inhibiting factors	Are local resources appropriately utilized?	Are existing facilities effectively utilized?	* Existing facilities of secondary schools are utilized as Divisional INSET Centres. * DCE is utilized as National INSET Centre. Project Office for Phase 1 at DCE is also utilized as SMASSE office.
			Are existing education management system (administration system, direction flow, etc.) effectively utilized?	* Existing education management system is utilized for INSET implementation. For example, administrative instruction and communication paths from DTED to Education Division Office and from Education Division Office to schools are utilized.
			Are human resources and know-how developed in Phase I of the Project effectively utilized?	* A part of INSET implementation system in Phase 1 is applied in Phase 2. For example, INSET was conducted by Divisional Trainers. There are also some changes in implementation. For example, National INSET was introduced in Phase 2, and SMASSE Secretariat is transferred to DTED. * CPs at DCE in Phase 1 participate in Phase 2 as part-time National Trainers. They are more confident after Phase 1 and are willing to get themselves involved in Phase 2. Some of them expressed their desire to get more involved in Phase 2, for example, supporting other five Divisional INSET. * Experiences in SEED in Phase 1 is beneficial, however, this leads to the current situation where the contents of INSET are different between SEED and other five Divisions. This is because three more INSET sessions in Phase 1 and one INSET session in Phase 2 were conducted in SEED before 2010 Divisional INSET. It is desirable to discuss the possibility of developing new materials to be commonly used among SEED and other Five Divisions in the future.
		Are experiences in related projects in neighboring countries appropriately utilized?	Are experiences, know-how, network, materials, and M&E indicators of SMASE-WECSA and other SMASSE-related projects effectively utilized?	* Concept of ASEI/PDSI and monitoring checklist developed by SMASSE in Kenya are incorporated in the Project in Malawi. * Training and workshop in other African countries are held in Kenya, Uganda, and Botswana. * CPs at DTED and Japanese Experts attend the SMASE-WECSA meeting every year to share information and experiences.
		Are there any other contributing and inhibiting factors in producing Outputs?	Are National Trainers maintained stably? (Important Assumptions)	* Newly recruited National Trainers are willing to continue to be involved in the Project. * Three National Trainers participating in long-term training in Japan are making contribution to the Project with their experiences through information sharing via Email and are expected to work as National Trainers when returning to Malawi.
			Are other educational activities interfering with the project activities? (Important Assumptions)	* Due to the change of school calendar, the period of holiday is shortened. As a result, the period of INSET was reduced to one week from the planned two weeks and the timing was changed. Some consider that one-week INSET is enough but others consider that one-week INSET period is a little short.

Efficiency	Contributing and inhibiting factors	Are there any other contributing and inhibiting factors in producing Outputs?	Are stability and cooperation of leadership maintained at all levels? (Important Assumptions)	* There was stability and cooperation of those in leadership position at MoEST.
			Are INSET activities priority assignment for officers involved? (Important Assumptions)	* INSET activities are priority assignments for officers involved.
			Are there any other contributing and inhibiting factors?	* According to interviews, some schools are not informed that they can utilize Divisional INSET Centre as resource centre. * There is possibility of increasing the number of subject in M/S education in on-going SSCAR. This may affect the contents of INSET.
Impact	Achievement of Overall Goal	Is the Overall Goal likely to be achieved?	Are teachers utilizing what is learned at INSET?	* A majority of both Divisional Trainers and teachers think that their capacity has been developed. Some of them are utilizing new methodology in the classrooms, but they still feel difficulties in implementing methodology learned at INSET in the classrooms. Some comment that SMASSE methodology is not easy to apply in large class and makes it difficult to conduct all the curriculum in designated time. Some teachers tend to go back to their conventional methodology if they are not observed. * For some underqualified teachers, it is difficult to conduct good class only by attending SMASSE INSET. This is because they lack content knowledge and they need more training on it. * It may be difficult to improve teachers' capacity by only a one-week INSET a year. At some schools, headteachers and teachers started to organize cluster-based training and school-based training to further develop their teaching skills.
			Is the level of participation of students improved in the class by teachers who attended INSET? If so, what is the reason?	* Teachers interviewed comment that students are enjoying class with higher level of participation and interaction. Girls started to participate in M/S class more actively than before because M/S class is conducted in more interesting manner than before.
	Causality between Project Purpose and Overall Goal	Are the Project Purpose and the Overall Goal related logically?		* Logic from quality INSET to quality teaching & learning is appropriate. However, there are some external variables out of the Project framework. For example, there are many underqualified teachers, the class size is too large, and there are not teaching and learning materials.
		Is Important Assumption between the Project Purpose and the Overall Goal appropriate at the time of the Mid-term Review? Is Important Assumption likely to be fulfilled?	Is the teaching force within school maintained stably? (Important Assumption)	* Transfer of teachers takes place occasionally. However, this will not cause major problems because INSET is conducted in all Divisions and all teachers are expected to attend INSET in their Division. * Transfer of teachers within public sectors is prohibited by the regulations of MoEST. About 70% of teachers who found a position in private sector return to teaching positions.
			Are there any other activities necessary to achieve Overall Goal?	* Continuous implementation of National and Divisional INSET is necessary with adequate and regular monitoring. * Follow-up of INSET, for example, cluster-based and school-based trainings are necessary. * Concept of ASEI/PDSI should be adequately taught at PRESET. * Teacher training at PRESET should be strengthened. * It is necessary to make SSCAR consistent with the direction and concept of SMASSE INSET contents. * It is important to provide appropriate teaching and learning environment.
	Ripple effect	Are there ripple effects?	Is the Super Goal likely to be achieved?	* It will take time in order that the results of the Project benefit the abilities of students. * There are some reports on the changes of students, for example, they show more interest in M/S subjects, and their participation is improved. Therefore, if the quality of M/S teachers are improved, the abilities of students in M/S subjects may be improved in a long term. However, there are other factors other than INSET. Abilities of students depend on education at primary school as well as their family environment, including economic conditions. In addition, relations between academic score and student-centred approach are not clear. ASEI/PDSI may encourage the level of participation, but it will take time that higher level of participation will increase the score of academic examinations.

Impact	Ripple effect	Are there ripple effects?	Are there any impacts on PRESET?	* Part-time National Trainers at DCE are teaching at DCE. They are utilizing approach of SMASSE. In PRESET course at DCE, they choose topics to be focused, utilizing the results of baseline survey.
			Are there any impacts on collaborative relations among neighboring schools?	* Divisional Trainers get acquainted with each other through INSET. They keep in touch after INSET and sometimes organize study gathering among schools.
			Are there any impacts in primary schools and private schools?	* There is not much impact on primary education so far, although there was report that some primary schools show interest in SMASSE INSET. * There was a request from private school to attend Divisional INSET. There were several participants in 2010 Divisional INSET in SHED.
			Are there any impacts on subjects other than maths and science?	* Some teachers interviewed comment that their colleagues of other subjects show interest on SMASSE approach. * Teachers of other subjects started to make lesson plan after SMASSE INSET was introduced. Development of lesson plan was already introduced in secondary school by the government regulations, but actually it was not regularly implemented before SMASSE INSET.
			Is monitoring regularly conducted at classes, reflecting the contents of INSET?	* The Project conducted monitoring on a sample basis. PEMA/SEMA incorporate the concept of ASEI/PDSI in regular monitoring at a classroom level.
		Are there any positive and negative impacts other than Overall Goal? If there are negative impacts, what mitigation measures are being taken?		* During interview, it was reported that one CDSS did not send teachers to one training course of English as the budget was allocated for SMASSE INSET.
Sustainability	Policy and Institutional aspect	Is policy support toward INSET likely to continue after the Project period?	Is strengthening secondary M/S education likely to continue to be priority issue at MoEST?	* INSET and continuous professional development for teachers for secondary education is a priority in NESP. The policy is expected to continue as NESP presents policy until 2017.
			Does MoEST have strategies to continue INSET after the Project period?	* MoEST is committed to implementing INSET in a continuous manner while there is not specific implementation plan yet.
		Are any measures taken to maintain consistency between Project direction and the secondary education curriculum to be revised?	Is the Project taking any measures to make the direction of SSCAR consistent with SMASSE INSET?	* The Project is carefully watching the progress of SSCAR so that the direction of SSCAR is consistent with SMASSE INSET. * The Malawi Institute of Education (MIE) and MoEST have discussions to have new curriculum consistent with SMASSE, including a plan to have an orientation of new curriculum on M/S subjects within the framework of SMASSE when curriculum is in place. Three officials at MIE were dispatched to training in Japan and Kenya. One National Coordinator is participating in plenary committee of SSCAR. Part-time National Trainer(s) at DCE is planned to participate in curriculum working group. * There is not much progress in SSCAR so far, but arrangement for securing fund is under way.
	Organizational and financial aspect	Is INSET management organization likely to be maintained?	Is INSET management already incorporated in major activities of Project Team, i.e., DTED and Education Division Office?	* INSET is already internalized as one of regular activities of DTED and Education Division Office. * Further management capacity development is necessary to smooth implementation of INSET and budget disbursement.
			Are there strategies to continuously secure human resources involved in INSET management?	* Currently the status of National Trainers at DTED is not clear and their status is unstable. * There are not specific written document on strategies so far, however, DTED is committed to the allocation of National Coordinators to SMASSE Secretariat.

Sustainability		Is appropriate system to support INSET established?	Is INSET participation of teachers likely to be continuously supported by headteachers and communities?	* Headteachers are supporting participation of teachers in INSET. For CDSS (non-cost centre), it is necessary to continuously support INSET cost by the SMASSE budget. At the same time, it is important for CDSS to secure budget on their own to send teachers to INSET. * According to Project report and stakeholders concerned, parents show interest in INSET during sensitization workshop.
		Is INSET Center likely to continue functioning?	Are facilities, materials, and equipment maintained appropriately?	* Headteachers at INSET Centres are willing to maintain facilities, materials, and equipment. Some headteachers establish rules to maintain facilities not only as INSET Centre but as school as a whole. It is still necessary to further raise the awareness of headteachers at INSET Centres to maintain the facilities. * Some schools suffer students' vandalizing. Sensitization to students should be recognized. * The guideline on maintenance of materials at INSET Centre is not kept at one school visited during the Mid-term Review.
			Is the system to secure budget to maintain facilities established appropriately?	* Maintenance is not easy at INSET Centres because budget for continuous maintenance of facilities as INSET Centre is not sufficiently allocated. Headteachers are utilizing a part of regular government budget and school fee of students for maintenance. * At DCE, recurrent cost to maintain facilities as National INSET Centre is not secured.
		Are financial sources secured to continuously implement INSET?	Does MoEST have strategies to secure financial resources to continuously implement INSET for M/S teachers? Are the strategies realistic?	* MoEST has already secure INSET budget and it is incorporated in MoEST annual plan (POW). Specific plan is not presented in the medium-term plan. The actual amount of budget depends on discussions among departments of MoEST within the ceiling provided to MoEST each year.
	Technical aspect	Is capacity of National and Divisional Trainers sufficiently developed?	Do National and Divisional Trainers understand ASEI/PDSI approach fully enough?	* National and Divisional Trainers understand ASEI/PDSI approach. Although most of them understand the concept of ASEI/PDSI but they still have difficulties in applying ASEI/PDSI concept at classroom level. * Many Divisional Trainers understand the concept of ASEI/PDSI, although some of them do not have deep understanding of the concept. Even those who think they understand ASEI/PDSI well still have difficulties in facilitating sessions of Divisional INSET, especially on practice. Some Divisional Trainers think that ASEI/PDSI is not easy to be applied in class without materials especially for improvisation.
			Do National and Divisional trainers have sufficient capacity to facilitate INSET?	* Capacity of National and Divisional Trainers is improved although further development is necessary. * National Trainers interviewed feel that they improved their capacity and are now more confident than before as trainer. They still feel they need further improvement in some aspects such as write-up development and facilitation. * Divisional Trainers also improved their facilitation capacity, for example, question technique and managing method of participants' discussions. Some of them are not fully confident yet and feel that they need more improvement. * Some of them need improvement in time allocation of sessions at National and Divisional INSET. * There is a great deal of difference in capacity among Divisional Trainers.
			Do National and Divisional Trainers have sufficient capacity to manage INSET?	* They were also able to manage confusion among participants when complains on hostel facilities arose during INSET.
			Do National and PEMA/SEMA have sufficient capacity to conduct monitoring and evaluation of INSET?	* National Trainers and PEMA/SEMA jointly conducted monitoring with support of Japanese Expert for five weeks. National Trainers and PEMA/SEMA improved their capacity in conducting monitroing & evaluation through classroom observation. * It is difficult for PEMA/SEMA to conduct monitoring as a part of their daily duties because they have too many schools to visit among limited number of officials. * It is desirable to share more information on monitoring with EMAS.

Sustainability	Technical aspect		Do National trainers have sufficient capacity to improve INSET based on evaluation results?	* National Trainers involved from Phase 1 have developed sufficient capacity. * Newly recruited National Trainers are now in the process of improving their capacity to incorporate the results of monitoring into development of new curriculum and materials of INSET. * Newly recruited National Trainers are also improving their capacity to incorporate the evaluation results during INSET into management of next INSET implementation.
		Is the quality of INSET likely to be maintained after the Project period?	Does MoEST have strategies to continuously strengthen INSET quality?	* They are willing to continue INSET and trying to secure budget. Specific procedure to secure budget is necessary. Also strategies to strengthen monitoring is necessary.
	Social, cultural, and environmental aspects	Are there any other factors related to sustainability?	Are there any other factors related to sustainability, including social, cultural, and environmental aspects?	* It is necessary to increase the number of female M/S teachers.

Annex 3: Summary of Project Inputs and Outputs

3-1 List of Japanese Experts

No.	Sex	Name	Title	From	To
1	Mr	Hikaru Kusakabe	INSET Management	Aug, 2008	Present
2	Ms	Ayumi Kikuchi	Mathematics and Science Education	Sep, 2008	Present

3-2 List of Assigned Counerparts

(1) National Coordinator

No.	Sex	Name	Title	Organisaton	From	To
1	Mr	Alfred Kamoto	Secondary Training Manager	Department of Teacher Education and Development, MoEST	Aug, 2008	Present
2	Mr	Absalom Phiri	Secondary Training Manager	Department of Teacher Education and Development, MoEST	Aug, 2008	Mar. 2010
3	Mr	Godwin Jere	Secondary Training Manager	Department of Teacher Education and Development, MoEST	Sep, 2009	Present

(2) Divisional Coordinator

No.	Sex	Name	Title	Organisaton	From	To
4	Mr	Rosario Soko	Inspector (Principal Education Method Advisor)	North Education Division Office	Aug, 2008	Present
5	Mr	Earnest Luhanga	Inspector (Senior Education Method Advisor)	North Education Division Office	Aug, 2008	Present
6	Ms	Edith Munthali	Inspector (Principal Education Method Advisor)	Central East Education Division Office	Aug, 2008	Present
7	Mr	William Kanyemba	Inspector (Senior Education Method Advisor)	Central East Education Division Office	Aug, 2008	Jul. 2009
8	Mr	Sakayi Musopole	Inspector (Senior Education Method Advisor)	Central East Education Division Office	Aug, 2008	Present
9	Mr	Ernest Matengo	Inspector (Senior Education Method Advisor)	Central West Education Division Office	Aug, 2008	Present
10	Mr	Paul Miamba	Inspector (Senior Education Method Advisor)	Central West Education Division Office	Aug, 2008	Present
11	Mr	Harlod Chigalu	Inspector (Senior Education Method Advisor)	South East Education Division Office	Aug, 2008	(Present)
12	Mr	Jeremiah Kamukuza	Inspector (Principal Education Method Advisor)	South East Education Division Office	Aug, 2008	Present
13	Ms	Caroline Moto	Inspector (Principal Education Method Advisor)	South West Education Division Office	Aug, 2008	Present
14	Mr	Peatry Kandio	Inspector (Senior Education Method Advisor)	South West Education Division Office	Aug, 2008	Present
15	Mr	Christopher Tsogolani	Inspector (Senior Education Method Advisor)	Shire Highland Education Division Office	Aug, 2008	Present
16	Mr	Anthony Manja	Inspector (Senior Education Method Advisor)	Shire Highland Education Division Office	Aug, 2008	Present

(3) Full-time National Trainers

No.	Sex	Name	Subject	Position	From	To	Remarks
1	Mr	George Vakusi	Biology	SMASSE Secretariat, DTED, MoEST	Aug, 2008	Present	On study leave in Japan from Mar, 2009 to Mar, 2011 (JICA long term training)
2	Mr	Enock Chinomba	Physical Science	SMASSE Secretariat, DTED, MoEST	Aug, 2008	Present	On study leave in Japan from Mar, 2010 to Mar, 2012 (JICA long term training)
3	Mr	Justus Nkhata	Mathematics	SMASSE Secretariat, DTED, MoEST	Aug, 2008	Present	On study leave in Japan from Sep, 2010 to Sep, 2012 (JICA long term training)
4	Ms	Lucia Chidalengwa	Biology	SMASSE Secretariat, DTED, MoEST	Jun, 2010	Present	
5	Mr	Andrew Thauzeni	Biology	SMASSE Secretariat, DTED, MoEST	Jun, 2010	Present	
6	Mr	Livati Potiphar	Mathematics	SMASSE Secretariat, DTED, MoEST	Jun, 2010	Present	
7	Mr	Cedric Mpaso	Physical Science	SMASSE Secretariat, DTED, MoEST	Jun, 2010	Present	

(4) Part-time National Trainers

No.	Sex	Name	Subject	Position	From	To
8	Mr	Mathias January	Mathematics	Lecturer, Domasi College of Education	Aug, 2008	Present
9	Mr	Siegfried Mkandawire	Mathematics	Lecturer, Domasi College of Education	Aug, 2008	Present
10	Mr	Phaundi Shonga	Physical Science	Lecturer, Domasi College of Education	Aug, 2008	Present
11	Mr	Joseph Mshanga	Physical Science	Lecturer, Domasi College of Education	Aug, 2008	Present
12	Mr	Gift Moyo	Biology	Lecturer, Domasi College of Education	Aug, 2008	Present
13	Mr	Prince Phwetekere	Biology	Lecturer, Domasi College of Education	Aug, 2008	Present
14	Ms	Catherine Kumwamba	Biology	Lecturer, Domasi College of Education	Apr, 2009	Present

3-3 List of Trainings

(1) Long-term training (Master's Degree)

No.	Course title	Venue	Duration	Sex	Name	Title	Organisation
1	Enhancing the Quality of Primary and Secondary Education (Science and Maths) in Sub-Saharan Africa	Hiroshima University, Japan	from Mar, 2009 to Mar, 2011	Mr	George Vakusi	National Trainer (Biology)	SMASSE Secretariat, DTED, MoEST
2	Enhancing the Quality of Primary and Secondary Education (Science and Maths) in Sub-Saharan Africa	Hiroshima University, Japan	from Mar, 2009 to Mar, 2012	Ms	Florence Thomo	Lecturer	Domasi College of Education
3	Enhancing the Quality of Primary and Secondary Education (Science and Maths) in Sub-Saharan Africa	Hiroshima University, Japan	from Sep, 2009 to Sep, 2011	Ms	Chimwemwe Ngwira	Science Teacher, Divisional Trainer (Physical Science)	Katoto Secodnary School / Mzuzu University
4	Improvement of Mathematics and Science Teacher Education	Naruto University of Education, Japan	from Mar, 2010 to Mar, 2012	Mr	Enock Chinomba	National Trainer (Physical Science)	SMASSE Secretariat, DTED, MoEST
5	Enhancing the Quality of Primary and Secondary Education (Science and Maths) in Sub-Saharan Africa	Hiroshima University, Japan	from Sep, 2010 to Sep, 2012	Mr	Justus Nkhata	National Trainer (Mathematics)	SMASSE Secretariat, DTED, MoEST

(2) Short-term training in Japan

	No	Course title	Venue	Duration	Sex	Name	Organisation
JFY2008/09	1	Practice of Science Education for Secondary School	Hiroshima	5th Aug-28th Sep, 2008	Mr	Mathias January	Domasi College of Education
	2	Study on Education Improvement of Training Course of Teachers for African Countries	Kyushu	3rd-30th Nov, 2008	Mr	Alnord Mwanza	Domasi College of Education
	3				Mr	Alfred Kamoto	DTED, MoEST
	4	Seminar for Educational Evaluation and Monitoring	Tokyo	24th Oct-14th Nov, 2008	Mr	John Mswayo	EMAS, MoEST
	5	Strengthening of (Local) Education for SMASE-WECSA for Sub-Saharan Africa	Sapporo	13th Jan- 14th Feb, 2009	Mr	Jeremiah Kamukuza	South East Education Division Office
	6				Mr	Elvis Salagi	DTED, MoEST
JFY2009/10	1	Practice of Science Education for Secondary School	Hiroshima	4th Aug-27th Sep, 2009	Mr	Austin Kalambo	Malawi Institute of Education (MIE)
	2	Improving Teaching Methods in Science & Mathematics in Primary Education	Sapporo	6th Oct-21th Nov, 2009	Ms	Donna Namaona	DTED, MoEST
	3	Study on Education Improvement of Training Course of Teachers for African Countries	Kyushu	3rd-30th Nov, 2009	Mr	Elias Chakwera	Domasi College of Education
	4				Ms	Darles Mbewe	DTED, MoEST
	5	Seminar for Educational Evaluation and Monitoring	Tokyo	26th Oct - 20th Nov, 2009	Ms	Chrissie Soko	EMAS, MoEST
	6	Strengthening of (Local) Education for SMASE-WECSA for Sub-Saharan Africa	Sapporo	13th Jan - 14th Feb, 2010	Mr	Mc Gregory Alufandika	South East Education Division Office
	7				Ms	Thoko Banda	Central West Education Division Office
	8	INSET Management for Anglophone Countries in Africa (A)	Hiroshima	17th Nov - 20th Dec, 2009	Mr	Absalom Phiri	DTED, MoEST
	9	INSET Management for Anglophone Countries in Africa(B)	Hiroshima	26th Jan-28th Feb, 2010	Mr	Bona Mjojo	Human Resource Department, MoEST
	10				Mr	Charles Inani	Department of Secondary Education, MoEST
	11				Mr	William Kanyemba	EMAS, MoEST
	12				Mr	Earnest Luhanga	Northern Education Division Office
	13				Mr	Rosario Soko	Northern Education Division Office
	14				Ms	Edith Munthali	Central East Education Division Office
	15				Mr	Earnest Matengo	Central West Education Division Office
	16				Mr	Harlod Chigalu	South East Education Division Office
	17				Ms	Eunice Dambo	South West Education Division Office
	18				Ms	Caroline Moto	South West Education Division Office
	19				Mr	Christopher Tsogolani	Shire High Land Education Division Office
	20				Mr	Sonnex Likharuwe	Shire High Land Education Division Office
	21				Mr	Silk Kadwala	Mulunguzi Secondary School
	22				Mr	John Phiri	Balaka Secondary School
	23				Mr	Peter Benson	Lisumbwi Secondary School
JFY2010/11	1	Study on Education Improvement of Training Course of Teachers for African Countries	Kyushu	25th Oct-28th Nov, 2010	Mr	Ndalapa Mhango	Domasi College of Education
	2				Mr	Patric Themu	DTED, MoEST
	3	Seminar for Educational Evaluation and Monitoring	Tokyo	25th Aug-18th Sep, 2010	Mr	Siege Mkandawire	Domasi College of Education
	4				Mr	Livati Potiphar	SMASSE Secretariat, DTED, MoEST
	5	Strengthening of (Local) Education for SMASE-WECSA for Sub-Saharan Africa	Sapporo	16th Jan-11th Feb, 2011	A participant to be selected		
	6	INSET Management for Anglophone Countries in Africa (A)	Hiroshima	17th Nov-18th Dec, 2010	Mr	Peatry Kandio	South West Education Division Office
	7	INSET Management for Anglophone Countries in Africa(B)	Hiroshima	25th Jan-16th Feb, 2011	15 participants to be selected		
	8	Improvement of Lesson Evaluation in Science for Sub-Sahara African Countries	Osaka	31st Jan-26th Feb, 2011	2 participants to be selected		

(3)-1 Training in the Third Country (Kenya)

	No.	Course title	Venue	Duration	Sex	Name	Organisation
JFY2008/09	1	ASEI/PDSI Approach In Secondary Mathematics and Science Education in Africa (No.8)	Nairobi	6th -31st Oct, 2008	Mr	Ernest Kachile	Likuni Boys Secondary School
	2	ASEI/PDSI Approach In Secondary Mathematics and Science Education in Africa (No.10)	Nairobi	3rd -28th Nov, 2008	Mr	Prince Phwetekele	Domasi College of Education
	3				Mr	Lloyd Mataka	Domasi College of Education
	4				Mr	Absalom Phiri	DTED, MoEST
	5				Mr	Jackson Yekha	Malawi Institute of Education (MIE)
	6				Mr	Austin Kalambo	Malawi Institute of Education (MIE)
	7				Mr	Christopher Neba	Malawi National Examinations Board
	8				Mr	Maxwell Magalasi	Lilongwe Teacher Training College
	9				Mr	Francis Luhanga	Brantyre Teacher Training College
JFY2009/10	10	ASEI/PDSI Approach In Secondary Mathematics and Science Education in Africa (No.11)	Nairobi	21st Sep-16th Oct, 2009	Ms	Martha Kayuwe	Chankhanga CDSS
	11				Mr	Livati Potiphar	Dedza Secondary School
	12				Mr	Charles Maonga	Dzenje CDSS
	13				Ms	Fides Msowoya	Bandawe Girls Secondary School
	14				Ms	Lucia Chidalengwa	Mkwichi Secondary School
	15				Mr	Chimwemwe Juwa	Njamba secondary school.
	16				Mr	John Gondwe	Nkhata-bay Secondary School
	17				Mr	Nixon Kaitano	Ngabu Secondary School
	18				Mr	Omega Mkandawire	Chiradzuru secondary school.
	19				Mr	Paul Mgunda	Dowa Secondary School
JFY2010/11	20	ASEI/PDSI Approach In Secondary Mathematics and Science Education in Africa (No.14)	Nairobi	19th Sep-16th Oct, 2010	Mr	Lameck Kaonga	Chichiri Secondary School
	21				Mr	Lovemore Likupha	Mulanje Secondary School
	22				Mr	Cedrick Mpaso	SMASSE Secretariat, DTED, MoEST
	23				Mr	Fanwell Chiwowa	St. John Bosco Secondary School
	24				Mr	Dominic Phiri	Chiphaso CDSS
	25				Mr	Osward Lungu	Mzuzu Secondary School
	26				Mr	Votie Mboweni	Lilongwe Girls Secondary School
	27				Mr	Andrew Thauzeni	SMASSE Secretariat, DTED, MoEST
	28				Mr	Albert Nkhonya	Katoto Secondary School
	29				Mr	Nchachi Mughandira	Chitipa Secondary School
	30				Mr	Frank Masewo	Maghemo Secondary School

(3)-2 Training in the Third Country (Malaysia)

	No	Course title	Venue	Duration	Sex	Name	Organisation
JFY2008/09	1	Secondary Science & Mathematics Teacher Educators Training for African Countries	Penang	4th-29th Aug, 2008	Mr	Phaundi Shonga	Domasi College of Education
	2				Mr	George Vsakusi	SMASSE Secretariat, DCE
	3				Mr	Enock Chinomba	SMASSE Secretariat, DCE
	4				Mr	Justus Nkhata	SMASSE Secretariat, DCE
	5	Secondary Science & Mathematics Teacher Educators Training for Malawi	Penang	2nd - 13th Feb, 2009	Mr	Collentino Chamangwana	Lisumbwi Secondary School
	6				Mr	Dyton Namikungulu	Ulongwe CDSS
	7				Mr	Frazer Ngaunje	Masongola Secondary School
	8				Mr	Fletcher Tewesa	St. Michaels Secondary School
	9				Mr	Patrick Njala	Lisumbwi Secondary School
	10				Mr	Joseph Katona	Chimwalira Secondary School
	11				Mr	John Nanga	Chimwalira Secondary School
	12				Mr	Francis Nyambalo	Masongola Secondary School
	13				Mr	Reuben Mkwapatira	Mangochi Secondary School
	14				Mr	Patrick Mandalawe	Songani CDSS
	15				Mr	Manjomo Somanje	Malawi National Examinations Board
JFY2009/10	16	Secondary Science & Mathematics Teacher Educators Training for Malawi	Penang	16th-25th Nov, 2009	Mr	Evance Chikwati	Kankao CDSS
	17				Mr	Ben Nantunga	Likangala Secondary School
	18				Mr	Benson Namacha	Mbenjere Secondary School
	19				Mr	Albert Msekandiana	Masongola Secondary School
	20				Mr	Henry Dzingo	Mulunguzi Secondary School
	21				Mr	Ishmael Mgadamika	Mangochi Secondary School
	22				Mr	Henry Lweya	Liwonde CDSS
	23				Mr	Innocent Chikopa	Malindi Secondary School
	24				Mr	Master Kajawo	Balaka Secondary School
	25				Mr	Siege Mkandawire	Domasi College of Education
	26				Mr	Justus Nkhata	SMASSE Secretariat, DCE
	27				Mr	John Phiri	Balaka Secondary School
	28				Mr	Kidwell Chipwatali	St Monica Secondary School
	29				Ms	Esther Nthumbu	St Michaels Secondary School
	30				Mr	Shadreck Mota	Lisumbwi Secondary School
	31				Mr	Richard Yaya	Domasi Demonstration Secondary School
	32				Mr	Andrew Nasalangwa	Malosa Secondary School
	33				Mr	Stanely Mandala	Mbenjere Secondary School
	34				Mr	Verson Makaika	Toleza CDSS
	35				Mr	Gilbert Kaponda	Balaka Secondary School
	36				Mr	Hamil Chimberenga	Domasi Demonstration Secondary School
	37				Mr	Joseph Mshanga	Domasi College of Education
	38				Mr	Gift Moyo	Domasi College of Education
	39				Ms	Catherine Kumwamba	Domasi College of Education
	40				Mr	Silk Kadwala	Mulunguzi Secondary School

(4) International Workshop

No.	Course title	Venue	Duration	Sex	Name	Organisation
1	8th SMASE-WECSA Regional Conference	Kenya	26th-30th May, 2008	Ms	Lonely Magareta	Department of Secondary Education, MoEST
2				Mr	Mathias January	Domasi College of Education
3	Understanding and Actualization of Good Lesson and Super Mathematics and Science Teacher Contest	Uganda	23rd-29th Mar, 2009	Mr	Absalom Phiri	DTED, MoEST
4				Mr	Enock Chinomba	SMASSE Secretariat, DCE
5				Mr	Justus Nkhata	SMASSE Secretariat, DCE
6	9th SMASE-WECSA Regional Conference	Kenya	16th-20th Nov, 2009	Mr	Alfred Kamoto	DTED, MoEST
7	Monitoring And Evaluation Technical Workshop	Botswana	24th-28th May, 2010	Mr	John Mswayo	EMAS, MoEST
8				Mr	William Kanyemba	EMAS, MoEST
9	10th SMASE-WECSA Regional Conference	Kenya	Dec, 2010		to be selected	
10					to be selected	

3-4 Summary of Project Activities

1. National INSET

No.	Title	Date	No. of Participants	No. of National Trainers
1	1st National INSET	25th May-5th Jun, 2009	192	9
2	2nd National INSET	4th-8th Jan, 2010	177	9

2. Divisional INSET

No.	Title	Date	No. of Participants	No. of Divisional Trainers
1	4th SEED INSET	8th-19th Dec, 2008	322	41
2	2010 Divisional INSET	24th-28th May, 2010	2,722	209

3. National Steering Committee (NSC)

No.	Title	Date	No. of Participants
1	First Steering Committee	15th Sep, 2009	25

4. Sensitization Workshop

No.	Title	Date	No. of Schools Participated	No. of Participants
1	Sensitization Workshop for recruitment of Divisional Trainers	February, 2009	641	1,498
2	Sensitization Workshop for Head Teachers and PTA members	December, 2009	658	1,261

5. Stakeholder Meeting

No.	Title	Date	No. of Participants
1	Stakeholder Meeting in Lilongwe	29th-30th Sep, 2008	21
2	Stakeholder Meeting in Domasi	26th-27th Jan, 2009	18
3	Stakeholder Meeting in Lilongwe	2nd-3rd Nov, 2009	20
4	Stakeholder Meeting in Lilongwe	13th Jan, 2010	19
5	Stakeholder Meeting in Mzuzu	8th Sep, 2010	22

6. Divisional Coordination Committee (DCC) Meeting

No.	Title	Date	No. of Participants
1	DCC Meeting in SEED	7th Nov, 2008	17
2	DCC Meeting in SEED	16th Apr, 2010	14
3	DCC Meeting in NED	26th Apr, 2010	15
4	DCC Meeting in CEED	27th Apr, 2010	12
5	DCC Meeting in SHED	30th Apr, 2010	9
6	DCC Meeting in SWED	3rd May, 2010	10
7	DCC Meeting in CWED	6th May, 2010	13
8	DCC Meeting in CEED	5th Jul, 2010	13
9	DCC Meeting in SHED	12th Jul, 2010	10
10	DCC Meeting in SEED	14th Jul, 2010	11
11	DCC Meeting in NED	15th Jul, 2010	15
12	DCC Meeting in SWED	18th Jul, 2010	14
13	DCC Meeting in CWED	19th Jul, 2010	12

7. Training of Trainers (ToT)

No.	Title	Date	No. of Participants
1	ToT in SEED	12th Sep, 2008	38
2	ToT in SEED	2nd-3rd Oct, 2008	43
3	Intensive Training in SEED	10th-14th Nov, 2008	44
4	ToT in SEED	30th Oct, 2009	32
5	ToT in SEED	18th Dec, 2009	34
6	ToT in SEED	22nd Jan, 2010	31
7	Intensive Training in SEED	1st-5th Feb, 2010	26
8	ToT in SEED	23rd Apr, 2010	25
9	ToT in Mzuzu, NED	6th May, 2010	26
10	ToT in Karonga, NED	7th May, 2010	12
11	ToT in CEED	10th May, 2010	33
12	ToT in CWED	11th May, 2010	31
13	ToT in SWED	12th May, 2010	26
14	ToT in SHED	23rd May, 2010	17

3-5 Summary of Project Outputs

1. Report

No.	Title	Date
1	4th SEED Divisional INSET Report	February, 2009
2	Baseline Survey Report	October, 2009
3	1st National INSET Report	June, 2009
4	2nd National INSET Report	February, 2010
5	2010 Divisional INSET Report	August, 2010

2. Guideline

No.	Title	Date
1	Guideline for Management of Divisional INSET centre	March, 2010

3. Write-up (for 4th SEED INSET)

No.	Title	Date
1	Student Centeredness (General Issue)	December, 2008
2	Polynomials (Mathematics)	December, 2008
3	Matrics (Mathematics)	December, 2008
4	Trigonometry (Matematics)	December, 2008
5	Statistics (Mathematics)	December, 2008
6	Scientific Investigation (Physical Science)	December, 2008
7	Oxidation and Reduction (Physical Science)	December, 2008
8	Moles and Molarity (Physical Science)	December, 2008
9	Semiconductors (Physical Science)	December, 2008
10	Respiration (Biology)	December, 2008
11	Coordination (Biology)	December, 2008
12	Micro-organisms (Biology)	December, 2008
13	Transport in Plants (Biology)	December, 2008
14	Garment Construction Processes (HEC)	December, 2008
15	Kitchen Equipment (HEC)	December, 2008
16	Planning and Preparation of Meals of People with Special Needs (HEC)	December, 2008
17	Table Setting (HEC)	December, 2008
18	Laundry Processes (HEC)	December, 2008

4. Write-up (for 1st National INSET)

No.	Title	Date
1	Overview of SMASSE	May, 2009
2	INSET Management	May, 2009
3	Team Building	May, 2009
4	Attitude towards Math and Science	May, 2009
5	ASEI/PDSI Approach	May, 2009
6	Write-up Development	May, 2009
7	Facilitation and Presentation	May, 2009
8	Monitoring and Evaluation	May, 2009

5. Write-up (for 2nd National INSET and 1st Divisional INSET in 5 divisions)

No.	Title	Date
1	Findings of Baseline Survey	January, 2010
2	Attitude (Math, Physical Science, Biology)	January, 2010
3	ASEI/PDSI Approach (Math, Physical Science, Biology)	January, 2010
4	Arithmetic Progressions (Matematics)	January, 2010
5	Oscillations and Waves (Physical Science)	January, 2010
6	Investigative Skills (Biology)	January, 2010

6. Write-up (for 5th SEED INSET)

No.	Title	Date
1	Planning for effective teaching and learning of M/S (General issue)	May, 2010
2	Indices and Logarithms (Mathematics)	May, 2010
3	Density and Mixtures (Mathematics)	May, 2010
4	Electricity (Physical Science)	May, 2010
5	Acids and Bases (Physical Science)	May, 2010
6	Human Nutrition (Biology)	May, 2010
7	Ecology (Biology)	May, 2010

3-6 List of Equipment Provided

<SMASSE Secretariat, DTED>

Equipment	Specification	Company	Unit Cost (MK)	Quantity	Sub-Total Cost (MK)	Year for delivery
Project Vehicle	Toyota Prado GX8 Station Wagon 4WD	Toyota Malawi Limited	6,350,000	1	6,350,000	2008
Project Vehicle	Toyota Hiace Minibus - 14 or 16 seater	Toyota Malawi Limited	5,100,000	1	5,100,000	2008
Laptop Computers	Hp Compaq 530 Laptop Computers	IT Centre	175,578	7	1,229,046	2008
	Lenovo 3000 Laptops	IT Centre	133,280	1	133,280	2009
	Toshiba Satellite Pro L300	Xerographics Limited	195,000	3	585,000	2009
Desktop Computers	Hp DX2300 Desktop Computers & HP 17" TFT Screens	IT Centre	140,070	3	420,210	2008
Laser-jet Printer	Hp Laser-jet 4250n Printer	IT Centre	255,925	1	255,925	2008
	Hp Laser-jet P2014 Printers	IT Centre	42,750	2	85,500	2008
Color Laser-jet Printer	Hp Color Laser-jet CP1515n Printer	IT Centre	73,660	1	73,660	2008
Scanner	Hp Scanjet 2400 Scanner	IT Centre	24,000	1	24,000	2008
LCD Projector	Sonny VPL ES7 2000 Lumens SVGA Projector	Globe Computer Systems Limited	217,010	1	217,010	2009
Flash Memory	4GB Flash Memory Disk	IT Centre	9,860	6	59,160	2008
	4GB Flash Memory Disk	IT Centre	6,900	14	96,600	2009
Microsoft	Microsoft Office 2007 Professional	IT Centre	55,000	12	660,000	2008
Antivirus Software	Norton Antivirus Software	IT Centre	18,050	12	216,600	2008
External Floppy Disk Drive	External Floppy Disk Drive	IT Centre	11,775	6	70,650	2008
PC Carry Cases	PC Carry Cases	IT Centre	0	12	0	2008
Photocopier	Heavy Duty Photocopier 38ppm	Xerographics Limited	1,700,000	1	1,700,000	2008
Uninterruptible Power Supply	APC / Sollatek Back up Electricity Supplyer 1500 VA	Xerographics Limited	60,000	3	180,000	2008
Supply Voltage Supervisor	APC / Sollatek Voltage Supervisor 1KVA	Xerographics Limited	24,000	1	24,000	2008
Digital Video Camera	HANDYCAM DCR-HC54E	Consumer Electonic Services	94,950	1	94,950	2008
				Total:	17,575,591	

<6 Education Division Offices>

Equipment	Specification	Company	Unit Cost (MK)	Quantity	Sub-Total Cost (MK)	Year for delivery
Desktop Computers	Hp DX2300 Desktop Computers & HP 17" TFT Screens	IT Centre	140,070	6	840,420	2009
Laser-jet Printers	Hp Laser-jet P2014 Printers	IT Centre	42,750	6	256,500	2009
Flash Memory	4GB Flash Memory Disk	IT Centre	9,860	6	59,160	2009
Microsoft	Microsoft Office 2007 Professional	IT Centre	55,000	6	330,000	2009
Antivirus Software	Norton Antivirus Software	IT Centre	18,050	6	108,300	2009
External Floppy Disk Drive	External Floppy Disk Drive	IT Centre	11,775	6	70,650	2009
Uninterruptible Power Supply	APC / Sollatek Back up Electricity Supplyer 1500 VA	Xerographics Limited	60,000	6	360,000	2009
				Total:	2,025,030	

<National INSET Centre>

Equipment	Specification	Company	Unit Cost (MK)	Quantity	Sub-Total Cost (MK)	Year for delivery
Photocopiers	Heavy Duty Photocopier 25ppm	Xerographics Limited	685,000	1	685,000	2009
Supply Voltage Supervisor	APC / Sollatek Voltage Supervisor 1KVA	Xerographics Limited	24,000	1	24,000	2009
TV Screen	Sony Bravia TV Screen	LORDS BEST COLLECTION	220,000	1	220,000	2010
DVD	LG DVD	LORDS BEST COLLECTION	14,500	1	14,500	2010
VCR	Panasonic VCR	LORDS BEST COLLECTION	22,500	1	22,500	2010
LCD Projector	Infocus IN2102 LCD Projector	IT Centre	186,275	1	186,275	2010
				Total:	1,152,275	

<16 Divisional INSET Centres>

Equipment	Specification	Company	Unit Cost (MK)	Quantity	Sub-Total Cost (MK)	Year for delivery
Laptop Computers	Hp Compaq 530 Laptop Computers	IT Centre	175,578	4	702,312	2010
	Lenovo 3000 Laptops	IT Centre	133,280	12	1,599,360	2010
Laser-jet Printers	Hp Laser-jet P2014 Printers	IT Centre	42,750	4	171,000	2010
	HP Laserjet P1505 Printers	IT Centre	46,782	12	561,384	2010
Microsoft	Microsoft Office 2007 Professional	IT Centre	55,000	16	880,000	2010
Antivirus Software	Norton Antivirus Software	IT Centre	18,050	3	54,150	2010
	Norton Antivirus Software	IT Centre	15,200	13	197,600	2010
Photocopiers	Heavy Duty Photocopier 25ppm	Xerographics Limited	685,000	4	2,740,000	2010
	Desktop digital copiers	Xerographics Limited	750,000	12	9,000,000	2010
Supply Voltage Supervisor	APC / Sollatek Voltage Supervisor 1KVA	Xerographics Limited	24,000	4	96,000	2010
	Voltage Stabilizers	Xerographics Limited	45,000	12	540,000	2010
PC Carry Cases	PC Carry Cases	IT Centre	0	16	0	2010
Printer Cables	1.8m USB Printer Cables	IT Centre	0	16	0	2010
TV Screen	Sony Bravia TV Screen	LORDS BEST COLLECTION	220,000	16	3,520,000	2010
DVD	LG DVD	LORDS BEST COLLECTION	14,500	16	232,000	2010
VCR	Panasonic VCR	LORDS BEST COLLECTION	22,500	16	360,000	2010
Digital Video Camera	HANDYCAM DCR-HC54E	Consumer Electonic Services	94,950	4	379,800	2011
		LORDS BEST COLLECTION	89,500	12	1,074,000	2011
LCD Projector	to be selected			16		2011
				Total:	22,107,606	

3-7 List of Materials Provided (for INSET Centres)

(1) National INSET Centre (Domasi College of Education)

Year	Total (MK)
2009	3,315,916
2010	1,627,558
Total	4,943,474

(2) Divisional INSET Centres

Year	INSET Centre	Division	Total (MK)
2008	Mulungzi Secondary School	SEED	1,723,157
	Balaka Secondary School		1,008,200
	Lisumbwi Secondary School		1,217,387
2010	Chitipa Secondary School	NED	2,625,734
	Euthini Secondary School		2,633,286
	Mzuzu Secondary School		3,111,414
	Mzimba Secondary School		3,244,685
	Chayamba Secondary School	CEED	3,056,562
	Madisi Secondary School		2,729,062
	Salima Secondary School		2,945,683
	Lilongwe Girls' Secondary School	CWED	3,095,803
	Dedza Secondary School		3,830,359
	Namitete Secondary School		3,269,921
	Mchinji Secondary School		3,478,866
	Mulungzi Secondary School	SEED	1,513,927
	Balaka Secondary School		1,096,959
	Lisumbwi Secondary School		921,041
	Blantyre Secondary School	SWED	4,403,890
	Mwanza Secondary School		2,544,525
	Ngabu Secondary School		2,702,234
	Mulanje Secondary School	SHED	2,601,469
	Thyolo Secondary School		2,383,207
		Total	56,137,371

3-8 Budget for Impremention of INSETs (2008/09 - 2011/12)

	2008/2009		2009/2010		2010/2011	2011/2012
	Planned	Actual	Planned	Actual	Planned	Planned
MoEST (MK)	20,000,000	11,277,387	29,862,600	28,491,372	29,862,600	29,862,600
JICA (MK)	40,528,000	44,982,908	66,522,000	92,636,791	42,680,000	34,450,000
School/community (MK)	1,501,500	1,501,500	18,750,000	10,666,000	18,750,000	18,750,000
Total	62,029,500	57,761,795	115,134,600	131,794,163	91,292,600	83,062,600
MoEST	32.2%	19.5%	25.9%	21.6%	32.7%	36.0%
JICA	65.3%	77.9%	57.8%	70.3%	46.8%	41.5%
School/community	2.4%	2.6%	16.3%	8.1%	20.5%	22.6%
Malawi side	34.7%	22.1%	42.2%	29.7%	53.2%	58.5%
JICA side	65.3%	77.9%	57.8%	70.3%	46.8%	41.5%

Annex 4: Project Design Matrix ver.2.0 (Draft)

Project Title: Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II
Executing Bodies: Ministry of Education, Science and Technology (MoEST) and Japan International Cooperation Agency (JICA)
Target Teachers: All mathematics and science teachers in public secondary schools (3,400 teachers) and headteachers in public secondary schools
Target Area: 6 Divisions
Duration: 4 years (2008 - 2012)

Version 2.0 (26th Oct, 2010)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Super goal The abilities of secondary school students in mathematics and science are improved in Malawi.	National Examination pass rate both at JCE and MSCE levels	National Examination results	The minimum number of M/S lessons/ periods per week is maintained. The learning environment of student is maintained.
Overall goal The quality of teaching & learning of mathematics and science is improved in secondary schools in Malawi.	~~(a) Secondary maths/science lessons sampled nationally obtain mean of over 3.0 on the scale of 1 to 5 in the Teaching & Learning Quality Index administered by the EMAS of MoEST.~~ (b) Secondary maths/science lessons sampled nationally obtain mean of over 2.5 on the scale of 0 to 4 in the ASEI/PDSI checklist administered by the project M&E team.	~~(a) EMAS M&E reports~~ (b) Project M&E reports	The stability of the teaching force within schools is maintained.
Project Purpose Quality INSETs for secondary mathematics and science teachers at Divisional level are provided.	By the end of the project, Divisional INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the INSET Quality Index through Pre- and Post-INSET, Session and Overall INSET evaluation instruments administered by the Monitoring and Evaluation Team.	Project M&E reports	Stability of Divisional trainers within divisions is maintained.

Output(s): 1. Capacity of Divisional Trainers is strengthened.	By the end of the project, 1(a) Over 240 divisional trainers undergo appropriate training. 1(b) National and Divisional Trainers obtain mean of over 3 on the scale of 0 to 4 in the Trainer Capacity Index administered by the Monitoring and Evaluation Team.	Project M&E reports	Stability of National trainers is maintained.
2. National INSET centre and Divisional INSET centre as resource centre are strengthened.	2(a) At least 1 national INSET centre and 19 divisional INSET centres are rehabilitated and equipped. 2(b) Guideline to improve physical and material environment for INSET centres is developed. 2(c) Physical and material environment for Divisional INSETs reach the level shown by INSET centre guideline. 2(d) INSET material and equipment are fully utilized for activities of teacher professional development.		
3. National & Divisional INSETs and M&E are implemented.	3(a) Every year, one INSET is conducted at over 19 INSET centres in Malawi. 3(b) National INSETs obtain mean of over 2.5 on the scale of 0 to 4 in the INSET Quality Index through Pre- and Post-INSET, Session and Overall INSET evaluation instruments administered by the Monitoring and Evaluation Team. 3(c) **Over 75% (2,500) of all M/S teachers in Public Secondary Schools attend Divisional INSETs.** 3(d) **5 INSET write-ups per cycle (4 subject & 1 general issue) are developed.** 3(e) Divisional INSET M&E Reports are submitted for each INSET.		Other educational activities will not interfere with the project activities.
4. Sustainable INSET management system is strengthened at all levels.	4(a) **SMASSE INSET budget is secured, and timely disbursed.** 4(b) **Over 80% of the total number of National and Divisional Coordinators, and headteachers at Divisional INSET centres participate in training sessions for strengthening their administrative capacity.**		Stability and cooperation of leadership at all levels are maintained. INSET activities will be priority assignment for officers involved.

Deleted: Over 75% of all M/S teachers in Public Secondary Schools attend Divisional INSETs .

Deleted: 9 INSET write-up per cycle (SEED 5: 4 subject & 1 general issue; and 4 for other divisions: 3 subject & 1 general issue) are developed.

Deleted: Malawian's contribution to Divisional INSET Fund

Deleted: Over XXX headteachers and over XXX divisional and ministry officials participate training sessions for strengthening their administrative capacity.

Activities: 1-1 Set TORs and recruitment criteria for National Trainers. 1-2 Recruit National Trainers. 1-3 Train National Trainers. 1-4 Sensitize M/S teachers for recruitment of Divisional Trainers. 1-5 Set TORs and recruitment criteria for Divisional Trainers. 1-6 Recruit Divisional Trainers. 1-7 Train Divisional Trainers. 1-8 Conduct Trainers' meetings. 2-1 Set designation criteria for INSET centres. 2-2 Designate and equip DCE and (to be decided) as National INSET Centres. 2-3 Designate schools as Divisional INSET centres. 2-4 Set minimum standards for INSET centres. 2-5 Conduct a survey on current physical and material environment at designated schools. 2-6 Carry out necessary maintenance and rehabilitation of the designated centres. 2-7 Equip INSET centres with T/L materials and facilities. 2-8 Set up guidelines for maintenance of equipment and facilities at INSET centres. 3-1 Conduct the baseline survey for M/S teachers. 3-2 Develop curriculums for INSETs. 3-3 Conduct National INSET. 3-4 Conduct monitoring and evaluation of National INSET. 3-5 Conduct Divisional INSET. 3-6 Conduct monitoring and evaluation of Divisional INSET. 4-1 Set TORs for different INSET committees. 4-2 Sensitize all stakeholders such as PTA, School Management Committee, and MoEST officials. 4-3 Establish INSET committees at different levels. ~~4-4 Establish Divisional INSET fund.~~ 4-5 Strengthen leadership at all levels through trainings, workshops and study tours. 4-6 Publicize INSET activities through newspapers, newsletters, radio and TV.	**Inputs:** 1. Malawian side: (a) Office space and facilities necessary for the Project (b) Expenses for monitoring and evaluation (c) Assignment of National Coordinator from DTED (d) Assignment of full time National Trainers to the Project (e) Expenses necessary for the implementation of the Project (Running cost for INSETs) 2. Japanese side: (a) Training of counterpart personnel in Japan, Kenya and other countries (b) Provision of equipment, materials and maintenance of facilities (if necessary) (c) Dispatch of short / long term experts (d) Expenses necessary for the implementation of the Project		

プロジェクト・デザイン・マトリックス
プロジェクト名：　マラウイ国中等理数科現職教員再訓練プロジェクト・フェーズ２
実施機関：　マラウイ教育科学技術省及びJICA
ターゲット教員：　全国公立中等学校の理数科教員（3400名）及び公立中等学校の学校長
ターゲット地域：　全国６教育管区
プロジェクト期間：　４年間（2008 – 2012）　　**Version 1.0 (19th May, 2008)**

	指標	指標入手方法	前提･外部条件
スーパーゴール: マラウイの中等教育レベルの生徒の能力が向上する。	JCE（Junior Certificate of Education）試験及びMSCE（Malawi School Certificate of Education）試験の合格率の向上。	National Examination results	週当たり最低理数科授業数が維持される。生徒の学習環境が維持される。
上位目標: マラウイの中等教育レベルにおける理数科の授業及び学習の質が向上する。	(a) 教育省教授法指導サービス局（Education Methods Advisory Services: EMAS）によって測定される、全国からサンプリングされた中等理数科教員の「授業の質指標」の平均値が、1～5 のスケールで3.0以上となる。 (b) プロジェクトのモニタリング評価チームによる全国からサンプリングされた中等理数科教員のASEI/PDSIチェックリストの平均点が、0～4のスケールで、2.5以上となる。	(a) EMAS M&E reports (b) Project M&E reports	教師の異動が頻繁には起こらない。
プロジェクト目標: 中等教育レベルの理数科の質の高い現職教員研修（INSET）が教育管区レベルで実施される。	プロジェクト終了時までに、プロジェクトのモニタリング評価チームによるINSET事前・事後評価を通じて測定される地方研修の「INSET質指標」の平均値が0～4のスケールで2.5以上となる。	Project M&E reports	地方研修講師の異動が頻繁には起こらない。
成果: 1. 地方研修講師の能力が強化される。 2. 中央･地方の研修センターがリソースセンターとして強化される。 3. 中央･地方の現職教員研修及びモニタリングが実施される。 4. 学校・地方教育行政レベルで持続的な現職教員研修の運営体制が強化される。	1(a) 240名以上の地方研修講師が適切な研修を受ける。 1(b) プロジェクトのモニタリング評価チームが調査する研修講師能力指標（Trainer Capacity Index）において、中央及び地方研修講師が、0～4のスケールで、3.0以上となる。 2(a) 最低1カ所の中央研修センター及び19カ所の地方研修センターが補修され、機材が整備される。 2(b) 地方研修センターの施設環境の改善を行うためのガイドラインを開発する。 2(c) 地方研修センターの施設環境が、ガイドラインに設定されたレベルに達する。 2(d) 現職教員研修の教材、機材が、教員の活動に十分活用される。 3(a) マラウイの全国19カ所の地方研修センターにおいて、毎年1回の現職教員研修が実施される。 3(b) プロジェクトのモニタリング評価チームが調査する「研修の質指標（INSET Quality Index）」において、中央研修が、0～4のスケールで、2.5以上となる。 3(c) 全国公立学校の中等理数科教員の75%以上が、地方研修に参加する。 3(d) 地方研修教材が各サイクルあたり、9種類作成される（SEEDは合計5種類（4科目及び全体講義1）、他教育管区は合計4種類（3科目及び全体講義1））。 3(e) 教員研修ごとに、地方研修のM&E報告書が提出される。 4(a) 地方研修実施のための経費基金へのマラウイ側の資金支援が向上する。 4(b) 学校長、教育省及び教育管区事務所の行政官が、運営管理能力強化の研修に参加する（参加者数値はプロジェクト開始後、確定予定）。	Project M&E reports	中央講師の異動が頻繁には起こらない。 他教育分野の活動が本プロジェクト活動の妨げとならない。

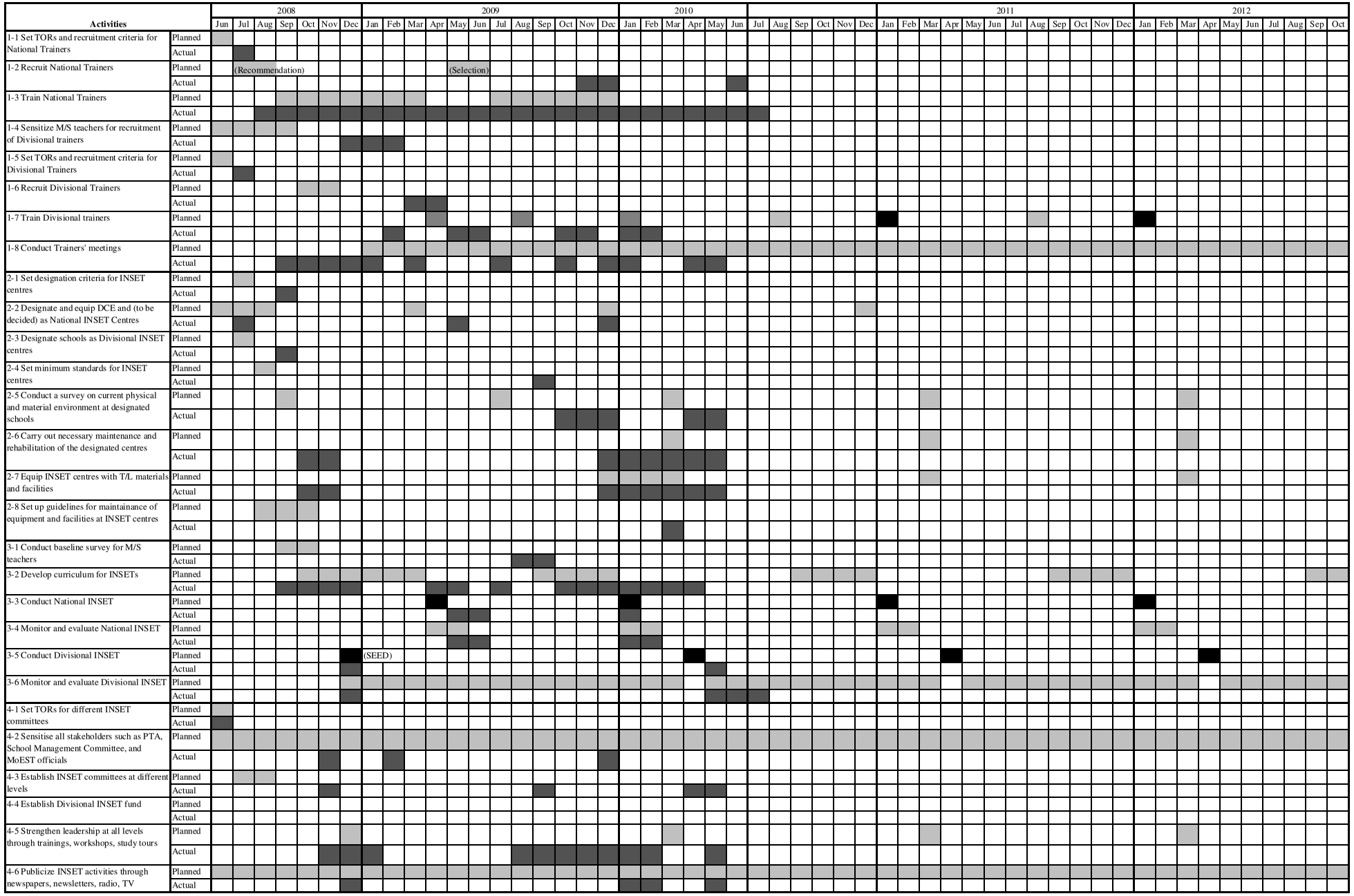
活動: 1-1　中央研修講師の TOR と選定クライテリアを設定する。 1-2　中央研修講師を選定する。 1-3　中央研修講師に対して研修を行う。 1-4　地方研修講師を選定するために、理数科教員に対して啓発活動を行う。 1-5　地方研修講師の TOR と選定クライテリアを設定する。 1-6　地方研修講師を選定する。 1-7　地方研修講師に対して研修を行う。 1-8　地方研修講師の研修会を実施する。 2-1　地方研修センター選定基準を設定する。 2-2　ドマシ教員養成大学及び（今後選定される場所）を中央研修センターとして選定し、機材整備を行う。 2-3　学校を地方研修センターとして選定する。 2-4　地方研修センターの設備最低基準を設定する。 2-5　地方研修センターに選定された学校の現在の施設環境の現状をベースライン調査する。 2-6　地方研修センター選定校の補修、維持管理を行う。 2-7　地方研修センターに授業教材･設備を供与する。 2-8　地方研修センターの機材･設備の維持管理ガイドラインを作成する。 3-1　教員のニーズのベースライン調査を実施する。 3-2　教員研修カリキュラムを開発する。 3-3　中央研修を実施する。 3-4　中央研修のモニタリング評価を実施する。 3-5　地方研修を実施する。 3-6　地方研修のモニタリング評価を実施する。 4-1　教員研修に関する様々な委員会の TOR を設定する。 4-2　PTA、学校運営委員会、教育省職員等のステークホルダー向けの啓発活動を実施する。 4-3　教育管区レベルで教員研修の運営委員会を設置する。 4-4　地方研修基金を設置する。 4-5　研修、ワークショップ、スタディツアーを通じて、すべてのレベルのリーダーシップを強化する。 4-6　新聞、ニュースレター、ラジオ、TV 等を通じて、教員研修活動の広報を行う。	**投入:** 1.　マラウイ側: (a)　プロジェクト執務環境 (b)　モニタリング評価活動経費 (c)　DTED から National Coordinator の配置 (d)　専従の中央研修講師の配置 (e)　プロジェクト実施に必要な経費（INSET のランニングコスト） 2.　日本側: (a)　日本、ケニア及び第三国での研修 (b)　機材供与 (c)　長期・短期専門家の派遣 (d)　プロジェクト実施に必要な経費		

＜PDM 各指標の詳細＞

PDM	上位目標 (a)	上位目標 (b)	プロジェクト目標	成果 1
指標	授業の質指標 (T&L Quality Index)	ASEI/PDSI チェックリスト	INSET 質指標 (INSET Quality Index)	研修講師能力指標 (Trainer Capacity Index)
項目・指数	• Teaching • Learning • Attainment • Pupils' attitude & behaviour • Assessment • Resources • Overall	• Attitude • Activity • Student-centred • Experiments • Improvisation • Planning • Seeing • Improving	(1) INSET Evaluation Index of Overall INSET Evaluation Instrument by Participants (2) INSET Evaluation Index of Overall INSET Evaluation Instrument by Facilitators (3) INSET Evaluation Index of INSET Session Evaluation Instrument by Participants (4) INSET Evaluation Index of Pre- & Post- INSET Evaluation Instrument by Participants	「INSET 質指標」(1)内 Facilitator の値 • Facilitators' mastery of content • Ability of facilitators to be focused • Ability to guide group activities • Ability to interject • Communication

指標	(1) INSET Evaluation Index of Overall INSET Evaluation Instrument by Participants	(2) INSET Evaluation Index of Overall INSET Evaluation Instrument by Facilitators	(3) INSET Evaluation Index of INSET Session Evaluation Instrument by Participants	(4) INSET Evaluation Index of Pre- & Post- INSET Evaluation Instrument by Participants
項目	• Content • Facilitator • Activities • Materials • Time Management • Facilities & Welfare • Communication • Relevance	• Planning • INSET contents • INSET materials • Doing • Seeing • Improving • General	• Plenary • Discussion • Hands-on activities • Peer teaching • Feedback on Peer Teaching	• Activity • Student-centred • Experiment • Improvisation • Planning • Seeing

Plan of Operation (PO)



対象	評価の視点	質問項目
地方研修講師	理数科教育の課題	（1） 理数科教育の一般的な課題は何か。
		（2） 理数科の授業を実践するうえでの課題は何か。
		（3） SMASSE の INSET は、上記の課題に対応しているか。
	中央研修	（1） 中央研修（SEED の場合、ToT や第三国研修）を通して、能力強化されたか。された場合、どのような面での能力が強化されたか。
		（2） 地方研修講師のより高い能力強化のため、中央研修（SEED の場合、ToT や第三国研修）で必要なことは何か。
		（3） 中央研修講師の能力は十分だったか（SEED 以外の地方研修講師）。
		（4） 中央研修センターは、INSET センターとしての機能を果たしているか。改善すべき点はあるか（SEED 以外の地方研修講師）。
		（5） 中央研修（SEED の場合、ToT や第三国研修）を通して得たことを教室レベルで実践しているか。している場合、どのような変化があったか。していない場合、理由は何か。
		（6） INSET で学んだことを実践するにあたり、学校側の協力はあるか。
	地方研修	（1） 地方研修を実施するにあたり、ファシリテーション面に関して課題はあるか。
		（2） より質の高い地方研修の実施のため、必要なことは何か。
		（3） 地方研修センターは、INSET センターとしての機能を果たしているか。改善すべき点はあるか。
		（4） 地方研修実施に際し、教育管区事務所、INSET センター、地方研修講師間のコミュニケーションは問題なかったか。
		（5） 地方研修を通して、参加者（一般の理数科教師）の能力向上は実施されたか。された場合、どのような点において向上したか。
		（6） 参加者は INSET で学んだことを教室レベルで実践しているか。
		（7） M&E の結果では、事前に連絡すると ASEI-PDSI を実践し、連絡しないと実践しないことが分かっている。教室レベルでの実践を定着させるために必要なことは何か。
	INSET の効果	（1） INSET を実施することで、授業・学習の質は向上する（した）と思うか。

		（２） INSET の実施は、生徒の学力の向上に貢献する（した）と思うか。
	今後について	（１） 理数科教師の能力強化のために、引き続き研修は必要か。
		（２） 地方研修講師として、今後も INSET に参加する意思があるか。
		（３） 地方研修講師の異動は頻繁に起きているか。

校長	理数科教育の課題	（１） 理数科教育の一般的な課題は何か。
		（２） 理数科の授業を実践するうえでの課題は何か。
		（３） SMASSE INSET の実施は、上記の課題に対応しているか。
	地方研修（研修運営実施面）	（１） SMASSE INSET について事前に十分な情報が得られたか。
		（２） 地方教育事務所との連絡方法に問題はなかったか。
		（３） 全理数科教員の人数と INSET 参加した人数は何名か。
		（４） INSET 参加にあたり、学校は参加者に対して必要な日当と交通費を支給したか。
		（５） 参加に際し、問題・困難があったか。学校は協力したか。
		（６） 理数科教員は進んで参加したか。
	地方研修	（１） 地方研修後、参加者から報告があったか。あった場合、どのような報告であったか。
		（２） 地方研修後、参加した教員は学んだことを教室で実践しているか。
		（３） 地方研修後、参加者の授業レベルでの実践を観察したか。した場合、参加者の能力は向上していたか。また、どのような点において向上したか。
		（４） M&E の結果では、事前に連絡すると INSET で学んだことを実践し、連絡しないと実践しないことが分かっている。教室レベルでの実践を定着させるために必要なことは何か。
		（５） 学校内またはクラスター内で、理数科教師の勉強会や授業観察などを実施しているか。
		（６） 学校内の他教科の教員と勉強会、授業観察などを実施しているか。
	INSET の効果	（１） INSET に参加した教員と参加しない教員で違いがみられるか。
		（２） INSET を実施することで、授業・学習の質は向上する（した）と思うか。
		（SEED：あった場合、どのような変化がみられたか。）

		（３） INSET の実施は、生徒の学力の向上に貢献する（した）と思うか。
		（SEED：した場合、どのような変化がみられたか。）
	今後について	（１） 理数科教師の能力強化のために、引き続き研修は必要か。
		（２） 校長として、今後も INSET に参加させる意思があるか。
		（３） 校長として、今後も教員を INSET に参加させる際の阻害要因は何か。

校長（地方研修センター校長）	地方研修センター（研修運営）	（１）SMASSE INSET に関する十分な情報を事前に得られたか。
		（２）INSET 中に発生した問題をどのように解決・改善したか（予算、研修運営、参加者からの苦情、サポートスタッフの管理、衛生面など）。
		（３）教育管区事務所との連絡体制に問題はなかったか。
		（４）スムーズな研修運営のため、十分な準備がなされたか。
		（５）INSET を実施するうえで、困難や問題はあったか。どのように解決したか。
		（６）地方研修実施に際し、教育管区事務所、INSET センター、地方研修講師間のコミュニケーション・協力関係に問題はなかったか。
		（７）研修運営面から判断して、研修期間の１週間は適切か。
		（８）INSET は全般的に順調に運営されたか。
		（９）INSET 実施にあたり、阻害要因、貢献要因はあるか。
	地方研修センター（施設・機材）	（１）センターとしての整備は十分に強化されたか。
		（２）施設改善に関する投入の規模とタイミングは適切だったか。
		（３）施設は適切に維持管理されているか。現在どのような取り組みを行っているか。今後、維持管理のためのルールやガイドラインが必要か。
		（４）整備された施設を維持管理するための予算はあるか。
		（５）INSET を実施するうえで、既存の施設を使用することによる問題はあるか。
		（６）センターをより強化するためにどのような整備が必要か。また、自分たちでできる取り組みは何か。
		（７）INSET 実施にあたり、供与された機材の数と質は十分か。

		（８）リソースセンターとして、近隣教員に十分活用されているか。すでにどのような実績があり、今後どのような計画があるか。

一般理数科教師	理数科教育の課題	（１） 理数科教育の一般的な課題は何か。
		（２） 理数科の授業を実践するうえでの課題は何か。
		（３） SMASSE の INSET は、上記の課題に対応しているか。
	地方研修（研修運営実施面）	（１） INSET 参加にあたり、学校は必要な日当と交通費を支給したか。
		（２） 参加に際し、問題・困難があったか。学校側の協力はあったか。
	地方研修	（１） 地方研修の期間は適切だったか。
		（２） 地方研修講師の能力は十分だったか。
		（３） 地方研修において、自分が習得したい知識やスキルを身につけることができたか。
		（４） 地方研修を通して、参加者（一般の理数科教師）の能力向上はされたか。された場合、どのような点において向上したか。
		（５） INSET を通して、より強化したい知識や能力は何か。
		（６） INSET で学んだことを教室レベルで実践しているか。実践している場合、何か変化があったか。
		（７） M&E の結果では、事前に連絡すると ASEI-PDSI を実践し、連絡しないと実践しないことが分かっている。教室レベルでの実践を定着させるために必要なことは何か。
		（８） INSET で学んだことを実践するにあたり、学校側の協力はあるか。
		（９） 学校内またはクラスター内で、理数科教師での勉強会や授業観察などを実施しているか。
		（１０） 学校内の他教科の教員と勉強会、授業観察などを実施しているか。
	INSET の効果	（１） INSET を実施することで、授業・学習の質は向上する（した）と思うか。
		（２） INSET の実施は、生徒の学力の向上に貢献する（した）と思うか。
	今後について	（１） 理数科教師の能力強化のために、引き続き研修は必要か。
		（２） 参加者として、今後も INSET に参加する意思があるか。

６．質問票（英文）

Questionnaire Manual: (Malawian CPs & Japanese Experts)

June, 2009

Project Evaluation for
The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE)
INSET Malawi Phase II

1 This is a questionnaire for project evaluation of the Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II

Overall Goal of the Project: The quality of teaching & learning of mathematics and science is improved in secondary schools in Malawi.
Project Purpose: Quality INSETs for secondary mathematics and science teachers at Divisional level are provided.

2 The questionnaire is designed in accordance with JICA's evaluation methodology which is regularly applied to evaluate JICA's technical cooperation projects. Evaluation will be conducted based on the Project Design Matrix (PDM) and in five criteria designated in JICA`s evaluation guideline. Please refer to PDM when necessary.

3 The data (answer) of the questionnaire will be collected and analyzed by an external consultant hired by JICA, and the results will be summarized during the evaluation.

4 Although the analyzed data of the questionnaires will be presented in public, the answer of each individual will be dealt as confidential.

5 The questionnaire consists of a total of 5 pages, including this page:

page 1: 0. Implementation Process

page 2: 1.Relevance

page 3: 2.Effectiveness.

page 4: 3.Efficiency

page 5: 4.Impact

page 6: 5.Sustainability

6 Please follow the directions described below upon answering questions in each page:

a. Please write your name, your position and period of your assignment involved in this project if possible. As it is mentioned before, the answer of each individual will be dealt as confidential.

b. Grade box (1, 2, 3, 4): Please answer each question by checking the relevant box with tick (✔) or changing the color of the box.
c. Reason(s)/Comments : Please provide reason(s) behind your judgment. Also please give your comments when applicable.

7 Please fill out the blank spaces of the questionnaire, and return it, hopefully, by 8 October to Ms. Kikuchi or bring it at the interview.

Please answer all the questions which you think are applicable to you.

Thank you very much for your time and cooperation.

Sincerely

EVALUATION QUESTIONNAIRE for CPs

Your Name:

Project Title : The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phas

Your Position / Speciality:

Period of your assignment :

0. Implementation Process

QUESTIONS	SUB-QUESTIONS	1	2	3	4	REASON(S)/COMMENTS
0.1 Overall Implementation process.	0.1.1 Was the implementation of each activity conducted smoothly as planned during the Project period?	Not at all	Rarely	More or less	Very much	
	0.1.2 If it was not, what were the problems?					
	0.1.3 How did you cope with the problems?					
0.2 Relations between Japanese Experts and Malawian CPs	0.2.1 Are communications between Japanese experts and Malawian CPs smooth?	Not at all	Rarely	More or less	Very much	
0.3 Ownership of CP organizations	0.3.1 Does MoEST have sufficient information on the Project progress?	Not at all	Rarely	More or less	Very much	
	0.3.2 Is allocation of CPs by MoEST appropriate?	Not at all	Rarely	More or less	Very much	
	0.3.3 Are CPs actively participating in Project activities?	Not at all	Rarely	More or less	Very much	
	0.3.4 Is Malawian budget secured and disbursed as planned?	Not at all	Rarely	More or less	Very much	
0.4 Project management system	0.4.1 Is management and monitoring system of the Project functioning?	Not at all	Rarely	More or less	Very much	
	0.4.2 Is PDM appropriately utilized and referred?	Not at all	Rarely	More or less	Very much	
	0.4.3 Is collaboartion with JOCV appropriately implemented?	Not at all	Rarely	More or less	Very much	
0.5 Contributing and inhibiting factors	0.5.1 Do headteachers have appropriate understanding toward expenditures on INSET?	Not at all	Rarely	More or less	Very much	
	0.5.2 Are their any difficulties for CPs and teachers to be actively involved in the Project and/or INSET?					
	0.5.3 Is INSET cost appropriately disburtsed at non-cost centre CDSSs?	Not at all	Rarely	More or less	Very much	
	0.5.4 Is the mechanism of MoEST to disburse the budget for national and divisional INSET appropriately functioning?	Not at all	Rarely	More or less	Very much	
	0.5.5 Are there any other contributing and inhibiting factors in regard to smooth Project implementation?					

* Important Assumptions mean external conditions important for project success, but that cannot be controlled by the project.
Please see the column of Important Assumption in PDM.

1. RELEVANCE

QUESTIONS	SUB-QUESTIONS	1	2	3	4	REASON(S) / Comments
1.1 Relevance of the Project in terms of Malawian needs	1.1.1 Is support for INSET of secondary M/S teachers consistent with the Malawian needs?	Not at all	Rarely	More or less	Very much	
	1.1.2 Are the contents of divisional INSET consistent with the needs of secondary M/S teachers?	Not at all	Rarely	More or less	Very much	
1.2 Relevance of the Project in terms of priority	1.2.1 Is the priority in NESP to strengthen Mathematics/Science teachers through INSET likely to continue?	Not at all	Rarely	More or less	Very much	
	1.2.2 Are there any other plan and strategy at policy level in regard to secondary M/S education?	Not at all	Rarely	More or less	Very much	
1.3 Relevance of Project approach	1.3.1 Is INSET appropriate as an approach to respond to development issues in M/S education in Malawi?	Not at all	Rarely	More or less	Very much	
	1.3.2 Is implementation method of INSET appropriate?	Not at all	Rarely	More or less	Very much	
	1.3.3 Is target group appropriately selected, including scale?	Not at all	Rarely	More or less	Very much	
	1.3.4 Are experiences of Japanese cooperation in M/S education implemented in other countries utilized?	Not at all	Rarely	More or less	Very much	
	1.3.5 Are there collaborative relations with other development partners? Is there any duplication in cooperation?	Not at all	Rarely	More or less	Very much	
	1.3.6 Are there any political. economic, and social changes that may affect Project implementation?	Not at all	Rarely	More or less	Very much	

2. EFFECTIVENESS

QUESTIONS	SUB-QUESTIONS	1	2	3	4	REASON(S)/ COMMENTS
2.1 Achievement of Project Purpose	2.1.1 To what extent do you think is the Project Purpose likely to be achieved?	Not at all	Rarely	More or less	Very much	
	2.1.2 Is the level of Objectively Verifiable Indicators of Project Purpose appropriately defined?	Not at all	A little	More or less	Very much	
	2.1.3 What do you think are the promoting factors to achieve the project purpose?					
	2.1.4 What do you think are the inhibiting factors to achieve the project purpose?					
2.2 Achievements and contribution of <u>EACH OUTPUT</u>	**2.2.1 OUTPUT 1 - Capacity of Divisional Trainers is strengthened.**					
	2.2.1.1 How much do you think has OUTPUT1 been achieved?	Not at all	A little	More or less	Very much	
	2.2.1.2 What are the challenges/difficulties to achieve the OUTPUT 1?					
	2.2.1.3 How much do you think has OUTPUT 1 contributed to achieve the project purpose?	Not at all	Rarely	More or less	Very much	
	2.2.2 OUTPUT 2 - National INSET centre and divisional INSET centre as resource centre are strengthened.					
	2.2.2.1 How much do you think has OUTPUT 2 been achieved?	Not at all	A little	More or less	Very much	
	2.2.2.2 What are the challenges/difficulties to achieve the OUTPUT 2?					
	2.2.2.3 How much do you think has OUTPUT 2 contributed to achieve the project purpose?	Not at all	Rarely	More or less	Very much	
	2.2.3 OUTPUT 3 - National & divisional INSETs and M&E are implemented.					
	2.2.3.1 How much do you think has OUTPUT 3 been achieved?	Not at all	A little	More or less	Very much	
	2.2.3.2 What are the challenges/difficulties to achieve the OUTPUT 3?					
	2.2.3.3 How much do you think has OUTPUT 3 contributed to achieve the project purpose?	Not at all	Rarely	More or less	Very much	
	2.2.4 OUTPUT 4 - Sustainable INSET management system is strengthened at all levels.					
	2.2.2.1 How much do you think has OUTPUT 4been achieved?	Not at all	A little	More or less	Very much	
	2.2.2.2 What are the challenges/difficulties to achieve the OUTPUT 4?					
	2.2.2.3 How much do you think has OUTPUT 2 contributed to achieve the project purpose?	Not at all	Rarely	More or less	Very much	
2.3 Causality of Outputs and Project Purpose	2.3.1 Is Project Purpose likely to be achieved as a result of achievement of Outputs? Is the logic between Outputs and Project Purpose appropriate?	Not at all	A little	More or less	Very much	
	2.3.2 Are there any other factors that contribute to achievement of Project Purpose?					
	2.3.3 Are Divisional trainers maintained within divisions? (Important Assumptions)	Not at all	A little	More or less	Very much	
	2.3.4 Are there any other inhibiting factors?					

Project Title : The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II

3. EFFICIENCY:

QUESTIONS	SUB-QUESTIONS		1	2	3	4	REASON(S) / COMMENTS
	---> > These grades are applied for all questions of this sheet.		Not at all	Rarely	More or less	Very much	
3.1 Have the Japanese inputs been appropriate?	3.1.1 Japanese Experts	a. Number of experts					
		b. Timeliness of dispatching experts					
		c. Fields of expertise					
	3.1.2 Provision of facilities and equipment	a. Quantity					
		b. Quality					
		c. Timeliness of provision					
		d. Cost					
	3.1.3 Training of CPs in Japan, Kanya, and Malaysia	a. Timing of activities					
		b. Quality of activities (materials, training)					
	3.1.4 Local cost support	a. Timeliness					
		b. Amount of support					
3.2 Have the Malawian inputs been appropriate?	3.2.1 Assignment of MalawianCPs	a. Number of CPs					
		b. Timeliness of assignment					
		c. Professional fields of CPs					
	3.2.2 Provision of Facilities / Equipment	a. Facilities (Project office, training sites, etc.)					
		b. Equipment and supplies					
	3.2.3 Operational Costs	a. Amount					
		b. Timeliness of disbursement					
3.3 Have the inputs been effectively utilized?	3.3.1 Utilization of inputs	a. Personnel					
		b. Facilities/equipment/supplies					
		c. Training in Japan and third countries					
		d. Operational Costs					
		e. Baseline survey					
		f. National INSET					
		g. Divisionla INSET					
		c. Sensitization workshop					
3.4 Contribuing and inhibiting factors	3.4.1 Are local resources appropriately utilized?						
	3.4.2 Are experiences in related projects (SMASSE, SMASE-WECSA) in neighboring countries		Not at all	Rarely	More or less	Very much	
	3.4.3 Are there any contributing and inhibiting factors in producing Outputs?						

Project Title : The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II

4. IMPACT:

QUESTIONS	SUB-QUESTIONS	1	2	3	4	REASONS (S) / COMMENTS
4.1 Achievement of Overall Goal	4.1.1 Is Overall Goal likely to be achieved?	Not at all	Rarely	More or less	Very much	
	4.1.2 Are Project Purpose and Overall Goal related logically?	Not at all	Rarely	More or less	Very much	
	4.1.3 Is Important Assumption between Project Purpose and Overall Goal appropriate at the time of the Mid-Term Review? Is Important Assumption likely	Not at all	Rarely	More or less	Very much	
	4.1.4 Are there any other factors inhibiting achievement ot Overall Goal?	Not at all	Rarely	More or less	Very much	
4.2 Ripple effects	4.2.1 Is Super goal likely to be achieved?	Not at all	Rarely	More or less	Very much	
	4.2.2 Are there any expected impacts on Malawian education development plan as a result of Overall Goal?	Not at all	Rarely	More or less	Very much	
	4.2.3 Are there any impacts on College of Educaiton?	Not at all	Rarely	More or less	Very much	
	4.2.4 Are there any impacts on collaborative relations among neighboring schools?	Not at all	Rarely	More or less	Very much	
	4.2.5 Are there any impacts in primary schools and private schools?	Not at all	Rarely	More or less	Very much	
	4.2.6 Are there any impacts on subjects other than maths and science?	Not at all	Rarely	More or less	Very much	
	4.2.7 Is monitoring regularly conducted at classes, reflecting the contents of INSET?	Not at all	Rarely	More or less	Very much	
	4.2.8 Are there any positive and negative impacts other than Overall Goal? If there are negative impacts, what mitigation measures are being taken?					

Project Title : The Project on Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II

5.SUSTAINABILITY:

QUESTIONS	SUB-QUESTIONS	1	2	3	4	REASON(S) / COMMENTS
5.1 Policy and institutional aspect	5.1.1 Is strengthening secondary M/S education likely to continue to be priority issue at MoEST?	Not at all	Rarely	More or less	Very much	
	5.1.2 Does MoEST have strategies to continue INSET after the Project period?	Not at all	Rarely	More or less	Very much	
	5.1.3 Are National trainers involved in the process of SSCAR?	Not at all	Rarely	More or less	Very much	
	5.1.4 Is SSCAR being implemented as planned?	Not at all	Rarely	More or less	Very much	
5.2 Organizational and financial aspect	5.2.1 1Is INSET management organization likely to be maintained?	Not at all	Rarely	More or less	Very much	
	5.2.2 Is appropriate system to support INSET established?	Not at all	Rarely	More or less	Very much	
	5.2.3 Is INSET center likely to continue functioning?	Not at all	Rarely	More or less	Very much	
	5.2.4 Are financial sources secured to continuously implement INSET?	Not at all	Rarely	More or less	Very much	
5.3 Technical aspect	5.3.1 Is capacity of National trainers sufficiently developed?	Not at all	Rarely	More or less	Very much	
	5.3.2 Is capacity of Divisional trainers sufficiently developed?	Not at all	Rarely	More or less	Very much	
	5.3.3 Is the quality of INSET likely to be maintained after the Project period?	Not at all	Rarely	More or less	Very much	
5.4 Other aspects	5.4.1Are there any other factors inhibiting sustainablity?					

Questionnaire/List of Interview Questions
(Divisional Trainers)

Project Evaluation for
Strengthening of Mathematics and Science in Secondary Education (SMASSE)
INSET Malawi Phase II

This questionnaire sheet shows a list of interview questions for project evaluation of the Project for Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II (August 2008 – August 2012).

> Overall Goal of the Project: The quality of teaching & learning of mathematics and science is improved in secondary schools in Malawi.
> Project Purpose: Qua lity INSETs for seconda ry mathematics and science teachers at Divisional level are provided.

The questionnaire (list of interview questions) is designed based on JICA's evaluation methodology which is regularly applied to evaluate JICA-funded technical cooperation projects.

The questionnaire (list of interview questions) is submitted to related organizations and personnel to show what questions will be presented during interview. However, it is appreciated if you fill in the questionnaire beforehand and hand it back to the Project ( ), if time permits.

a. Please write your name, your position and period of your assignment involved in this project if possible. The answer of each individual will be dealt as confidential.

b. Comments: Please provide comments below each question.

Thank you very much for your time and cooperation.

Sincerely

Your Name:

Organization:

Period or your assignment (Month/Year you were designated as Divisional trainer): /

1 Issues in secondary mathematics and science education in Malawi

1-1 What do you think are the major challenges or priority issues in secondary M/S education in general in Malawi?

Comments

1-2 What challenges/difficulties do you have in conducting M/S classes?

Comments

1-3 To how much extent is SMASSE INSET responding to the challenges/difficulties mentioned above?

Comments

2 National INSET

2-1 In what aspects did you improve your abilities through INSET?
(For SEED: In what aspects did you improve your abilities through in ToT and training in third countries?)

Comments

2-2 What do you think are necessary in National INSET to further improve the abilities of Divisional Trainers?
(For SEED: What do you think are necessary in ToT and training in third countries?)

Comments

2-3 (For Divisional trainers except for SEED) Do you think that the National Trainers are well trained?

Comments

2-4 (For Divisional trainers except for SEED) Do you think that National INSET Centre is functioning appropriately? Do you have any suggestions to improve National INSET Centre?

Comments

2-5 Do you practice what you learned at National INSET (or ToT/Training in third country for SEED) in actual class? If so, what changes do you see in class? If not, what is the reason?

Comments

2-6 What difficulties/constraints do you have in implementing what you learned at INSET?

Comments

3 Divisional INSET

3-1 What difficulties/problems do you have in facilitation in conducting divisional INSET?

Comments

3-2 What do you think are necessary to further improve divisional INSET?

Comments

3-3 Do you think that divisional INSET Centre is functioning appropriately? Do you have any suggestions to improve divisional INSET Centre?

Comments

3-4 Do you have smooth communications with related organizations and stakeholders such as Division Office, INSET Centre, and Divisional trainers?

Comments

3-5 In what aspects did INSET participants improve their capacity through divisional INSET?

Comments

3-6 Do teachers implement what they learned at INSET in actual class?

Comments

3-7 What do you think is necessary for teachers to practice what they learned at INSET in class regularly and continuously?

Comments

4 Impact of INSET

4-1 How much extent do you think is INSET contributing to the improvement of

the quality of teaching and learning?

Comments

4-2 How much extent do you think is INSET contributing to the abilities of students?

Comments

5 Sustainability of the Project

5-1 Do you think INSET is still necessary to improve capacity of M/S teachers?

Comments

5-2 Are you willing to participate in INSET as Divisional Trainer in the future?

Comments

5-3 Is there frequent turnover of Divisional Trainers?

Comments

Thank you for your kind cooperation.

Questionnaire
(Head teachers)

Project Evaluation for
Strengthening of Mathematics and Science in Secondary Education (SMASSE)
INSET Malawi Phase II

This is a questionnaire for project evaluation of the Project for Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II (August 2008 – August 2012).

> Overall Goal of the Project: The quality of teaching & learning of mathematics and science is improved in secondary schools in Malawi.
> Project Purpose: Qua lity INSETs for seconda ry mathematics and science teachers at Divisional level are provided.

The questionnaire is designed based on JICA's evaluation methodology which is regularly applied to evaluate JICA-funded technical cooperation projects.

The questionnaire is submitted to related organizations and personnel to show what questions will be presented during interview. It is not necessary to fill in the questionnaire beforehand.

Thank you very much for your time and cooperation.

Sincerely

1 Issues in secondary mathematics and science education in Malawi

1-4 What do you think are the major challenges or priority issues in secondary M/S education in general in Malawi?

1-5 What challenges/difficulties do you have in conducting M/S classes?

1-6 To how much extent is SMASSE INSET responding to the challenges/difficulties mentioned above?

2 Management of divisional INSET

2-1 Do you think that INSET is well prepared and organized?

2-2 (1) Please give us the total number of M/S teachers at your school.
(2) How many M/S teachers out of the above total have participated in INSET so far?

2-3 Does your school provide participants with transportation and allowance necessary for INSET ?

2-4 What difficulties are there for teachers to participate in INSET?

3 Implementation of divisional INSET

3-1 What reports on INSET do you get from the participants?

3-2 In what aspects did INSET participants improve their capacity?

3-3 Do teachers implement what they learned at INSET in actual class?

3-4 What do you think is necessary for teachers to practice what they learned at INSET in class regularly and continuously?

3-5 Do M/S teachers organize lesson observation and/or study sessions among them at your school and/or within the cluster?

3-6 Do M/S teachers organize lesson observation and/or study sessions with teachers of other subjects at your school?

4 Impact of INSET

4-1 Do you see any differences between teachers who participated in INSET and those who did not?

4-2 How do you think is INSET contributing to the improvement of the quality of teaching and learning?

4-3 How do you think is INSET contributing to the abilities of students?

5 Future direction of INSET

5-1 Do you think INSET is still necessary to improve capacity of M/S teachers?

5-2 What are difficulties/challenges in allowing teachers to continuously participate in INSET?

Thank you for your kind cooperation.

Questionnaire
(Head teachers at INSET Centres)

Project Evaluation for
Strengthening of Mathematics and Science in Secondary Education (SMASSE)
INSET Malawi Phase II

This is a questionnaire for project evaluation of the Project for Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II (August 2008 – August 2012).

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The questionnaire is designed based on JICA's evaluation methodology which is regularly applied to evaluate JICA-funded technical cooperation projects.

The questionnaire is submitted to related organizations and personnel to show what questions will be presented during interview. It is not necessary to fill in the questionnaire beforehand.

Thank you very much for your time and cooperation.

Sincerely

1 Issues in secondary mathematics and science education in Malawi

1-7 What do you think are the major challenges or priority issues in secondary M/S education in general in Malawi?

1-8 What challenges/difficulties do you have in conducting M/S classes?

1-9 To how much extent is SMASSE INSET responding to the challenges/difficulties mentioned above?

2 Management of divisional INSET

2-1 Do you think that INSET is well prepared and organized?

2-2 (1) Please give us the total number of M/S teachers at your school.
(2) How many M/S teachers out of the above total have participated in INSET so far?

2-3 Does your school provide participants with transportation and allowance necessary for INSET ?

2-4 What difficulties are there for teachers to participate in INSET?

3 Implementation of divisional INSET

3-1 What reports on INSET do you get from the participants?

3-2 In what aspects did INSET participants improve their capacity?

3-3 Do teachers implement what they learned at INSET in actual class?

3-4 What do you think is necessary for teachers to practice what they learned at INSET in class regularly and continuously?

3-5 Do M/S teachers organize lesson observation and/or study sessions among them at your school and/or within the cluster?

3-6 Do M/S teachers organize lesson observation and/or study sessions with teachers of other subjects at your school?

4 Impact of INSET

4-1 Do you see any differences between teachers who participated in INSET and those who did not?

4-2 How do you think is INSET contributing to the improvement of the quality of teaching and learning?

4-3 How do you think is INSET contributing to the abilities of students?

5 Future direction of INSET

5-1 Do you think INSET is still necessary to improve capacity of M/S teachers?

5-2 What are difficulties/challenges in allowing teachers to continuously participate in INSET?

6 Management of divisional INSET centre

6-1 Did you get sufficient information about SMASSE and INSET beforehand?

6-2 Do you have smooth communication with related organizations and stakeholders, such as Education Division Office, INSET Centre, Divisional Trainer?

6-3 What difficulties/challenges do you have in preparing and organizing INSET as head teacher at INSET centre? How did you cope with them?

6-4 Do you think INSET was conducted smoothly in general? What are contributing/inhibiting factors in managing INSET?

6-5 Do you think that the period of INSET (one week) is appropriate from the managerial viewpoint?

7 Management of divisional INSET centre

7-1 Do you think that the facilities are improved enough as INSET centre?

7-2 Are the facilities of INSET centre managed and maintained appropriately? What measures have you taken and what suggestions do you have to manage and maintain the facilities of INSET centre appropriately?

7-3 How do you manage budget to maintain the facilities?

7-4 What efforts are you taking to further improve INSET centre? What do you think are necessary to improve INSET centre?

7-5 Is INSET centre utilized by teachers at nearby school as resource centre? What plan do you have to utilize INSET in the future?

Thank you for your kind cooperation.

Questionnaire
(Mathematics/Science Teachers)

Project Evaluation for
Strengthening of Mathematics and Science in Secondary Education (SMASSE)
INSET Malawi Phase II

This is a questionnaire for project evaluation of the Project for Strengthening of Mathematics and Science in Secondary Education (SMASSE) INSET Malawi Phase II (August 2008 – August 2012).

> Overall Goal of the Project: The quality of teaching & learning of mathematics and science is improved in secondary schools in Malawi.
> Project Purpose: Quality INSETs for secondary mathematics and science teachers at Divisional level are provided.

The questionnaire is designed based on JICA's evaluation methodology which is regularly applied to evaluate JICA-funded technical cooperation projects.

The questionnaire is submitted to related organizations and personnel to show what questions will be presented during interview. It is not necessary to fill in the questionnaire beforehand.

Thank you very much for your time and cooperation.

Sincerely

1 Issues in secondary mathematics and science education in Malawi

1-10 What do you think are the major challenges or priority issues in secondary M/S education in general in Malawi?

1-11 What challenges/difficulties do you have in conducting M/S classes?

1-12 To how much extent is SMASSE INSET responding to the challenges/difficulties mentioned above?

2 Logistics of divisional INSET

2-1 Did your school provide you with necessary allowance and transport to participate in INSET?

2-2 Do you have any difficulties in participating in INSET?

3 Divisional INSET

3-1 To how much extent do you think INSET is appropriate?
(1) Period
(2) Abilities of Divisional trainer
(3) Contents (knowledge and skills obtained)

3-2 In what aspects do you think that the abilities of participants are improved through INSET?

3-3 Do you practice what you learned at INSET in class regularly and continuously?

3-4 What do you think is necessary to practice what you learned at INSET in class regularly and continuously?

3-5 What supports do you get from school in implementing what you learned at INSET at class?

3-6 Do M/S teachers organize lesson observation and/or study sessions among them at your school and/or within the cluster?

3-7 Do M/S teachers organize lesson observation and/or study sessions with teachers of other subjects at your school?

4 Impact of INSET

4-1 How do you think is INSET contributing to the improvement of the quality of teaching and learning?

4-2 How do you think is INSET contributing to the abilities of students?

5 Sustainability of the Project

5-1 Do you think INSET is still necessary to improve capacity of M/S teachers?

5-2 Are you willing to participate in INSET in the future?

Thank you for your kind cooperation.

Report on Baseline Survey

October, 2009

SMASSE INSET Malawi

DTED,MoEST

Private Bag 215, LL

ACKNOWLEDGEMENT

The SMASSE Secretariat would like to sincerely thank all stake holders who assisted in the planning and implementation of the Baseline Survey especially the schools for allowing us to conduct the survey, Education Division Office for giving its fullest cooperation and support during the survey, MoEST through DTED and JICA for providing funds and technical support for the survey, National Trainers and all those who assisted in one way or the other. It is our hope that the findings will be utilized effectively to improve the quality of mathematics and science education in Malawi.

LIST OF ABBREVIATIONS

ASEI	Activity, Student-centred, Experiment, and Improvisation
CDSS	Community Day Secondary School
CEED	Central East Education Division
CWED	Central West Education Division
DCE	Domasi College of Education
DTED	Department of Teacher Education and Development
DTs	Divisional Trainers
HT	Head Teacher
INSET	In-Service Education and Training
JCE	Junior certificate of Education
JICA	Japan International Cooperation Agency
MoEST	Ministry of Education, Science and Technology
MSCE	Malawi School Certificate of Education
M/S	Mathematics and Science
NED	North Education Division
NTs	National Trainers
PDSI	Plan, Do, See, and Improve
SEED	South East Education Division
SEMA	Senior Education Methods Advisor
SHED	Shire Highlands Education Division
SMASSE	Strengthening of Mathematics and Science in Secondary Education
SS	Secondary School
SWED	South West Education Division
T/L	Teaching and Learning

TABLE OF CONTENTS

1. Background

SMASSE INSET Malawi is a technical cooperation between the government of Malawi through the Ministry of Education Science and Technology (MoEST) and Government of Japan through Japan International Cooperation Agency (JICA). It was noted that many students are lately performing poorly in mathematics and science subjects both at Junior Certificate of Education (JCE) and Malawi School Certificate of Education (MSCE) levels. The aim of the project is to improve the quality of teaching and learning of mathematics and science in secondary schools through establishing regularised and institutionalised IN-Service Education and Training (INSET) for mathematics and science teachers in Malawi. The project was piloted in South East Education Division (SEED) from 2004 to 2008. After being evaluated both by internal and external evaluators, the pilot phase was considered to be successful hence the need to roll it to other remaining five divisions since they face similar problems as those of SEED.

With the secretariat at Department of Teacher Education and Development (DTED), the Phase II commenced in August, 2008 after a successful implementation in SEED, the government of Malawi through MoEST signed a formal agreement with the Government of Japan through JICA. The Phase II will be implemented in the remaining five divisions; North Education Division (NED), Central East Education Division (CEED), Central West Education Division (CWED), South West Education Division (SWED) and Shire Highlands Education Division (SHED) as well as in SEED.

As a requirement of the project, it was realized necessary to carry out a baseline survey in these five divisions in order to find out the current status/situation of mathematics and science teaching in these divisions before the commencement of the project activities.

2. Introduction

After the recommendations from both MoEST and JICA to roll out the project to the five remaining divisions, there was need to find out the current situations in the teaching and learning of mathematics and science before the commencement of the project. This was conducted to collect information on how mathematics and science is being taught to assess the impact of the project after its commencement. The objectives of the baseline survey were to;

1) Find out the current situation of mathematics and science teaching in the schools.
2) Identify the problems teachers face when teaching mathematics and science lessons.
3) Find out the needs of mathematics and science teachers in order to improve their teaching skills.

The exercise involved a number of activities: administering questionnaires to the Head Teacher, mathematics and science teachers and students. Selected lessons in mathematics and science were observed during this exercise.

The baseline survey was conducted from 24/08/2009 to 30/09/2009. (See appendix 1 for the programme and appendix 2 for the personnel)

3. Methodology

3.1 Instruments:

A number of instruments were used during this exercise to achieve specific objective(s).

- To achieve objective 1, ASEI/PDSI[1] lesson observation checklist, questionnaire for H/Teachers and questionnaire for students were used.
- To achieve objective 2, questionnaire for maths/science teachers and interview were used.
- To achieve objective 3, questionnaire for maths/science teachers and subjects-based questionnaires were used.

The detailed description of the purposes of each instrument (See appendix 3-8 for the original questionnaires):

(1) Head Teacher's(HT) Questionnaire:

This questionnaire had items that would assist:

- To collect basic information on the type school as well as HT's information such as sex, subjects which HT is teaching, qualification of the HT and the experience as the HT.
- To find out how often mathematics and science teachers get support from the school administration.
- To find out how head teachers think about the relationship between students' performance and other problems such as lack of teaching and learning materials, teachers' problems etc.
- To find out what HTs usually do such in their lessons
- To find out the attitudes of HTs towards the teaching and learning of maths/science.

[1] ASEI is short for "Activity, Student-centred, Experiment, and Improvisation" and PDSI is short for "Plan, Do, See, and Improve". ASEI-PDSI approach is introduced to improve the quality of mathematics and science lessons through INSET.

(2) Mathematics and science teachers' questionnaire:

This questionnaire had items that would assist:

- To collect basic information such as sex, subjects which teachers teach, qualification, teaching experience, number of students in a class and total periods per week.
- To find out how often mathematics and science teachers get support from head of departments, HT, SEMA, other teachers etc.
- To find out the attitudes of teachers towards various elements of teaching.
- To find out to what extent they find it difficult to practice ASEI-PDSI.
- To find out their attitude about the relationship between students' performance and other problems such as lack of teaching and learning materials, teachers' problems etc.
- To find out their needs and to get their views on how best they can improve the quality of teaching.
- To find out which areas they prefer to be focused on INSET.

(3) Interview with mathematics and science teachers:

Mathematics and science teachers were asked several questions with the purpose of finding out:

- why teachers do not allow students to participate actively in their lessons
- why teachers do not conduct experiments/activities in their lessons
- why teachers do not improvise teaching and learning materials if the need arises
- why teachers do not prepare thoroughly lesson plans
- why teachers do not allow their fellow colleagues to observe their lessons

(4) Subject –based questionnaires:

This questionnaire had items that would assist:

- To find out which topics poses a lot of challenges to teachers (difficult topics to teachers)

(5) Students' Questionnaires:

This questionnaire had items that would assist:

- To find out the attitudes of students towards the learning of mathematics and science.
- To find out teachers' attitude toward teaching mathematics and science.
- To find out what teachers usually do in their lessons.

(6) Lesson Observation:

This lesson observation checklist has items:

- To find out what teachers do during the lessons. (*Observing problems; Not all the problems may come out; "exemplary" lessons → should be coupled with students' questionnaire*)
- To find out the attitudes of teachers towards mathematics and science. (*Attitudes manifested in their observable behaviour*)
- To find out to what extent teachers practice ASEI-PDSI in the lesson.

3.2 Target schools

A total of 97 schools out of 644 government schools in five divisions (representing 15%) were targeted for the baseline survey. Statistically 30% is a recommended percentage for data collection but since it was not possible to visit all the schools within planned time it was decided to target only 15% of the total schools in the five divisions.

Table 1: Number of Targeted Schools

DIVISION	CDSSs APPROVED	CDSSs NOT APPROVED	GOVERNMENT BOARDING	GOVERNMENT DAY	GRANT AIDED	TOTAL
NED	6	19	1	1	1	28
CEED	9	6	1	1	0	17
CWED	11	8	2	2	1	24
SHED	11	0	1	1	0	13
SWED	5	7	1	2	0	15
TOTAL	**42**	**40**	**6**	**7**	**2**	**97**

4. Preparation for the baseline survey

A series of activities were carried out in preparation for smooth implementation of the baseline survey.

4.1 Modification of the instruments

There was need to use the same instruments that were used in SEED for uniformity. However there was slight change in the instruments to suit the current situation. This was done by going through each instrument one by one and improved the areas that needed improvement. In addition to the instruments, subject questionnaires were introduced to find out topics which teachers think difficult to teach. This exercise was done in weeks prior to the beginning of the survey.

4.2 Development of the programme

The secretariat developed the tentative programme based on the number of schools. It was suggested that 2 survey groups should be organized and each group should visit 2 schools per day.

4.3 Meetings with the Divisional SEMAs

The secretariat arranged sensitization meetings with all the SEMAs in the five divisions so that they could have an idea on the objective of the survey and how the survey would be conducted. During this meeting the SEMAs were also drilled on the instruments, their objective and how to use them. It was also during the same meeting that the secretariat and the SEMAs made the final selection of schools to be targeted. These meetings were held in their respective divisions as shown in table 2:

Table 2: Programme of meetings

DIVISION	DATE	Personnel from Division	Personnel from SMASSE
NED	10/08/2009	Mr Luhanga (SEMA) Mr Soko (SEMA)	Mr Chinomba (NT) Ms Kikuchi (Expert)
SHED	10/08/2009	Mr Tsogolani (SEMA)	Mr Nkhata (NT)
CEED	11/08/2009	Mrs Banda (PEMA) Mr Thungwa (Divisional Trainer)	Mr Chinomba (NT) Ms Kikuchi (Expert)
SWED	11/08/2009	Mrs Caroline Moto Mwale (SEMA)	Mr Nkhata (NT)
CWED	17/08/2009	Mr Matengo (SEMA)	Mr Chinomba (NT)

From these meetings the SEMAs came up with some suggestions for smooth implementation of the baseline survey and below are some of these suggestions;

- SEMAs from the NED suggested not to inform the schools that officials from division and SMASSE would be carrying out the survey to avoid staged lessons.
- SEMAs from CWED suggested to check the schemes of work of the maths/science teachers to identify the problems teachers face.

4.4 Meetings with the SEED Divisional Trainers

The secretariat also felt the need to involve 11 SEED trainers to conduct the survey due to shortage of human resource in the secretariat hence the need to brief them on how the survey would be conducted and to share with them on how to use the baseline instruments. The meeting was held at Domasi College of Education (DCE) on 14/08/2009.

4.5 Pilot Test of the exercise

A pilot or try out exercise of the baseline survey was arranged. The tryout survey was conducted at Songani CDSS and Domasi Demonstration secondary school. The purpose of the tryout was actually to check (i) whether the HTs, the maths/science teachers and the students would be able to understand the items in the instruments. The tryout was also done to check (ii) how long the

questionnaires would take to be filled in relation with the plan to visit two schools per day. At the end of the exercise it was noted that the HTs, the maths and science teachers and the Form 4 students were able to understand the items in the questionnaires without any problem, but the Form 2 students had some problems to understand the items. It was then agreed that the form 2 students would need a lot of time as well as more clarifications to fill the questionnaires.

Through the same tryout exercise, it was also noted that it would be possible to visit two schools in a day. Below is table summarising the findings of the tryout exercise:

(1) General Comments.

- The schedule is manageable to implement.
- Surveyors must arrive at the school at 7:00am before commencement of classes.

(2) Comments on each instrument

Table 3: Comments from Pilot Test

INSTRUMENT	COMMENTS
Questionnaire for Head teachers	• The instrument is clear to head teachers however question number 26 needs to be explained to them. • The surveyor should be there as the head teacher is filling the questionnaire; this should be true with all other questionnaires. S/he should fill by him/her self • It takes 25 minutes for the head teacher to complete the questionnaire.
Questionnaire for teachers	• The instrument is clear to teachers. • It takes 40 minutes for a teacher to fill the questionnaire and the subject questions. • Teachers who teach only junior or senior classes may fill one of the subject based questionnaires • In cases where a teacher teaches two subjects, s/he should fill the subject-based questionnaires for both subjects.
Questionnaire for students	• It takes 30-40 minutes for students to fill the questionnaire. • Students do not know the meaning of 'INSET', the surveyor need to explain to students in the preamble. • Form 2 students take longer to fill the questionnaire than form 4 students. • Students had problems in understanding the words 'patient', 'predicting' and 'individually' as used in question 12, 14 and 18, the surveyor should explain and clarify them to students. • The surveyor should go through the preamble and examples

	together with the students. • Some students did not have writing materials, there is need to borrow those who don't have.
ASEI-PDSI Lesson observation checklist	• Almost same ratings were found from the three surveyors. • Surveyors need to discuss the ratings soon after observing the lesson. • Each group need to discuss the ratings (lesson observation) from their group before discussing with the other group.

5. IMPLEMENTATION OF BASELINE SURVEY

5.1 Target schools

A total of 98 schools out of 644 government schools in five divisions (representing 15%) were targeted for the baseline survey.

Table 4: Target Schools

DIVISION	CDSSs APPROVED	CDSSs NOT APPROVED	GOVERNMENT BOARDING	GOVERNMENT DAY	GRANT AIDED	TOTAL
NED	6	19	1	1	1	28
CEED	9	6	1	1	0	17
CWED	11	8	2	2	1	24
SHED	11	0	1	1	0	13
SWED	5	7	1	2	0	15
TOTAL	**42**	**40**	**6**	**7**	**2**	**97**

5.2 Schedule at each school

At every school visited the following schedule was shown below although in some circumstances the schedule was changed to suit the situation of a particular school visited.

Table 5: Programme at each school

Time	Surveyor A	Surveyor B	Surveyor C
7:00-7:30	Arrive at school 1; Courtesy call to HT		
7:30-8:30	**Classroom Observation and Discussion** (Form1or 3)		
8:30-9:30	**Questionnaire for Maths/Science Teachers**		
9:30-10:30	**Interview for Maths/Science Teachers**		
10:30-11:00	**Questionnaire for Students**(form 4)	**Questionnaire for Students** (Form 2)	**Questionnaire for HT**
11:00	Leave school for another school.		
11:30-12:00	Arrive at school 2; Courtesy call to HT		
12:00-13:00	**Classroom Observation and Discussion (Form1or 3)**		

13:00-13:30	**Questionnaire for Students** (Form 4)	**Questionnaire for Students** (Form 2)	**Questionnaire for HT**
13:30-14:30	**Questionnaire for Maths/Science Teachers**		
14:30-15:30	**Interview for Maths/Science Teachers**		

The survey was conducted from 24th August to 30th September in five divisions (see appendix for the program). Four schools were visited each day by two teams of surveyors drawn from the secretariat, divisional EMAS and South East Education Division Trainers.

5.3 Number of collected data

The following table is a summary of the total number of schools visited, M/S teachers, students interviewed, number of lessons observed and the number of subject questionnaires administered.

Table 6: Data collected

Target Group	Number
No of schools	97
Head Teachers	90
M/S Teachers	281
Students (Senior)	3473
Students (Junior)	5010
Lesson observation	74
Subject Questionnaires	578

5.4 Successes

1. All the 97 schools were visited as planned.
2. There was cooperation among all those involved HTs, mathematics and science teachers, students, secretariat and surveyors.

5.5 Challenges

1. In some cases it was not possible to observe lessons in the afternoon for some teachers had already taught their lessons.
2. There was Junior Certificate Examination and it was not possible to meet some teachers who were involved in invigilation.

6. FINDINGS OF THE BASELINE SURVEY

6.1 Findings from Questionnaires

6.1.1 Head Teachers' questionnaire

This questionnaire was meant to seek information from Head teachers (HTs) on the support they give to the teaching and learning of M/S (Mathematics and Science), their attitude on students' performance, their views on how M/S teachers implement lessons, their attitude towards effective T/L of M/S and their attitude towards in-service training of M/S teachers. A total of 90 HTs were interviewed.

a) Support of M/S teachers

This section sought information from HTs on how often they supervise, advise M/S teachers, organize meetings, organize inductions courses for new teachers and organize school based INSETs. The following key was used; 0-Never, 1-once a year, 2-once a term, 3-twice a term and 4-more than twice a term.

Questions;

F1. How often do you supervise the teaching of maths/science teachers?
F2. How often do you give maths/science teachers professional/academic advice?
F3. How often does your school hold meetings for maths/science teachers?
F4. How often do you organise inductions for new maths/science teachers?
F5. How often do you organize school-based INSETs for maths/science teachers?

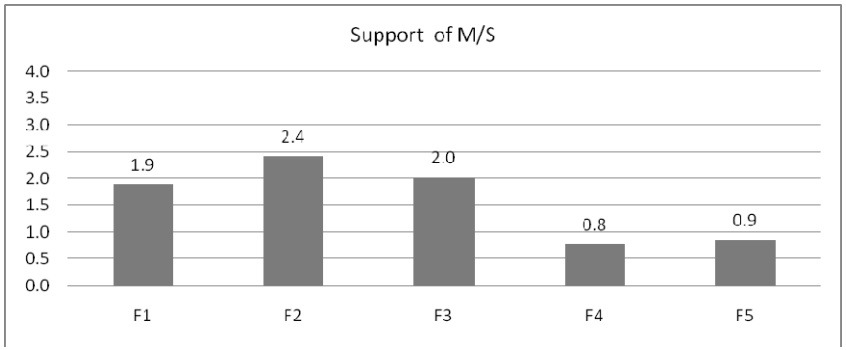


FIG 1: Results on support of M/S teachers in average

The results show that HTs are able to give advice and hold meetings for M/S teachers more than once a term and on the other hand supervise M/S teachers at most once a term. Induction for new M/S teachers and school based INSETs are organized at most once a year.

b) Students' Performance.

Table 7: Items under "Students' Performance" in the HT questionnaire

G1 Students' performance in maths/science is significantly poorer than in other subjects.
G2 Students' performance in maths/science is affected more seriously by the problem of *T/L materials (e.g. textbooks)* than the problems which teachers have.
G3 Students' performance is affected more seriously by the problem of *facilities (e.g. laboratory)* than the problems which teachers have.
G4 Students' performance is affected more seriously by the problem of *students themselves* than the problems which teachers have.

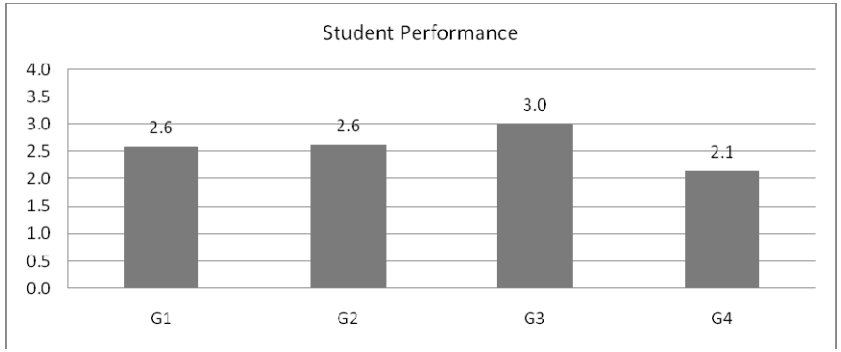


FIG 2: Results on students' performance in average

From the results, HTs think students' performance is affected by the problem of facilities and teaching and learning materials than the problems which teachers (i.e. lack of skills to involve learners in a lesson, lack of skills to include activities in the lesson, lack of skills to improvise teaching and learning materials if the need arises, lack of content knowledge in the teaching subject etc.) and students (i.e. poor attitude towards mathematics and science subjects, laziness etc) have (G2-G4). In addition HTs think students' performance in M/S is on average, significantly poorer than in other subjects (G1).

c) Lesson Implementation

This category sought information on how the HTs feel teachers implement lessons. The section looks at how often teachers include activities and experiments in their lessons, improvise and plan for their lesson. In addition it also seeks the HTs opinion to what extent students participate in a lesson. The items under this section are;

Q5. Teachers rarely include activities in their lessons and prefer lecture –-style lessons.
Q6. In most cases, the participation of students in lessons is good.
Q7. Teachers regularly include experiments in their lessons.
Q8. Teachers regularly use improvised equipment/materials.
Q9. Teachers always prepare lesson plans.

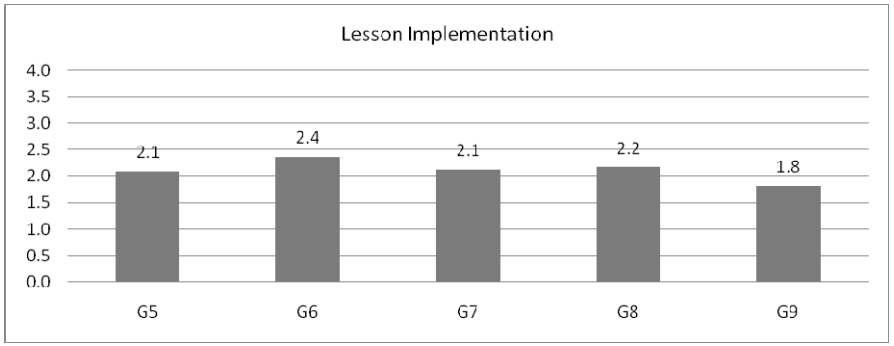


FIG 3: Results on Lesson Implementation in average

Almost all the figures are above average except planning which is below 2. This is an indication that from the HTs point of view teachers do no plan adequately.

d) Attitude towards Effective teaching and learning of mathematics and sciences

Table 8: Items under "Attitude towards Effective teaching and learning of M/S in the HT questionnaire

G10 Some teachers can teach effectively even if they don't know subject contents.
G11 Some teachers can teach effectively even if they don't know appropriate teaching methodologies.
G12 Lesson plans are always essential for effective teaching
G13 The pressure to cover the whole syllabus may be preventing some teachers from utilising varied teaching methods.
G14 Many teachers are failing to teach effectively because they don't have appropriate qualifications.
G15 Large class size limits the methodologies that teachers can use.
G16 Teachers cannot teach effectively if the supply of T/L equipment/materials is inadequate.
G17 Improvised equipment/materials cannot be more effective than standard equipment/materials.
G18 Teachers cannot conduct experiments if there is no laboratory structure.
G19 Students' performance is seriously affected if there is no library structure.
G20 Teachers' attitudes greatly affect students' performance.
G21 There is no significant difference between teaching maths/science and teaching other subjects.

This section examined the HT views on teachers' capacity in different areas ranging from: teachers' content knowledge, methods used in teaching, whether lesson plan are important or not, pressure to cover the syllabus and other factors that affect teachers effective lesson delivery.

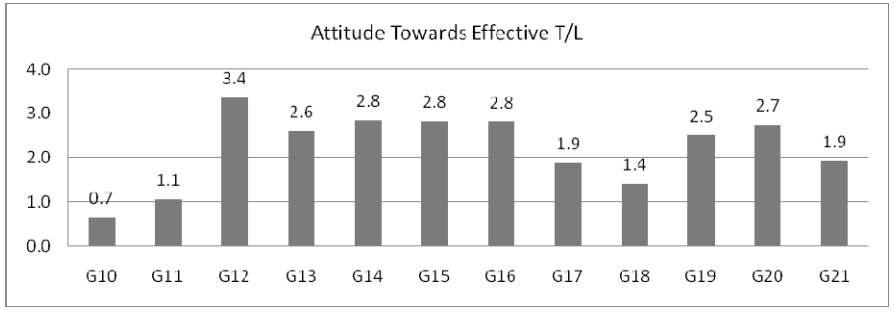


FIG 4: Results on Attitude towards effective T/L in average

e) From the Head teachers interviewed

1. Teachers cannot teach effectively if they don't have:
   a) Adequate content mastery,
   b) Appropriate teaching methodologies, lesson planning.
2. Teaching is affected with the large class size especially if the supply of teaching and learning material/equipment is inadequate.
3. Teachers' attitude towards teaching greatly affects students' performance.

f) Attitude towards Support of Teaching and Learning of Maths and Science.

Table 9: Items under "Attitude towards support of T/L of M/S in the HT questionnaire

G22 My attitudes towards maths/science subjects do not greatly affect teachers' teaching.
G23 Frequent supervision is essential for teachers' effective teaching.
G24 Teachers' mutual support within school is essential for their effective teaching.
G25 Cooperation among neighbouring schools can enhance the quality of teaching.
G26 Teachers' requests are not always relevant to the improvement of their teaching.
G27 Teachers should spend more time teaching in class than participating in teaching-related

activities (e.g. participating workshops etc.) outside school.
G28 In my school, we use our budget for the improvement of teaching Maths and Science as much as we can.
G29 In my school, teachers are encouraged to participate in INSETs.
G30 I am in good relationship with teachers in my school.

This section had items seeking information from HTs on the support they give to teachers outside the classroom including supervision of teachers, cooperation among neighbouring schools and financial support towards teachers training.

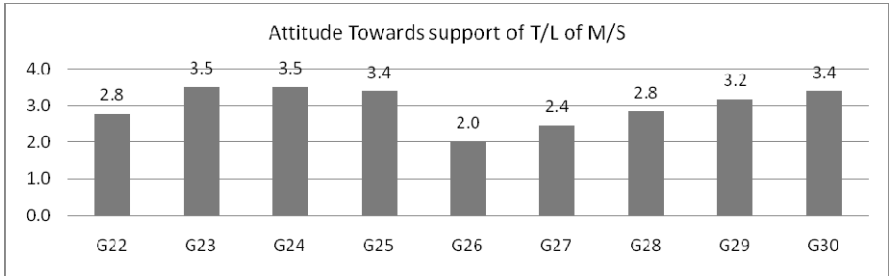


FIG 5: Results on Attitude towards support of T/L of M/S in average

From the results, it is noted that:

1. the following are essential for teachers' effective teaching
    a) Frequent supervision. (G23)
    b) Teachers' mutual support within the school. (G24)
    c) Cooperation among neighbouring schools. (G25)
2. Schools use their budget for improvement of teaching and learning of mathematics and science. (G28)
3. There is good relationship between teachers and their HTs. (G30)

6.1.2. Findings from Mathematics and science teachers' questionnaire

(1) Mathematics and Science teachers' questionnaire

Section A: General Information

This section had items trying to get general information of the teachers involved in the survey like their sex, qualification, teaching experience, sizes of the classes they teach and teaching load.

A total of 281 mathematics and science teachers participated in the baseline survey by filling in the questionnaires in the five education divisions (SHED, SWED, CWED, CEED and NED).

Out of these 281 teachers, 234 were male teachers representing 83%, 42 were female teachers representing 15% and 5 did not indicate their sex representing 2%.

Out of the 281 teachers, 140 are not qualified, they posses MSCE certificate, 73 teachers have Diploma in Education, 40 teachers have Bachelor of Education while 25 teachers have other qualifications apart from the ones stated above.

In summary from the data collected 50% represents not qualified teachers, 41% represents qualified teachers while 9% represents teachers with other qualifications in other realms like Bachelor's in Agriculture, Fisheries, Science etc.

Out of the 281 teachers involved in the baseline survey, 212 have a short experience (below 5 years teaching experience) in teaching mathematics and science representing 75% while 69 teachers have long teaching experience (more than 5 years teaching) representing 25%.

Below is the detailed analysis of information obtained from the mathematics and science teachers questionnaires especially on the general information of the teachers.

SEX:

More male M/S teachers (234) were involved in the survey as compared to female M/S teachers (42) as shown by percentages in Fig 6:

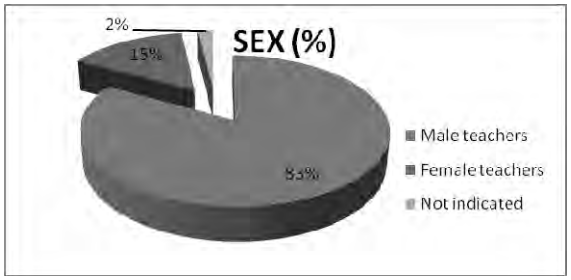


FIG 6: Number of Male and Female teachers in involved (by %)

QUALIFICATION:

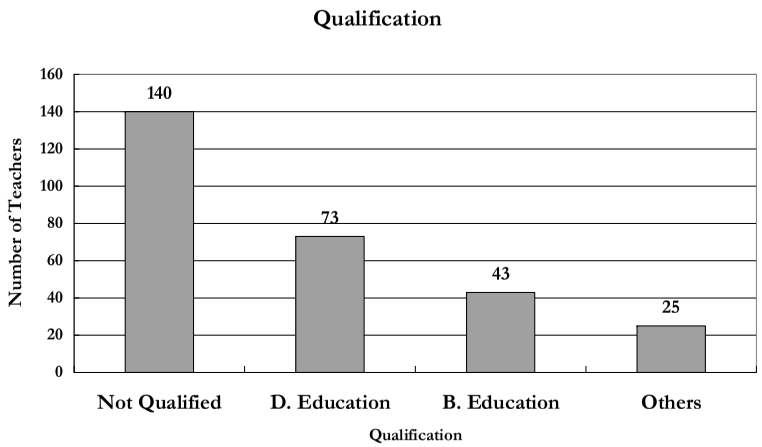


FIG 7: Qualification of M/S teachers

It is noted that more maths/science teachers involved in the survey are not qualified (140). These teachers possess MSCE certificate and they are teaching at secondary school level. 73 teachers involved in the survey have Diploma in Education, 43 teachers have Bachelors

degree in education while 25 teachers possess other qualifications i.e Bachelor's degree in Agriculture etc.

Qualification Percentage

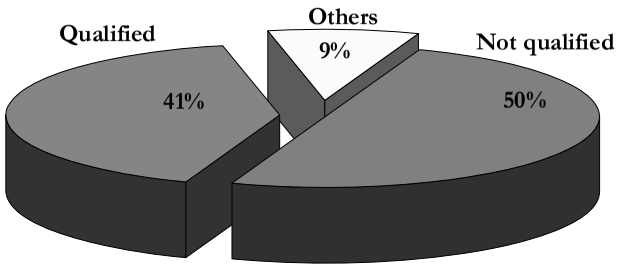


FIG 8: Qualification by percentage of M/S teachers

Qualification by Division

The overview of this result is that the occupations of each qualification in all divisions are arranged as similar to the national result.

Some outstanding characters in this result shown in the graph below are following points;

1. North divisions have more MSCE holders than South divisions have.
2. SHED has more Diplomas in Education and other qualification holders than other divisions have.
3. CWED and SWED have about 2 times Bachelors in Education holders than other divisions have.
4. SWED has fewer Diplomas in Education than other divisions have.

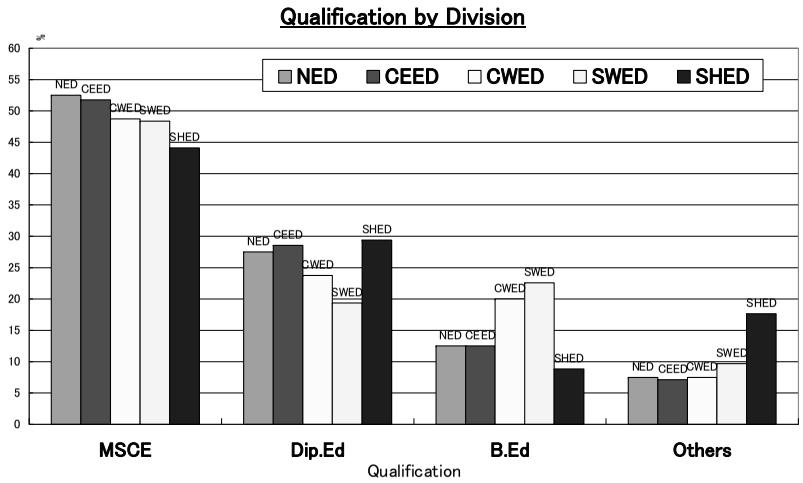


FIG 9: Qualification by Division

These results show that the higher qualified teachers are being concentrated on the divisions having big cities such as Lilongwe and Blantyre. That may be why it is easier for teachers to access Educational Institution there, and the big cities have rich people crying for high quality in education, as it were, high qualified teachers.

TEACHING EXPERINCE:

FIG 10: Teaching experince by percentage

75% of the total teachers involved in the survey have less teaching experience, that is, they have teaching experience of ten (10) years below and 25% of the total teachers interviews have a long teaching experinece (more than ten years teaching experience)

CLASS SIZE:

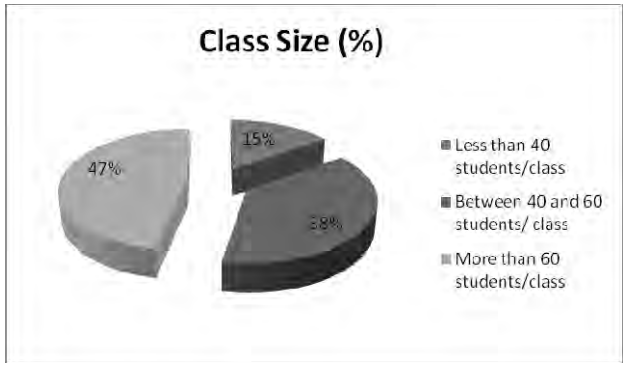


FIG 11: Class size by percentage

47% of the total teachers involved in the survey they teach more than 60 students in one class, 38% of the total teachers they teach between 40 and 60 students per class and 15% of the total teachers they teach less than 40 students per class.

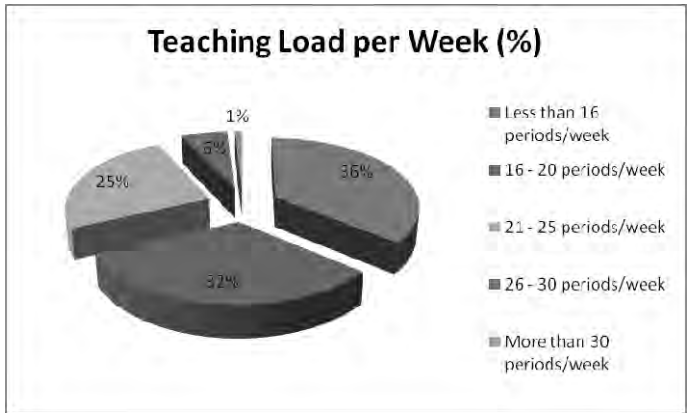


FIG 12: Teaching load per week per percantage

From Fig 12, it is noted that out of the total teachers involved in the survey, 36% teach less than 16 periods per week, 32% teach between 16-20 periods per week, 25% teach between 21-25 periods per week, 6% teach between 26-30 periods per week and 1% teach more than 30 periods per week. It is noted that a majority of teachers involved in the survey are not overloaded.

CURRENT SITUATION:

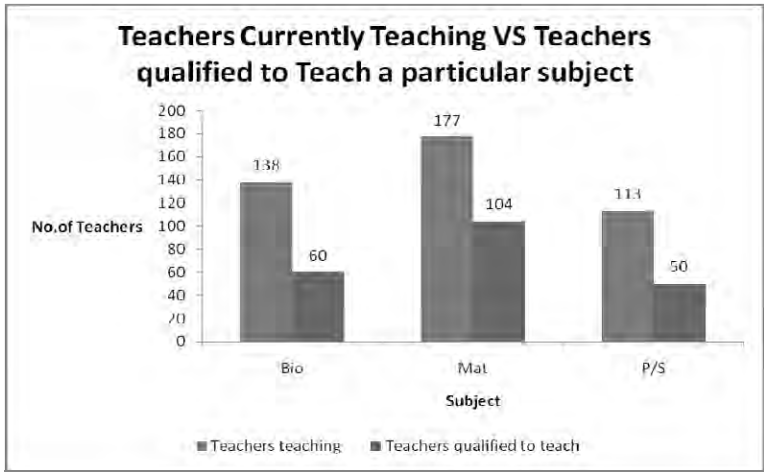


FIG 13: Current situation (teachers currently teaching vs teachers qualified to teach a particular subject)

Out of 281 teachers involved in the survey, 138 are teaching biology, 176 are teaching mathematics and 111 are teaching physical science. These figures are over 281 because some teachers teach two subjects of three subjects. Out of these teachers teaching these three subjects, 60 teachers are qualified to teach biology, 104 are qualified to teach mathematics and only 50 are qualified to teach physical science. Detailed information is summarized in Fig 13.

Section B (Opportunity to support M/S teachers)

In this section there were items/questions that were asking M/S teachers on how often they get support from different stakeholders in education sector i.e. **item 1** asks how often teachers get supervise from Head of Department, **item 2** asks how often teachers get

support from HTs, **item 3** asks how often teachers get supervision from Education Division (EMASs/PEMAs), **item 4** asks how often teachers get support from MoEST etc. Fig 14 indicates the summarized results of the teachers' responses.

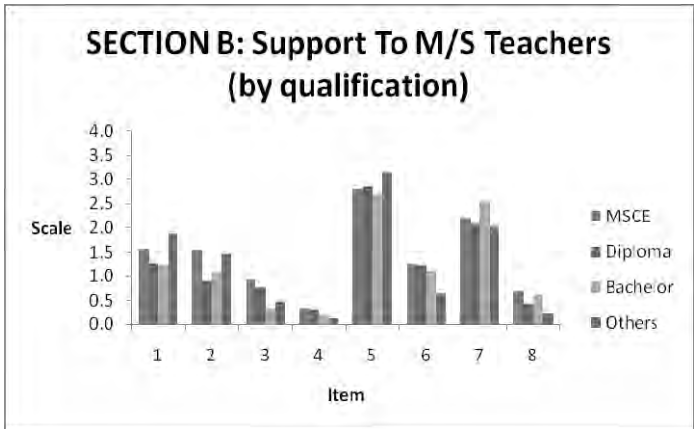


FIG 14: Results on support to M/S Teachers in average

On the scale of 0 to 4, the teachers especially Diploma holders and teachers with other qualifications rated highly on item 5 (advice by other teachers within your school) an indication that teachers do share ideas and opinions as well as assisting each others. However Items 3 and 4 (supervision by officials from SEMAs/PEMAs and Ministry of Education Headquarters respectively) teachers especially Bachelor holders rated them so low an indication that officials from Division and Ministry rarely visit teachers in the schools. It is also seen that Item 8 (school based INSETs) is rated lowly meaning that very few schools organize these workshops and school based INSETs. Below are the items under this category and they were rated on the scale 0 to 4. **[key: 0- never, 1-once a year, 2-once a term, 3-twice a term, 4-more than twice a term].**

Table 10: Items under "Support to M/S Teachers" in the M/S teacher questionnaire

How often do you get the following support?	
1	Supervision by Head of Department
2	Supervision by Headteacher
3	Supervision by officials from Education Divisions (SEMAs/PEMAs)
4	Supervision by officials from Ministry of Education Headquarters

5	Advice by other teachers within your school
6	Advice by teachers in other schools
7	Departmental meetings
8	Departmental workshops/ school-based INSETs

Section C (Teachers' challenges **mathematics and science teaching)**

Under this section the items were divided into 5 (A, B, C, D, E) categories as summarized below;

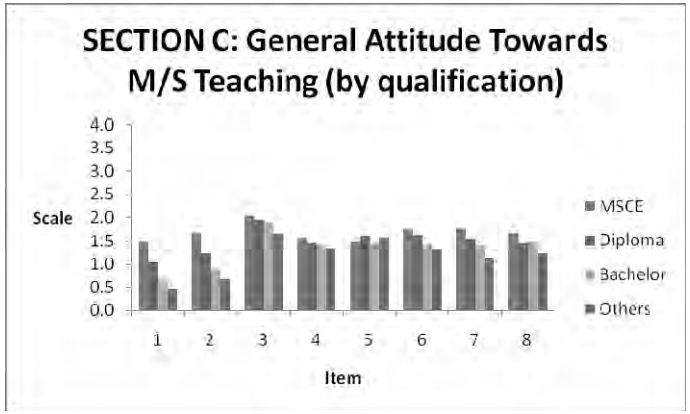
Category A: General Teachers' Attitude towards Maths/Science Teaching

This category had items that looked at the general attitude of teachers towards the teaching and learning mathematics and science, teachers' attitude towards the students in mathematics and science lessons etc. These items ranged from item 1 to item 8 in the M/S teachers' questionnaires. These are the items in this category and they had an opening statement of **'I find it difficult to.....'** and the items were rated using the scale of 0 to 4. **[KEY: 0- Not at all, 1- A little, 2- moderately, 3-Considerably, 4- To a great extent.]**

In summary Not at all(0), A little(1) and Moderately(3) are grouped to be 'NO' while Considerably(4) and To a great extent(5) have been grouped to be 'YES' and the responses are in percentages.

Table 11: Items under "General teachers' attitude towards M/S teaching in the M/S teacher questionnaire

1	Teach maths/science subject(s).
2	Make myself appear to be enjoying the teaching of maths/science.
3	Sympathise with the problems/needs of each student during lessons.
4	Exercise patience with students.
5	Encourage students to report for classes on time.
6	Encourage students to study maths/science.
7	Encourage students to think that maths/science are applicable subjects by using everyday examples.
8	Encourage students to think that learning maths/science are for improving their daily lives not only for passing exams.



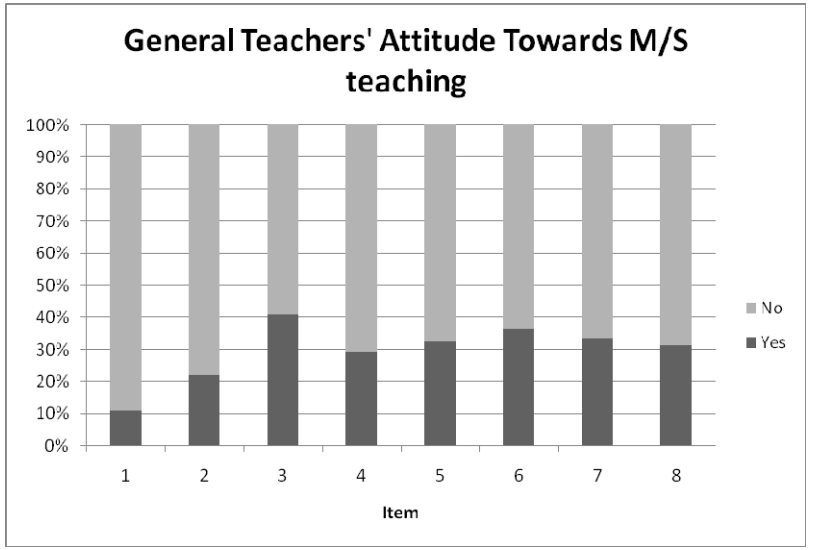


FIG 15: Results on General teachers' attitude towards M/S Teaching

Item 3 (Sympathise with the problems/needs of each student during lessons) teachers rated it so highly (to great extent and considerably) meaning that teachers especially the MSCE holders do find it so difficult to address the problems and needs of each and every student

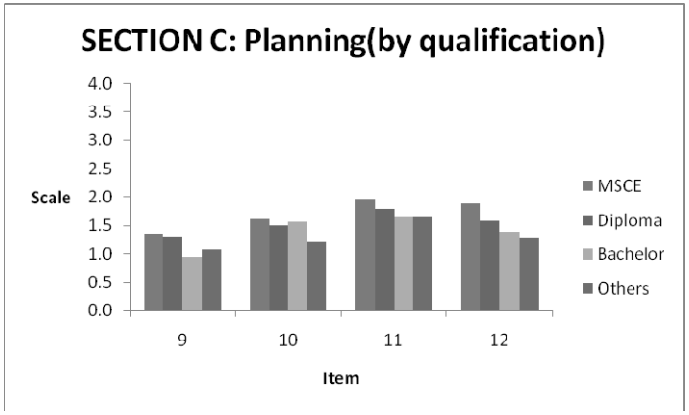
during M/S lessons while item 1 (Teach maths/science) teachers especially Bachelor holders rated it so low meaning that teachers do not find so many difficulties in teaching mathematics and science.

Category B: Planning

This category had items that asked teachers on how best they prepare and plan for mathematics and science lessons. This includes lesson planning, make lesson plan appropriate in terms of students' abilities/interest etc. The items in this category ranged from Item 9 to item 12. These are the items in this category and they had an opening statement of **'I find it difficult to.....'** and the items were rated using the scale of 0 to 4. **[KEY: 0- Not at all, 1- A little, 2- moderately, 3-Considerably, 4- To a great extent.]** In summary Not at all(0), A little(1) and Moderately(3) are grouped to be 'NO' while Considerably(4) and To a great extent(5) have been grouped to be 'YES' and the responses are in percentages.

Table 12: Items under "Planning" in the M/S teacher questionnaire

9	Prepare lesson plans.
10	Make lesson plan appropriate in terms of students' abilities/interest.
11	Prepare adequate/appropriate materials for students' use.
12	Incorporate practical work (i.e. other than lecture-style teaching) into my lessons as much as possible.



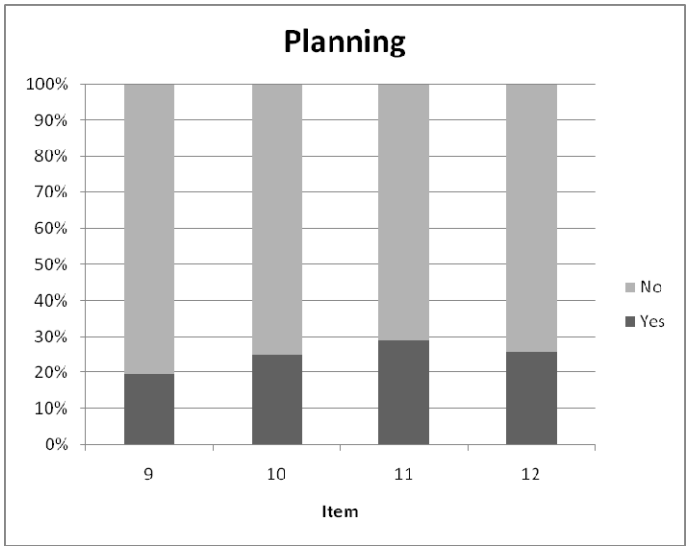


FIG 16: Results on Planning

Item 11 (Prepare adequate/appropriate materials for students' use) teachers especially MSCE holders rated it so highly meaning they (teachers) find it so difficult to prepare adequate and appropriate materials for the students to use in the classroom during lessons. It is also noted that teachers especially Bachelor holders rated item 9 (Prepare lessons plans) low as compared to other items in this category meaning that teachers do not find much difficulties in preparing lesson plans.

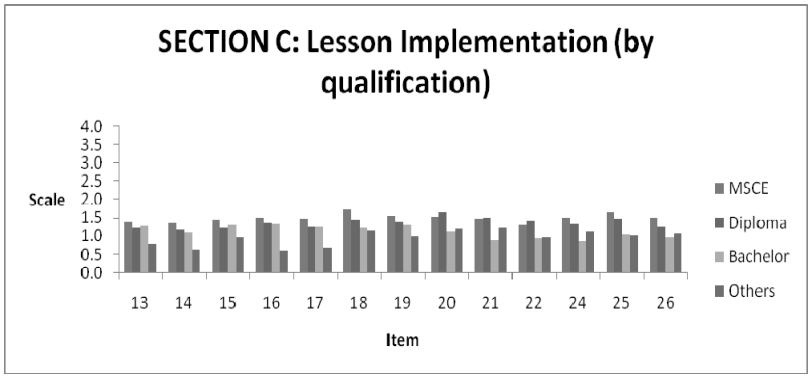
Category C: Lesson Implementation

In this category there were items that looked at the way the teachers delivers a lesson in classroom and also at the challenges teachers face when presenting lessons. The items ranged from Item 13 to Item 26. Fig 17 shows that teachers rated low (highest being 1.5 on the scale of 0 to 4) almost all the items in this category a meaning that teachers do not find much of the problems in delivering mathematics and science lessons. But does this reflect the true situation on the ground or teachers failed to expose their problems during this exercise? These are the items in this category and they had an opening statement of **'I find it difficult to.....'** and the items were rated using the scale of 0 to 4. **[KEY: 0- Not at all, 1- A little, 2- moderately, 3-Considerably, 4- To a great extent.]**

In summary Not at all(0), A little(1) and Moderately(3) are grouped to be 'NO' while Considerably(4) and To a great extent(5) have been grouped to be 'YES' and the responses are in percentages.

Table 13: Items under "Lesson Implementation" in the M/S teacher questionnaire

13	Give students appropriate tasks for discussions
14	Let students ask many questions.
15	Let students demonstrate something in class.
16	Encourage students to give their experiences on a topic.
17	Encourage students to explain their ideas on a topic before I give an explanation.
18	Encourage students to come up with their own hypothesis/predictions/suggestions.
19	Encourage students to discuss the differences in their hypothesis/predictions/suggestions.
20	Encourage students to verify the hypothesis/predictions/suggestions by themselves (e.g. through experiment)
21	Encourage students to observe and record the results on their own
22	Encourage students to discuss the difference in their results.
24	Demonstrate experiments during lessons.
25	Encourage students to deduce theories/ concepts from activities/experiments
26	Relate activities/experiments to theories/concepts clearly.



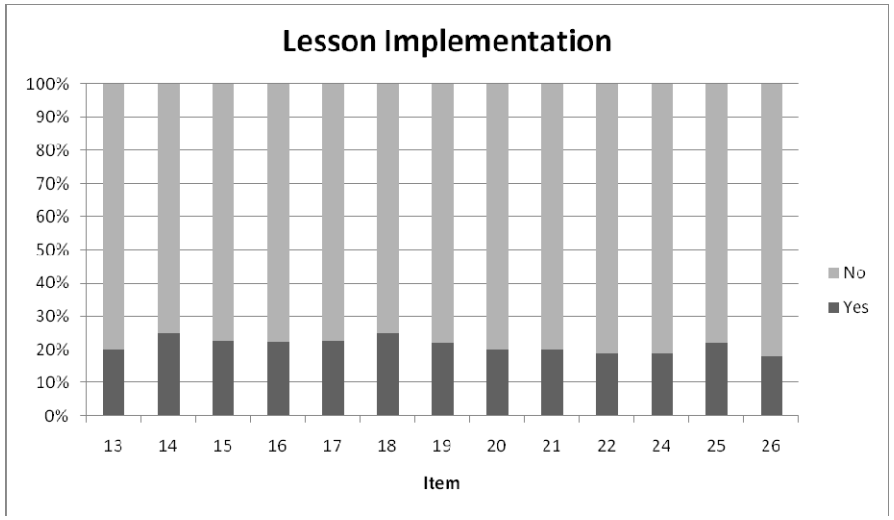


FIG 17: Results on Lesson Implementation

In this category, teachers especially MSCE holders rated Item 14 (Let students ask many questions) high as compared to other items meaning that teachers do find it so difficult to encourage students during the lesson to ask as many questions as possible. It is the same with Item 18 (Encourage students to come up with their own hypothesis / predictions / suggestions). Teachers especially MSCE holders rated this Item highly meaning that teachers have a lot of problems to give the chance to the learners to predict or suggest possible outcomes of the experiments/activities before doing them.

Comparison of the result between teachers' questionnaire and Lesson observation (ASEI-PDSI checklist)

In order to verify the problems, teachers' questionnaire was developed to make companion to the ASEI-PDSI check list. The relationships are described below;

Table 14: Comparison of the responses of students and teachers on the ASEI-PDSI items

No	Teachers' questionnaire I find it difficult to ……		ASEI-PDSI checklist	
1	2	Make myself appear to be enjoying the teaching of maths/science.	1	Did the teacher appear to be enjoying the teaching?
2	3	Sympathise with the problems/needs of each student during lessons.	2	Was the teacher sympathetic to the problems/needs of each student?
3	4	Exercise patience with students.	3	Did the teacher exercise patience with students?
4	9	Prepare lesson plans.	25	Did the teacher prepare a lesson plan?
5	11	Prepare adequate/appropriate materials for students' use.	27	Did the teacher prepare appropriate materials for students' use?
6	12	Incorporate practical work/activities (i.e. other than lecture-style teaching) into my lessons as much as possible.	5	Did the teacher incorporate activities for students into the lesson?
7	13	Give students appropriate tasks for discussions	9	Did the teacher give students appropriate tasks for discussions?
8	14	Let students ask many questions.	30	Did the teacher invite questions from students in the course of the lesson?
9	15	Let students demonstrate something in class.	10	Did students do anything to show the whole class or the group?
10	16	Encourage students to give their experiences on a topic.	11	Did students give their prior experiences or explain their ideas related to the content?
11	17	Encourage students to explain their ideas on a topic before I give an explanation.	11	Did students give their prior experiences or explain their ideas related to the content?
12	18	Encourage students to come up with their own hypothesis/predictions/suggestions.	12	Did students come up with their own predictions/suggestions for concepts/theories/rules/ methods etc. in the lesson?
13	19	Encourage students to discuss the differences in their hypothesis/predictions/suggestions.	13	Did students discuss the difference in their own predictions/suggestions?
14	20	Encourage students to verify the hypothesis/predictions/suggestions by themselves (e.g. through experiment)	14	Did students verify their predictions/suggestions on their own?
15	21	Encourage students to observe and record the results on their own	15	Did students present their own observations/results of their activities?
16	22	Encourage students to discuss the difference in their results.	16	Did students discuss the differences in their observations/results of their activities?
17	24	Demonstrate experiments during lessons.	19	Was an experiment conducted?
18	25	Encourage students to deduce theories/ concepts from activities/experiments	20	Did students deduce theories/concepts from the activities/experiment?
19	26	Relate activities/experiments to theories/concepts clearly.	21	Did the teacher relate activities/experiment to theories/concepts clearly?
20	27	Modify/simplify experiments/activities when necessary.	22	Did the teacher simplify methods for activities, in consideration of efficient resource use?
21	28	Utilise materials available in students' immediate environment.	23	Did the teacher utilise materials available in students' immediate environment?
22	29	Utilise improvised equipment/materials	24	Did the teacher use improvised equipment/materials for activities?
23	30	Encourage students to use improvised materials effectively.	24	Did the teacher use improvised equipment/materials for activities?
24	31	Ask students to evaluate my lessons.	18	Did students evaluate the lesson?
25	34	Improve on my weaknesses in subsequent lessons following self-assessment.	35	Was the teacher able to indicate some points to improve?

Fig 18 shows the deference between teachers' answer and the result of lesson observation. It should be noted that the questionnaires use different way to ask. For example, the scale of teachers' questionnaire means 0;not difficult at all, 1;a little difficult, 2;moderately

difficult, 3;considerably difficult and 4;to a great extent difficult. On the other hand, the scale of ASEI-PDSI check list 0;not observed at all, 1;a little observed, 2;average observed, 3;adequately observed, 4;a great deal observed.

Fig 18 explains that teachers find only a little difficult to do most items however they don't practice them during their lessons.

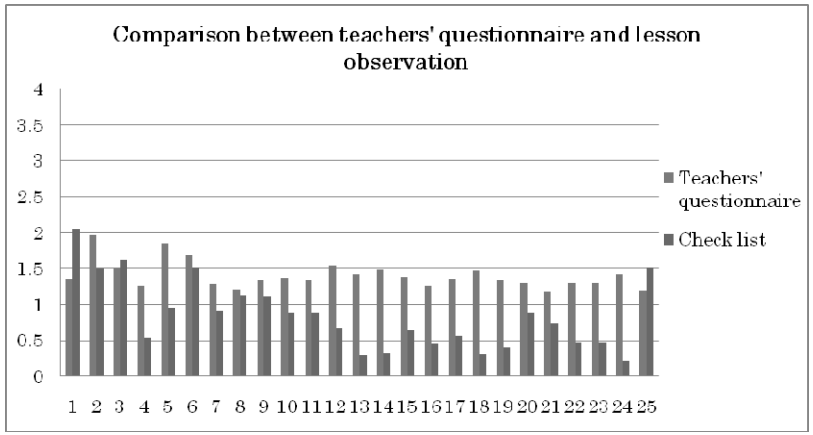


FIG 18: Comparison between teachers' questionnaire and lesson observation

Category D: Improvisation

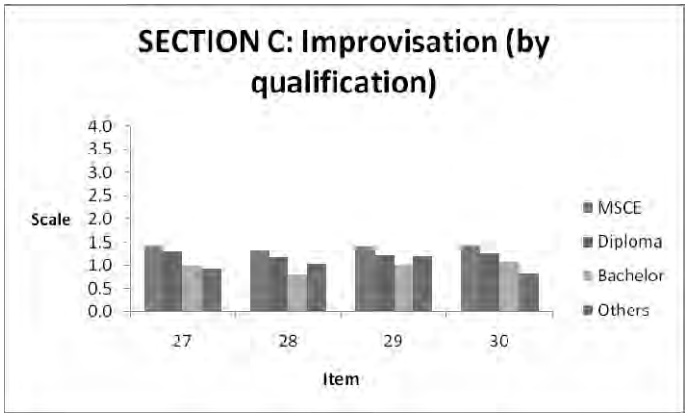
In this category teachers were asked if they, sometimes, improvise some of the teaching and learning materials if the need arises. The items ranged from Item 27 to Item 30. Referring to the summarized results in Fig 19, it is the same situation as in category C above where teachers indicated not to have many difficulties with improvisation. These are the items in this category and they had an opening statement of **'I find it difficult to.....'** and the items were rated using the scale of 0 to 4.

[KEY: 0- Not at all, 1- A little, 2- moderately, 3-Considerably, 4- To a great extent.]

In summary Not at all(0), A little(1) and Moderately(3) are grouped to be 'NO' while Considerably(4) and To a great extent(5) have been grouped to be 'YES' and the responses are in percentages.

Table 15: Items under "Improvisation" in the M/S teacher questionnaire

27	Modify/simplify experiments/activities when necessary.
28	Utilise materials available in students' immediate environment.
29	Utilise improvised equipment/materials
30	Encourage students to use improvised materials effectively.



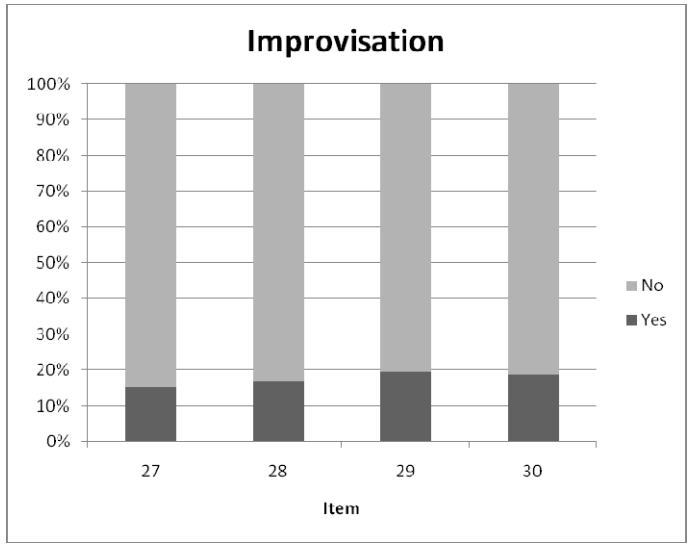


FIG 19: Results on Improvisation

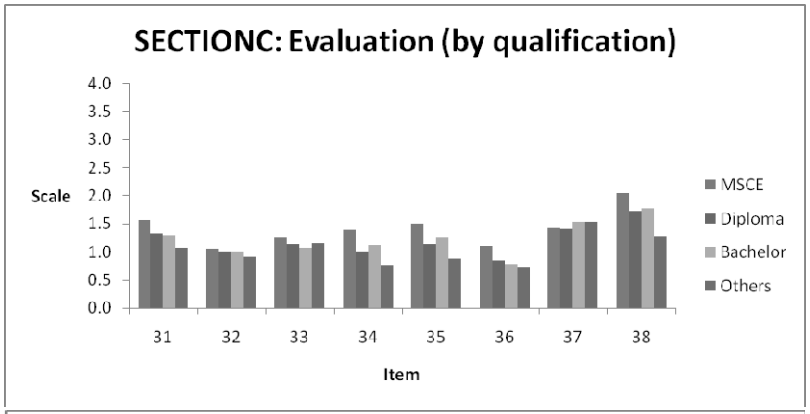
In this category, teachers especially MSCE holders rated highly item 29 (Utilise improvised equipment/materials) meaning that teachers do rarely improvise T/L materials in their lessons if the need arises or teachers do find it so difficult to improvise T/L materials and also from Item 30 (Encourage students to use improvised materials effectively), it shows that teachers do not encourage students to use improvised materials effectively.

Category E: Evaluation

The items in this category tried to find out from the teachers on how they find weaknesses in the lessons and on how they improve in the subsequent lessons. This category had items like asking the teacher whether he/she asks his/her students to evaluate his/her lesson, corroboration of teachers within or with other schools for academic and professional assistance etc. The items ranged from Item 31 to Item 38. Fig 20 is showing that teachers do not have a lot of difficulties in these items except item 38 (covering the whole syllabus within the specified time). This shows that a lot of teachers especially MSCE holders do not finish covering the syllabus (teaching all the topics as per required in the syllabus). These are the items in this category and they had an opening statement of **'I find it difficult to.....'** and the items were rated using the scale of 0 to 4. **[KEY: 0- Not at all, 1- A little, 2- moderately, 3-Considerably, 4- To a great extent.]** In summary Not at all(0), A little(1) and Moderately(3) are grouped to be 'NO' while Considerably(4) and To a great extent(5) have been grouped to be 'YES' and the responses are in percentages.

Table 16: Items under "Evaluation" in the M/S teacher questionnaire

31	Ask students to evaluate my lessons.	
32	Encourage students to do assignments.	
33	Mark given assignments as soon as possible.	
34	Improve on my weaknesses in subsequent lessons following self-assessment.	
35	Incorporate the improvements in teaching approaches/methods into subsequent lesson plans following the self-assessment.	
36	Ask other teachers within the same school for academic/professional assistance.	
37	Ask neighbouring schools for academic/professional assistance.	
38	Cover the whole syllabus within the specified time	



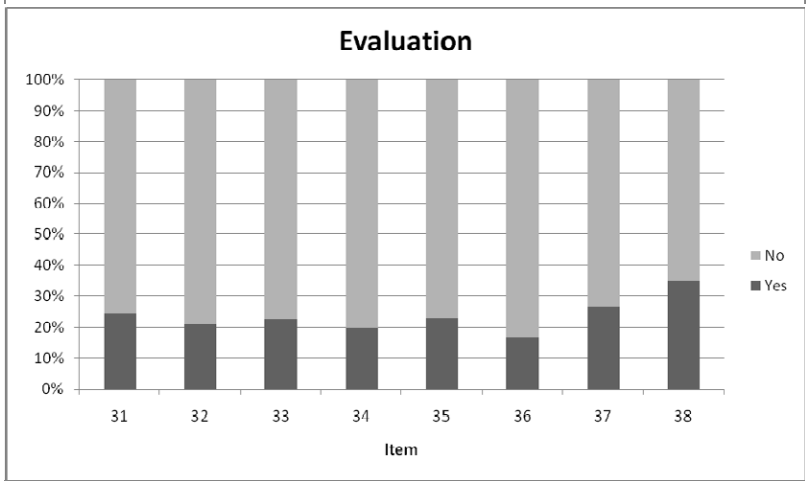


FIG 20: Results on Evaluation

Figure 21 is summarizing the results of teachers' responses;

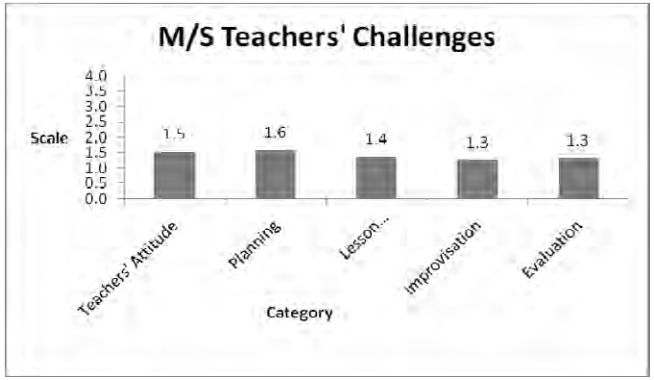


FIG 21: Summary results on teachers' responses on "M/S teachers' challenges" in average

To analyze the data of Section C, the average of the answers, Teachers find it difficult to *do something* "Considerably" and "To a great extent", is shown below in each category. And in each category, the highest score items, as it were the most difficult points for teachers, are shown in next column.

Table 17: Summary of responses on each category in section C

Category	Average	The highest score item
Category A General teachers' attitude towards M/S teaching	29.6 %	**Item 3 : 40.9 %** Sympathize with the problem/needs of each student during lessons.
Category B Planning	24.8 %	**Item 11 : 28.8 %** Prepare adequate/appropriate materials for students' use.
Category C Lesson Implementation	21.4 %	**Item 14 : 24.9 %** Let students ask many questions. **Item 18 : 24.9 %** Encourage students to come up with their own hypothesis/predictions/suggestions.
Category D Improvisation	17.7 %	**Item 29 : 19.6 %** Utilize improvised equipments/materials.
Category E Evaluation	23.5 %	**Item 38 : 34.9 %** Cover the whole syllabus within the specific time.

In this result, Category A, "General teachers' attitude towards M/S teaching", has the highest score in the categories. It means that many teachers have difficulty in their own attitude towards M/S teaching. Especially the item 3, "Sympathize with the problem/needs of each student during lessons", has the highest score in all items in this section. It means

that many teachers have difficulty in sympathizing with the problem/needs of each student during lessons, so to speak, in understanding students' problems in learning.

Section C by Division

The percentage of the answers of "Considerably" or "Great extent" by Division is shown in Fig 22.

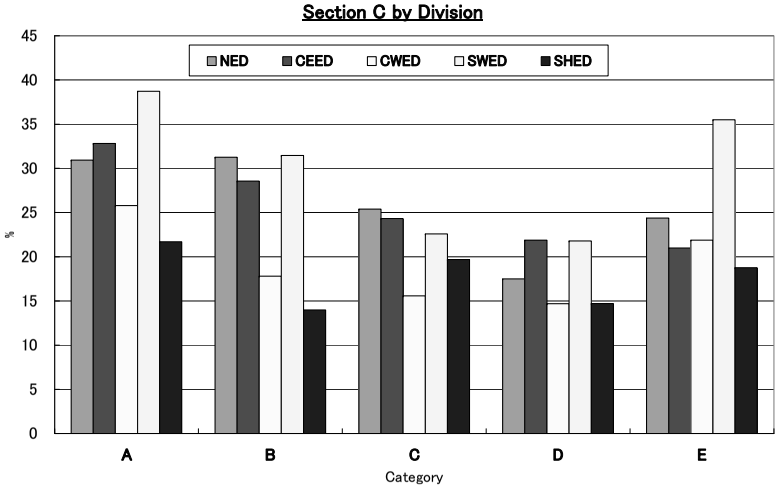


FIG 22: Results on section C by Division

In this result, the following points are found.

1. NED has the highest score in Category B "Planning",
2. SWED shows stronger response in Category E "Evaluation".
3. CEED, CWED, SWED and SHED have the highest score in Category A "General teachers' attitude towards M/S teaching".
4. SHED shows less difficulties in all Categories than others do.

Section C by Qualification

The percentage of the answers of "Considerably" or "Great extent" by Qualification is shown in the Fig 23.

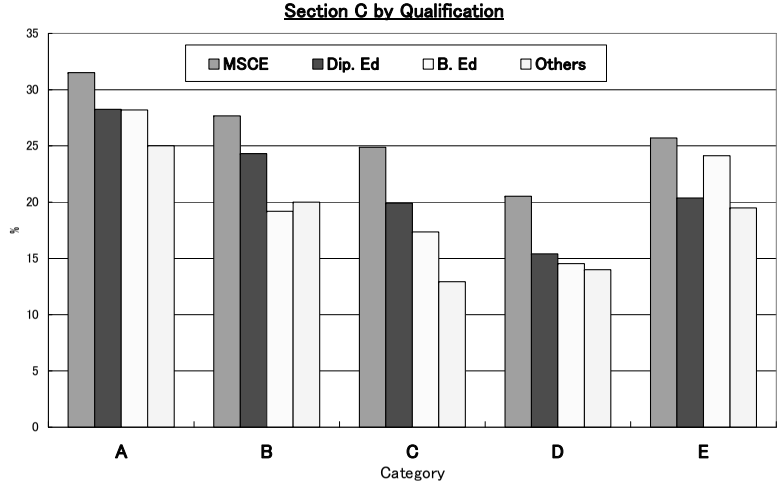


FIG 23: Results on section E by Qualification

In this result, the following points are found.

1. Bachelors in Education show strong response in Category E "Evaluation".
2. In overall view, MSCE holders have more difficulties than others have.

Section D (Factors affecting students' performance in M/S)

In this section there were three items that were asking mathematics and science teachers to compare to what extent other problems (i.e. materials, facilities at the school, students themselves etc) affect the performance of students in mathematics and science than the problems teachers have themselves. Below are the items in this category and they had an opening stating of '**To what extent do you agree to the following statements?** And they were rated using the scale of 0 to 4 **[KEY: 0- Strongly disagree, 1-disagree, 2-Average, 3-Agree, 4- Strongly Agree].**

Table 18: Items under section D (Factors affecting students performance) in the M/S teacher questionnaire

1	Students' performance is affected more seriously by the problem of T/L materials (e.g. textbooks) than the problems which teachers have.
2	Students' performance is affected more seriously by the problem of facilities (e.g. laboratory) than the problems which teachers have.
3	Students' performance is affected more seriously by the problem of students themselves than the problems which teachers have.

The results are summarized in Fig 24.

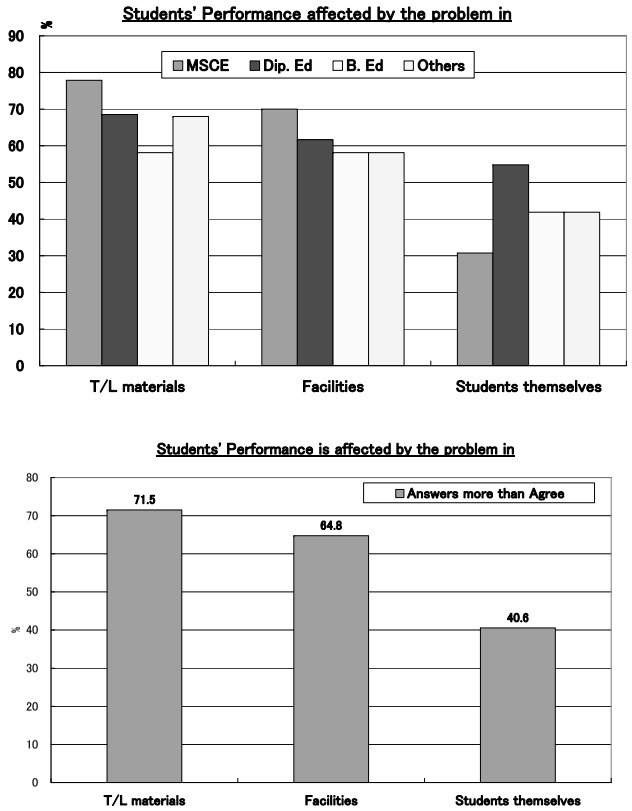


FIG 24: Results on section D (Factors affecting students performance)

From the results, many teachers especially MSCE holders agree or rated highly item 1 (students' performance is affected more seriously by the problem of T/L materials (e.g. textbooks, chemicals, equipment) than the problems which teachers have on the scale of 0 to 4. However teachers especially MSCE holders rated lowly item 3 (students' performance is affected more seriously by the problem of students themselves than the problems which teachers have).

In summary teachers are for the idea that the problems they have in planning and presenting lessons do not affect the performance of students much in mathematics and science as compared to the problem of lack of teaching and learning materials.

Section E (Elements affecting the teaching and learning of M/S)

In this section, there were items that asked teachers to compare the impact of several factors on the teaching and learning of mathematics and science. Below are the items in this category and they had an opening statement of '**Elements that may affect the quality of teaching of maths/science to various extents** and they were rated using the scale of 0 to 4 **[KEY: 0- Not at all, 1- A little, 2- Moderately, 3- Strong, 4- Very Strong].**

Table 19: Items under section E (Elements affecting the teaching and learning of M/S in the M/S teacher questionnaire

1	Teachers' content knowledge on topics in the syllabus
2	Teachers' skills of handling topics in the syllabus
3	Teachers' knowledge on various teaching methodologies
4	Teachers' skills on various teaching methodologies
5	Teachers' knowledge of lesson planning
6	Teachers' skills of lesson planning
7	Teachers' skills of covering syllabus within time
8	Teachers' qualification (e.g. MSCE, Dip. Ed., B. Ed. …)
9	Class size (e.g. classroom with 80 students vs. classroom with 40 students)
10	Teachers' skills of handling large classes
11	Availability of T/L equipment/materials
12	Teachers' skills of handling equipment/materials
13	Teachers' improvisation skills

14	Availability of laboratory structures
15	Availability of library structures
16	Quality/condition of classroom buildings
17	Students' attitudes towards maths/science subjects
18	Teachers' attitudes towards maths/science subjects
19	Headteacher's attitudes towards the teaching of maths/science subjects
20	Frequency of supervision
21	Cooperation among teachers in the same school
22	Cooperation among teachers of different schools

The overall result of Section E is shown in the graph below. In the analysis, the percentage of the answers of "Strongly" and "Very Strongly" are shown in Fig 25.

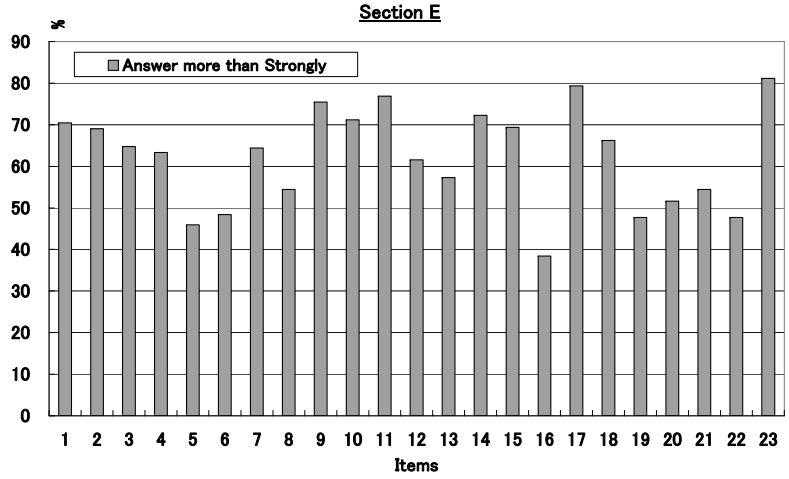


FIG 25: Results on section E (Elements affecting the T/L of M/S)

The total result is shown below in order of ascending higher occupations among the items which more than 50 % teachers answered.

Table 20: Results of teachers' responses in section E

FACTORS	%
Overload	81.1
Students' attitude	***79.4***
Availability of T/L materials	76.9

Class size	75.4
Availability of Laboratory	72.2
Teachers' skill of handling large size class	71.2
Content Knowledge on topics	70.5
Availability of Library	69.4
Teaching skill of handling topics	69.0
Teachers' attitude	66.2
Knowledge on methodology	64.8
Time management skill	64.4
Teachers' skill of methodology	63.4
Teachers' skill of handling materials	61.6
Teachers' Improvisation skill	57.3
Teachers' qualification	54.5
Teachers' cooperation in the same school	54.5
Supervision	51.6

In accordance with the result shown above, it is clear that "Students' Attitude" is in high position, around 80 % answered. Considering "Students' Attitude", it is definitely relevant to the classroom situation. Moreover, that classroom situation must be linking to the teachers' skill to handle the class and students. In return, this result shows the key to changing Students' Attitude is in Teachers themselves.

As SMASSE project Super Goal shows, SMASSE aims at changing Students' Learning through the change of Teachers. That point should be shared with all teachers.

In addition, INSET concerned factor that SMASSE can challenge to improve or overcome are teachers' skill. Therefore in this case, the foci of this result should be on the issues relating INSET. That is to say, in the list shown above, there are many teachers' issues that have more than 50 % occupation. This INSET should be focus on them.

Section E by Qualification

Similarly to above, the result shown below is analyzed by Qualifications.

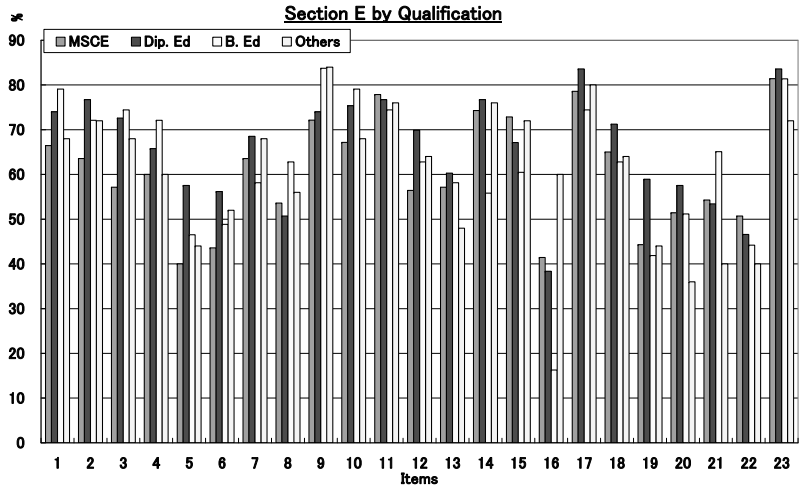


FIG 26: Results on section E by Qualification

According to the result, each top 3 answers per qualification are shown in tables 21, 22, 23 and 24.

Table 21: MSCE holders' responses on section E

MSCE Holders	
Overloading	81.4 %
Students' attitude	78.6 %
Availability of T/L materials	77.9 %

Table 22: Dip. Ed holders' responses on section E

Dip. Ed Holders	
Students' attitude / Overloading	83.6 %
Teaching skill of handling topics / Availability of T/L materials / Availability of Laboratory	76.7 %
Teachers' skill of handling large size class	75.3 %

Table 23: B.Ed holders' responses on section E

B. Ed	
Class size	83.7 %
Overloading	81.4 %
Content Knowledge on topic / Teachers' skill of handling large size class	79.1%

Table 24: Teachers with other qualifications responses on section E

Others	
Class size	84.0 %
Students' attitude	80.0 %
Availability of T/L materials / Availability of Laboratory	76.0 %

The big differences by Qualification

Item 3

Teachers' knowledge on various teaching methodologies

In this item, MSCE holders remarked fewer responses to compare with B.Ed holders. It means MSCE holders think the teachers' knowledge on various teaching methodologies is not affecting the quality of teaching so much.

Item 5

Teachers' knowledge of lesson planning

In this item, MSCE holders remarked fewer responses to compare with Diploma holders. It means MSCE holders think the teachers' knowledge of lesson planning is not affecting the quality of teaching so much.

Item 14

Availability of laboratory structures

In this item, Bachelor holders remarked fewer responses to compare with MSCE and Diploma holders. It means Bachelor holders think the availability of laboratory structures is not affecting the quality of teaching so much.

Item 16

Quality/condition of classroom buildings

In this item, Bachelor holders remarked fewer responses to compare with MSCE and Diploma holders. It means Bachelor holders think the quality/condition of classroom buildings is not affecting the quality of teaching so much.

Item 19

Head teacher's attitudes towards the teaching of math/science subjects

In this item, Diploma holders remarked more responses to compare with MSCE and Bachelor holders. It means many Diploma holders think the head teacher's attitude towards the teaching of math/science subjects is affecting the quality of teaching so much.

Item 21

Cooperation among math/science teachers in the same school

In this item, Bachelor holders remarked more responses to compare with MSCE and Diploa holders. It means many Bachelor holders think the cooperation among math/science teachers in the same school is affecting the quality of teaching so much.

Section E by Division

The top rates of the answer by divisions are shown below.

NED

In NED, teachers considered the factors affecting the quality of teaching are shown below in order of higher occupation of answers.

Table 25: Teachers from NED responses on section E

NED	
Overloading	83.8 %
Students' attitude	83.8 %
Availability of Laboratory	82.5 %
Availability of T/L materials	80.0 %

It means that M/S teachers from NED considered (1) overloading as the major element affecting the teaching and learning of mathematics and science followed by (2) students attitude and (3) availability of laboratory.

CEED

In CEED, teachers considered the factors affecting the quality of teaching are shown below in order of higher occupation of answers.

Table 26: Teachers from CEED responses on section E

CEED	
Class size	82.1 %
Overloading / Availability of T/L materials	80.4 %

Teachers' content knowledge	76.8 %
Teaching skill of handling topics / Teachers' Improvisation skill	73.2 %

M/S teachers from CEED considered (1) class size, (2) overloading and (3) availability of T/L materials as the major three elements affecting the teaching and learning of mathematics and science in schools.

CWED

In CWED, teachers considered the factors affecting the quality of teaching are shown below in order of higher occupation of answers.

Table 27: Teachers from CWED responses on section E

CWED	
Class size	83.9 %
Students' attitude	82.5 %
Overloading	80.0 %
Availability of T/L materials	77.5 %

M/S teachers from CWED considered (1) class size, (2) students attitude and (3) overloading as three major elements affecting the teaching and learning of mathematics and science in secondary schools.

SWED

In SWED, teachers considered the factors affecting the quality of teaching are shown below in order of higher occupation of answers.

Table 28: Teachers from SWED responses on section E

SWED	
Overloading	83.9 %
Students' attitude	80.7 %
Availability of Library	77.4 %
Knowledge on Methodology / Teaching skill / Class size	74.2 %

In SWED, M/S teachers considered (1) overloading, (2) students attitude and (3) availability of library as the major three elements affecting the teaching and learning of mathematics and science in secondary schools.

SHED

In SHED, teachers considered the factors affecting the quality of teaching are shown below in order of higher occupation of answers.

Table 29: Teachers from SHED responses on section E

SHED	
Overloading	76.5 %
Teachers' content knowledge / Teachers' skill of handling large size class	73.5 %
Students' attitude	70.6 %
Class size / Availability of T/L materials	67.7 %

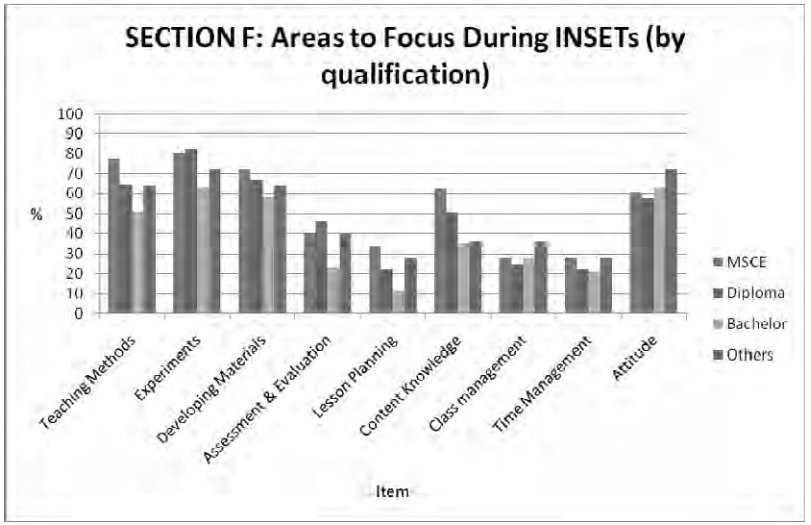
In SHED, M/S teachers considered (1) overloading, (2) Teachers content knowledge/Teachers skills of handling large class size and (3) students attitude as the major three elements affecting the teaching and learning of mathematics and science in secondary schools.

Section F (Areas to focus during INSETs)

In this section M/S teachers were given an opportunity to suggest areas to be focused much during the INSET and the areas are as listed below:

1. Teaching methodologies.
2. Experiments/practical skills.
3. Development of teaching and learning materials.
4. Assessment and Evaluation.
5. Lesson Planning.
6. Content knowledge.
7. Class Management.
8. Time Management.
9. Attitude/Motivation.

The results are summarized in Fig 21;



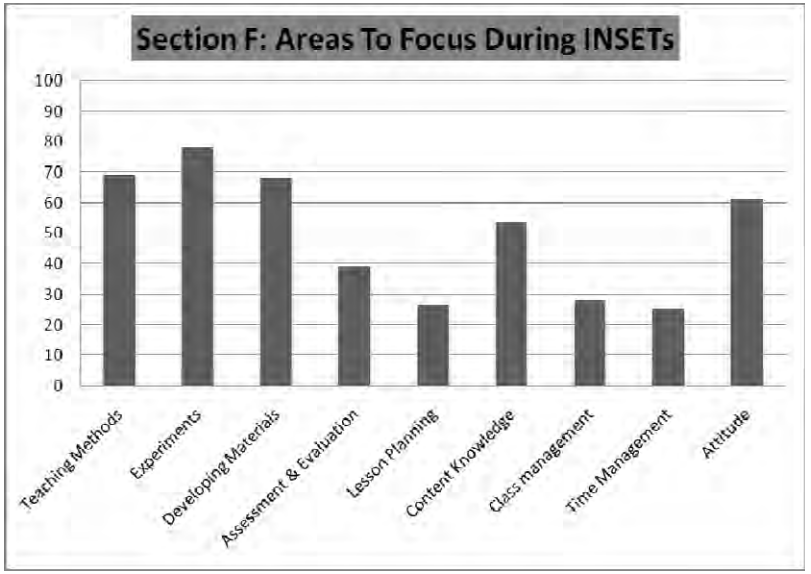


FIG 27: Results on section F (Areas to focus during INSETs)

It is seen from Fig 27 that most teachers would love if the following areas are given much attention in the subsequent INSETs;

a) Experiments/practical skills
b) Teaching methodologies
c) Development of teaching and learning materials
d) Attitude/motivation

Summary of teachers' questionnaire:

From the information above it shows that teachers do not have a lot of problems in teaching mathematics and science subjects. However this does not reflect the true picture of the real situation on the ground (how teachers are teaching mathematics and science lessons) due to Lesson observation results. Teachers have indicated that they do not find many difficulties as shown by the ratings in the graph of M/S teachers' challenges above (not exceeding 2.0, average) yet looking at their lessons there is no match because from the lesson observations results it shows that teachers face a lot of problems in preparing, presenting and evaluating their lessons. What can be seen from the information collected from teachers through this maths/science teachers' questionnaire is that teachers do not realise that they have challenges/problems in presenting student-centred lessons or may be that teachers do not know the characteristics of the 'Good Lesson'.

(2) Findings from M/S teachers' Interview

In this category M/S teachers were asked to give their opinions as to why teachers do some practices in mathematics and science lessons. This was done through interview where teachers were asked five questions.

Q1. Why do you think some teachers do not allow students to actively participate in their lessons?
Q2. Why do you think some teachers are reluctant to conduct experiments/activities?
Q3. Why do you think some teachers do not improvise equipment/materials?
Q4. Why do you think some teachers are reluctant to prepare thorough lesson plans?
Q5. Why do you think some teachers are not eager to allow others to assess their lessons?

Observations:

Under Q1 most teachers considered the following as major reasons preventing teachers from allowing students to actively participate in mathematics and science lessons;

a) lack of content knowledge by teachers
b) time consuming
c) lack of skills on the part of the teachers to involve the students in the lesson
d) big class sizes
e) inadequate teaching and learning materials

From the teachers' responses above it is showing that many teachers have a lot of challenges especially in terms of understanding the content. It is also indicating that teachers rush to finish the syllabus hence having no time to allow students express themselves adequately in the classroom. Also it is seen that sizes of classes limit the teachers to involve the students all throughout in the class due to inadequate teaching and learning materials in the schools.

Under Q2 most teachers considered the following as major reasons preventing them from conducting experiments/activities;

a) Lack of content knowledge
b) Lack of teaching and learning materials
c) Time consuming
d) Lack of skills to conduct experiments/activities

Again looking at the responses above, it is seen that teachers have a bigger challenge to understand the content they are teaching and this limit them to conduct experiments because they lack the skills on how to carry out the experiment as a result they just opt to skip the experiments. Also the issue of lack of teaching and learning materials in schools, which indeed is a major challenge to many schools, is coming up as one of the major reasons teachers fail to conduct experiments in their lessons.

Under Q3 most teachers considered the following as reasons why most teachers fail to improvise teaching and learning materials in case of shortage or in availability of materials;

a) Lack of skills to improvise
b) Lack of content knowledge
c) Time consuming

d) Laziness on part of teachers

Teachers' responses above are showing that teachers feel they do not have enough skills and knowledge to improvise the teaching and learning materials whenever the need arises. Also most teachers are just lazy to improvise some of these teaching and learning materials.

Under Q4 most teachers considered the following as major reasons why teachers do not prepare thoroughly lessons plans;

a) Overloading (too much teaching periods per week)
b) Lack of skills to develop thoroughly lesson plans
c) Time consuming
d) Overconfidence on the part of the teachers after teaching for a long time
e) Laziness on the part of the teachers

It is observed that teachers find it difficult to write thoroughly lessons due to a number of factors. One of the major factors being overloading, teachers are given too much teaching periods to teach per week which actually make them not to have enough time to write lesson plans. Teachers feel that the preparation of lesson plans consume their time and gives them extra work on top of too much work they have already. It is found that teachers are just lazy to write these lesson plans.

Under Q5 most teachers considered the following as reasons why teachers do not allow fellow teachers to observe their lessons;

a) Teachers avoid exposing their weaknesses in front of fellow teachers
b) Lack of proper preparation of the lesson
c) Lack of cooperation amongst the teachers at the school
d) Attitude of 'Know-It-all' by teachers.

From the teachers' responses, it is discovered that teachers do not allow their colleagues to observe their lesson because of shyness. Teachers are shy to expose their weaknesses to fellow teachers. Teachers do not allow fellow teachers to observe their lessons due to poor preparation of the lesson.

Recommendation:

From the results obtained from the interview questions with M/S teachers involved in the survey, it is recommended that the following should be emphasized much in the subsequent INSETs by SMASSE INSET Malawi;

a. There is need to change teachers attitude towards mathematics and science subjects. It seems most M/S teachers have negative attitude towards the subjects and this affects their lesson delivery.
b. It is also seen that most teachers are not qualified hence they do not have a lot of knowledge in their teaching subjects. This affects the teachers so much in planning and implementation of the lessons. It is recommended then that SMASSE-INSET Malawi should organize its trainings in such a way that they address this problem of lack of content masterly
c. Also the trainings organized by SMASSE-INSET Malawi should equip teachers with adequate skills on how to develop teaching and learning materials if the need arises. They should also be equipped with skills on how to prepare thoroughly lessons plans, involving students successfully in the lessons as well as they should be equipped with skills on how to include meaningful activities that will assist the learners to discover new knowledge by themselves in the lessons.

6.1.3 Findings from subject-based questionnaires

Teachers were required to rate to what extent they find difficult to teach topics in their subjects. During the exercise, they were explained that they can rate the difficulties based on not only their content knowledge but also lesson delivery, availability of teaching/learning resources, understanding level of students, etc. However it was observed that there was tendency they rated lower on the scale of 0 to 4. Each key means 0; not at all, 1; a little, 2; moderately, 3; considerably and 4; to a great extent. Although there was the tendency, it was felt that the secretariat needs to analyze the topic areas which teachers find difficult to teach.

(1) Mathematics Junior Section

Fig 28 shows the topics in junior mathematics which the teachers find difficult to teach specially 18) Density and Mixtures, 20) Reflection and Rotation and 29) Vectors.

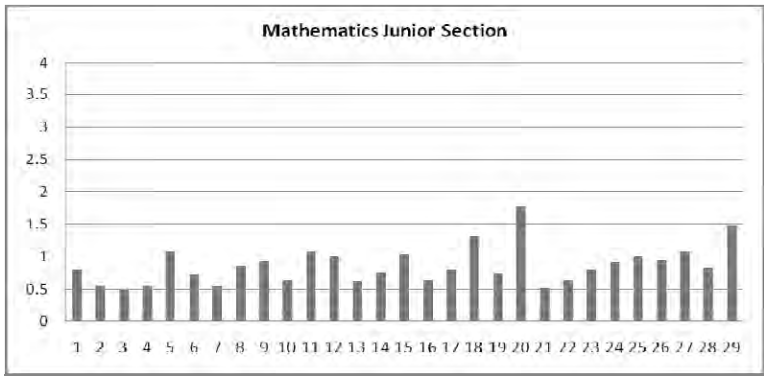


FIG 28: Results on Mathematics Junior Section

1. Number System
2. Sets
3. Lines and Angles
4. Algebraic Expressions
5. Number Patterns
6. Approximations
7. Directed Numbers
8. Social and Commercial Arithmetic
9. Geometrical Constructions I&II
10. Pythagoras Theorem
11. Plane Shapes
12. Mensuration I
13. Linear Simultaneous Equations
14. Proportions
15. Indices and Logarithms
16. Coordinates
17. Linear Graph
18. Density and Mixtures
19. Triangles
20. Reflection and Rotation
21. Linear Equations
22. Statistics
23. Convex Polygons
24. Similarity
25. Inequalities
26. Travel Graphs
27. Probability
28. Quadratic Equation
29. Vectors

Fig 29 shows the results according to their qualifications. Fig 29 shows that in general MSCE holders think more difficult to teach rather than the others do. It also shows that Bachelor holders think more difficult to teach some topic areas than Diploma holders do e.g. No. 12, No. 15, No. 25, No. 27, No. 29. Diploma holders are more confident than the rest.

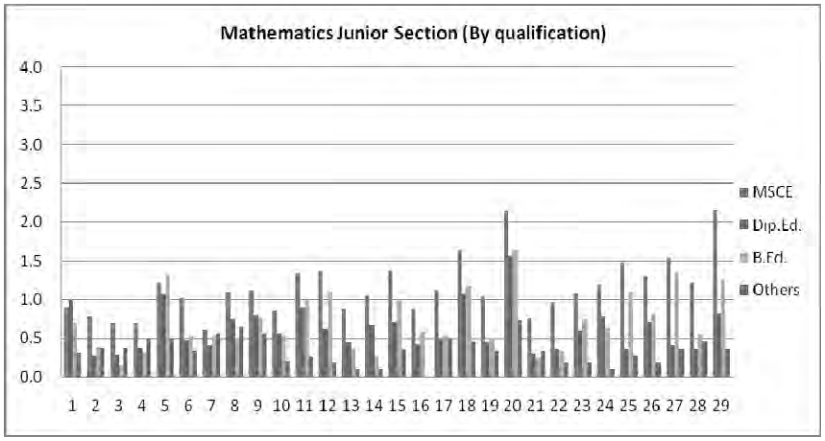


FIG 29: Results on Mathematics Junior Section by Qualification

(2) Mathematics Senior Section

Fig 30 shows that teachers find difficult to teach specially 18) Trigonometric Functions, 20) 3 Dimensional Figures, 22) Vectors II and 25) Linear Programming.

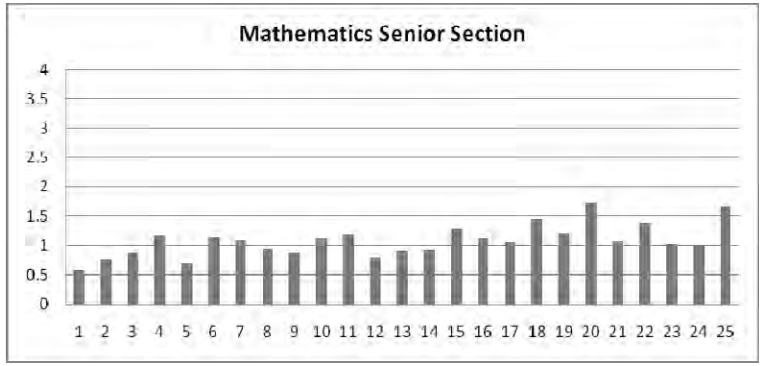


FIG 30: results on Mathematics Senior Section

Fig 31 shows the results according to their qualifications. Fig 31 shows that in general MSCE holders think more difficult to teach rather than the others do. It also shows that Bachelor holders think more difficult to teach some topic areas than Diploma holders do e.g. No. 10, No. 15, No. 19, No. 20

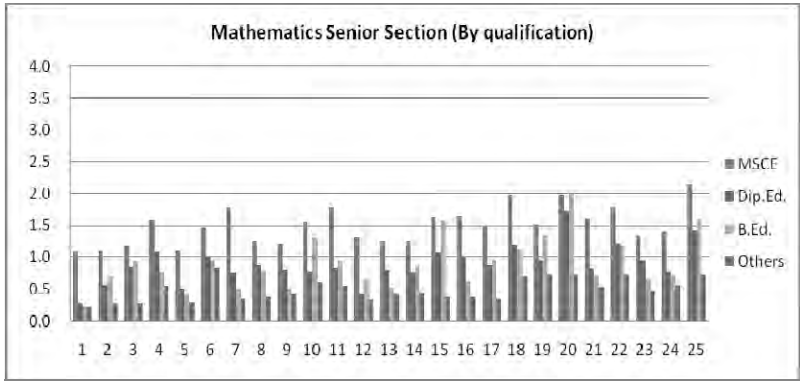


FIG 31: Mathematics Senior Section by qualification

(3) Physical Science Junior Section

Fig 32 shows that teachers find difficult to teach specially 1) Scientific Investigations, 9) Chemical Reactions, 11) Power and machines and 15) Organic Compounds.

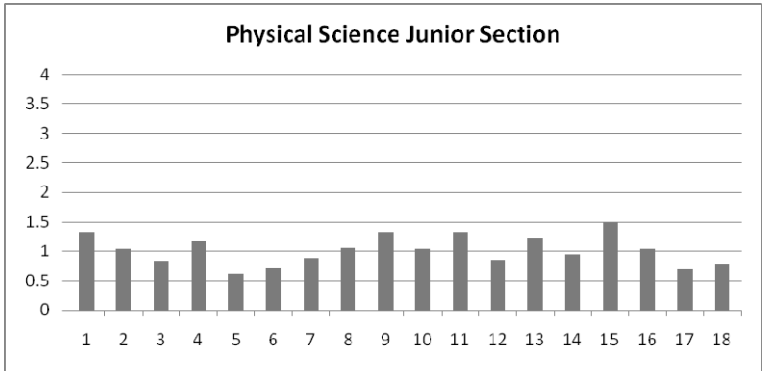


FIG 32: Physical Science Junior Section

1. Scientific Investigations
2. Mechanics
3. Energy
4. Electricity and Magnetism
5. Properties and Structure of Matter I
6. Elements, Compounds and Mixtures
7. Chemical Symbols and Formula
8. Periodic Table
9. Chemical Reaction
10. Acids and Base

11. Power and Machines
12. Properties and Structure of Matter II
13. Specific Heat Capacity
14. Light
15. Vibrations and Waves
16. Organic Compounds
17. Pollution of the Environment
18. Density

Fig 33 shows the results according to their qualifications. Fig 33 shows that MSCE holders think more difficult to teach all the topic areas than the others do. It also shows that there is a big gap between MSCE holders and the others in all the topic areas.

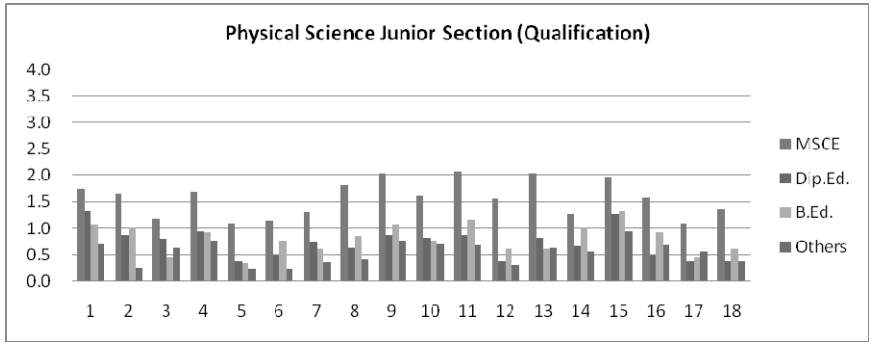


FIG 33: Results on Physical Science Junior Section by Qualification

(4) Physical Science Senior Section

Fig 34 shows that teachers find difficult to teach specially 5) Electricity, Magnetism and Electromagnetic Induction I, 9) Electricity, Magnetism and Electromagnetic Induction II and 11) Nuclear Physics.

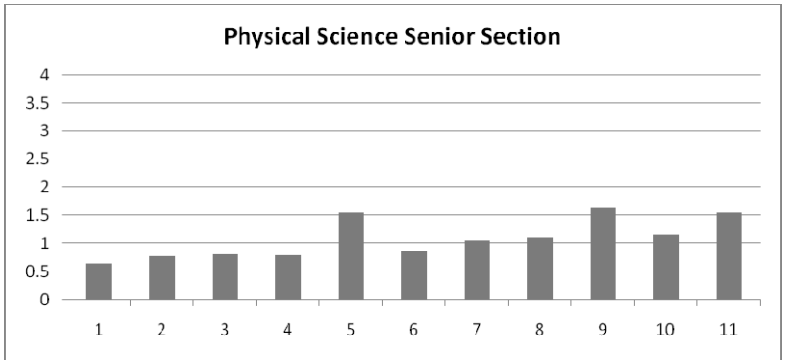


FIG 34: Results on Physical Science Senior Section

1. Properties of Matter
2. Chemical Reactions I
3. Forces and Motion
4. Organic Chemistry I
5. Electricity, Magnetism and Electromagnetic Induction I
6. Elements and Chemical Bonding
7. Oscillations and Waves
8. Organic Chemistry II
9. Electricity, Magnetism and Electromagnetic Induction II
10. Chemical Reaction II
11. Nuclear Physics

Fig 35 shows the results according to their qualifications. Fig 35 shows that MSCE holders think more difficult to teach all the topic areas than others do. Diploma holders think difficult to teach 5) Electricity, Magnetism and Electromagnetic Induction I and 9) Electricity, Magnetism and Electromagnetic Induction II. Bachelor holders think difficult to teach 11) Nuclear Physics. It also shows that there is a big gap between MSCE holders and the others in all the topic areas except 5) and 9).

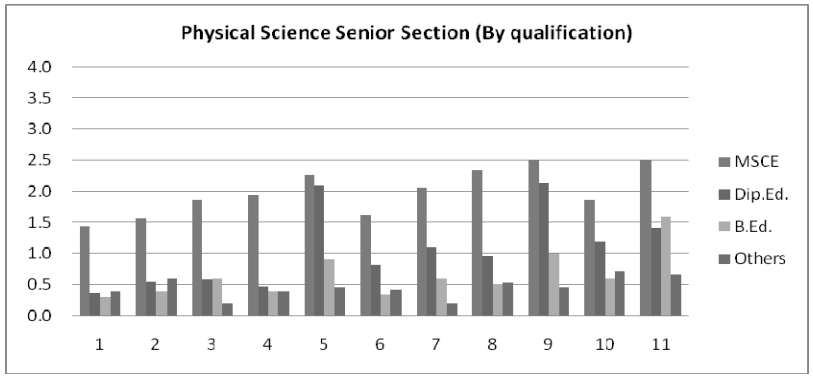


FIG 35: Results on Physical Science Senior Section by Qualification

(5) **Biology Junior Section**

Fig 36 shows that teachers find difficult to teach specially 1) Thinking and Study Skills, 2) Problem Solving and 3) Investigative Skills and Techniques. Teachers think more difficult to teach "Scientific thinking and skills" than subject contents.

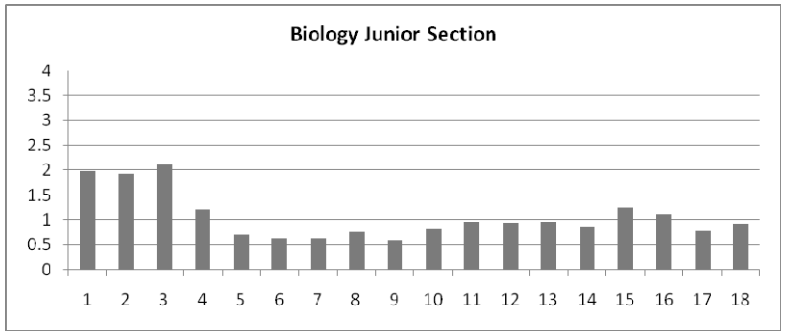


FIG 36: Results on Biology Junior Section

1. Thinking and Study Skills
2. Problem Solving
3. Investigative Skills and Techniques
4. Interactions between organism and the physical world
5. Photosynthesis
6. Human Nutrition
7. Digestive System
8. Worm Infections
9. Living things around us
10. Plant Growth
11. Circulatory System
12. Respiratory System
13. Excretion
14. Locomotion
15. Coordination

16. Microorganisms
17. Diarrhoeal Diseases
18. Sexually Transmitted Diseases

Fig 37 shows the results according to their qualifications. Fig 37 shows that MSCE and Diploma holders think difficult to teach 1) Thinking and Study Skills, 2) Problem Solving and 3) Investigative Skills and Techniques. It also shows that there is not a big gap between MSCE & Diploma holders and the others in all the topic areas except 1), 2) and 3).

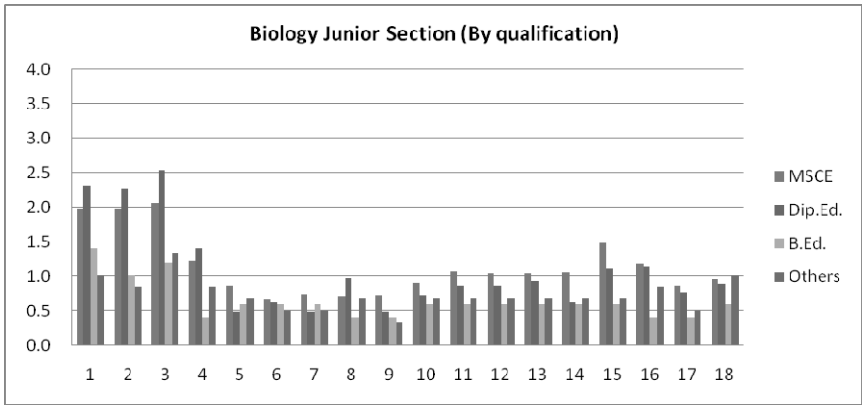


FIG 37: Results on Biology Junior Section by Qualification

(6) Biology Senior Section

Fig 38 shows that teachers find difficult to teach specially 11) Genetics, 12) Ecosystem, 13) Co-ordination, 15) Cancer and 16) Evolution.

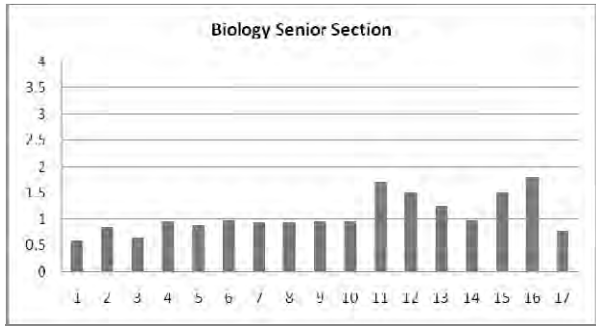


FIG 38: Results on Biology Senior Section

1. Photosynthesis
2. Transport in Plants
3. Human Digestive System
4. Human Circulatory System
5. Respiratory System
6. Locomotion
7. Reproduction
8. Diseases caused by Protozoa, Bacteria, Fungi and Viruses
9. Tropisms
10. Excretion
11. Genetics
12. Ecosystems
13. Co-ordination
14. Immunity
15. Cancer
16. Evolution
17. Human Population

Fig 39 shows the results according to their qualifications. Fig 39 shows that MSCE holders think difficult to teach 11) Genetics, 12) Ecosystem, 15) Cancer and 16) Evolution. It also shows that there is not a big gap between MSCE holders and the others in all the topic areas except 11), 12), 15) and 16).

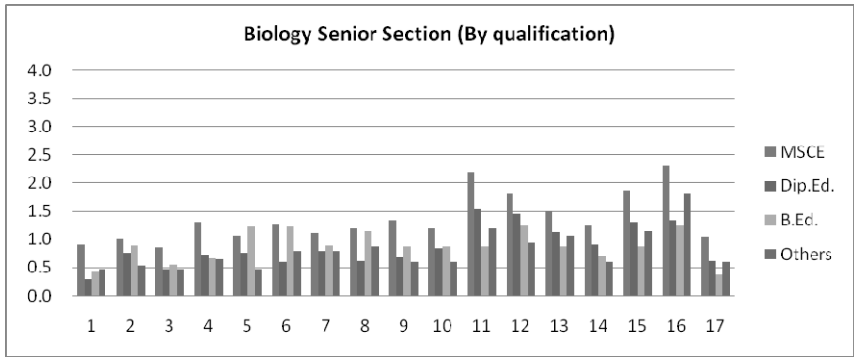


FIG 39: Results on Biology Senior Section by Qualification

The Figures which are shown by their qualifications show the followings;

- The Figure in Physical Science shows that the qualifications affect the level of difficulties to teach. It means that MSCE holders think difficult to teach than the

others do.

- The Figure in Biology show that the qualification doesn't affect much about the level of difficulties to teach.

6.1.4 Findings from students' questionnaires

Students' questionnaires were conducted the following objectives;

- To find out the attitudes of students towards the learning of mathematics and science.
- To find out teachers' attitude toward teaching mathematics and science.
- To find out what teachers usually do in their lessons.

Basically, Form 2 and 4 students were asked to fill the questionnaire. However Form 1 and 3 filled the questionnaire when Form 2 and 4 were not available because they sit in JCE or mock examinations.

Each key means 0; strongly disagree, 1; disagree, 2; average 3; agree and 4; strongly agree.

(1) Students' attitude toward mathematics and science

Table 30 shows the percentage of students who answered each scale on each questions. According to the result, we can find the followings.

1) Most students (80.2%) like maths/science subjects.
2) Most students (76.9%) enjoy learning maths/science subject.
3) Most students (69.0%) actively participate in maths/science lessons.
4) 1/4 students (28.8%) find math/science difficult.
5) Most students (62.0%) disagree "Girls think maths/science is only for boys". It means that they think maths/science is for both boys and girls.
6) Most students (76.7%) think that learning maths/science is not only passing exams, but for improving their daily lives.

Table 30: Results of students' responses on "Students attitude towards M/S

Question		0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	No answer
1	I like maths/science subjects.	2.5	3.0	13.6	31.1	49.1	0.7
2	I enjoy learning maths/science subjects.	2.4	3.6	16.1	32.2	44.7	1.0
3	I actively participate in maths/science lesson.	4.4	6.1	18.3	32.3	36.7	2.3
4	I find maths/science too difficult.	22.5	19.3	26.8	16.5	12.3	2.6
5	Girls think maths/science is only for boys.	43.6	18.4	15.5	11.0	9.4	2.0
6	Learning maths/science is only for passing exams, but not for improving our daily lives.	56.4	20.3	8.4	6.4	7.3	1.3

Fig 40 shows the results according to their Forms. There is a gap between junior students and senior students on question (5) and (6). The result of question (6) shows that senior students think "Learning maths/science is not only for passing exams, but also for improving our daily lives" more strongly than junior students.

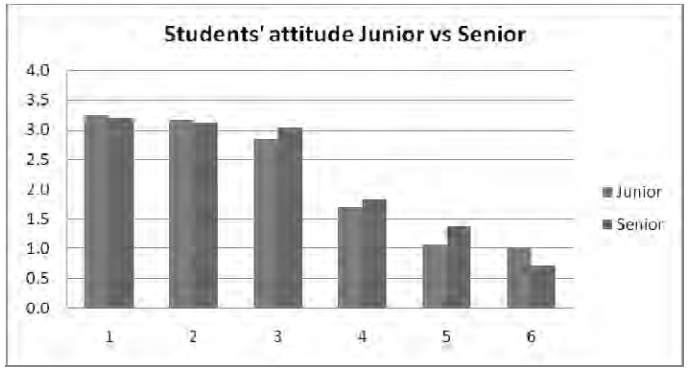


FIG 40: Results on students attitude towards M/S (Junior VS Senior)

Fig 41 shows the results according to their sex. There is a gap between boys and girls on question (5). The result of question (5) shows that girls don't think "maths/science is only for boys" more strongly than boys do.

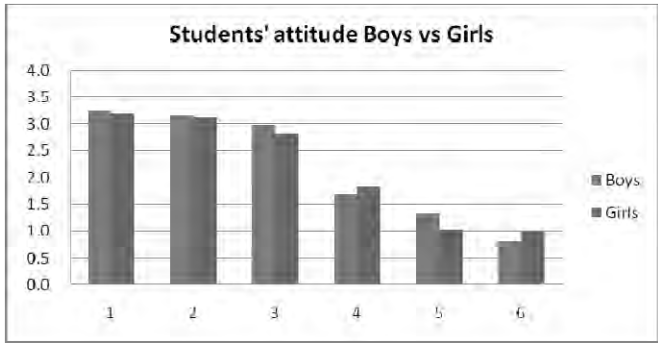


FIG 41: Results on students' attitude towards M/S (Boys VS Girls)

Fig 42 shows the results according to their type of school. There is a gap among the answers on question (3) and (6). The result of question (3) shows that students in government boarding and grant aided answer "I actively participate in maths/science lesson" rather than the rest students do. The result of question (6) shows that students in grant aided think "Learning maths/science is not only for passing exams, but also for improving our daily lives" more strongly than the rest students do. It means that teachers in grant aided show "use of maths/science in our daily life" in their lessons more frequently than the rest teachers do.

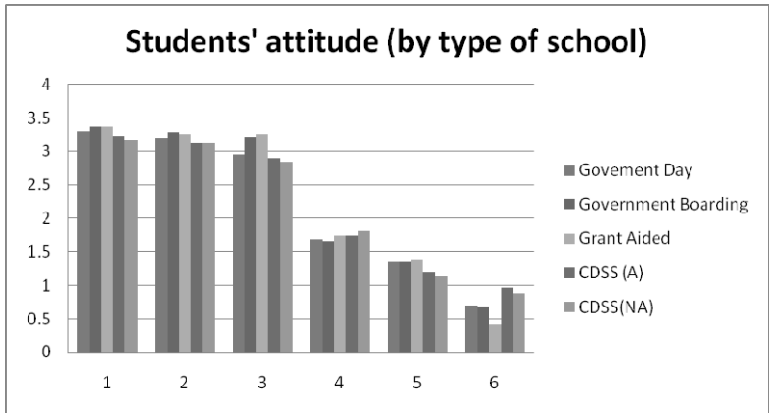


FIG 42: Results on students' attitude towards M/S (by type of school)

(2) Teachers' attitude toward teaching mathematics and science

Table 31 shows the percentage of students who answered each scale on each questions. According to the result, the followings can be found.

7) More than half students (63.2%) say "Teachers don't say math/science are difficult subjects".
8) More than half students (59.9%) say "Teachers enjoy teaching maths/science".
11) One quarter (1/4) of the total students interviewed say "Teachers come to class late."
12) One third (1/3) of the total students interviewed say "Teachers are not patient with us during M/S lessons."
13) Most students (82.9%) say "Teachers encourage both boys and girls to study maths/science".

Table 31: Results of students' responses on "Teachers attitude towards M/S

	Question	0 (%)	1 (%)	2 (%)	3 (%)	4 (%)	No answer
7	Teachers say math/science are difficult subjects.	39.7	23.5	13.3	12.9	9.0	1.6
8	Teachers enjoy teaching maths/science.	7.0	8.1	22.5	31.2	28.7	2.6
9	Teachers come to class late.	28.6	17.5	25.8	13.7	12.0	2.5
10	Teachers often give extra lessons.	16.5	14.6	23.6	24.9	16.7	3.7
11	Teachers pay attention to our problems/needs during maths/science lessons.	11.2	9.1	16.9	30.7	30.6	1.4
12	Teachers are patient with us during maths/science lessons.	17.5	13.5	19.2	25.0	21.9	3.0
13	Teachers encourage both boys and girls to study maths/science.	3.7	2.9	7.5	26.1	56.8	3.0

Fig 43 shows the results according to their Forms. According to the graph below, gaps between junior students and senior students are not found.

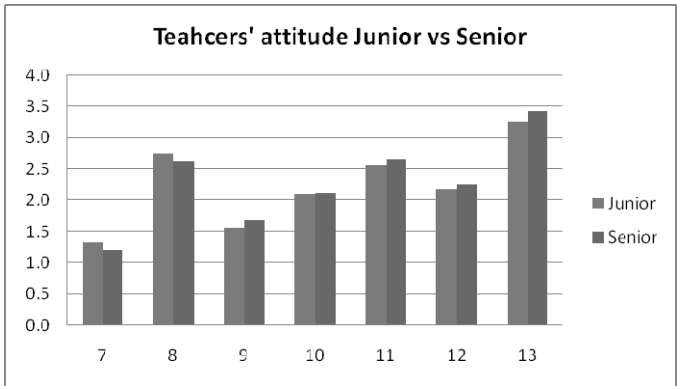


FIG 43: Teachers attitude towards M/S (Junior VS Senior)

Fig 44 shows the results according to their type of school. There is a gap among the answers on question (9) (11) and (12).

- The result of question (9) shows that teachers in grant aided don't come to class late rather than the rest teachers.
- The result of question (11) shows that teachers in grant aided pay attention to our problems/needs during maths/science lessons rather than the rest teachers.
- The result of question (12) shows that teachers in grant aided are patient with students during maths/science lessons.

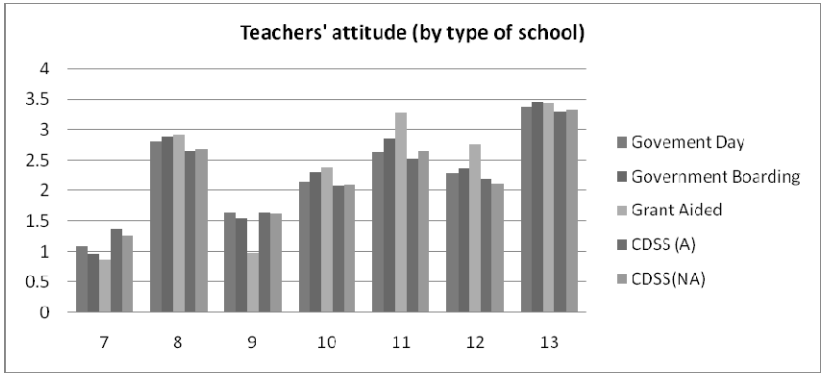


FIG 44: Results on teachers' attitude towards M/S (by school type)

(3) Teachers' activities during lessons

Fig 45 shows the percentage of students who answered each scale on each questions. According to the result, the followings can be found.

15) Most students (63.1%) say "Teachers usually tell us to do some *group* activities during lessons".
16) Most students (62.2%) say "Teachers usually encourage us to discuss in groups during lessons".
23) Most students (60.7%) say "Teachers usually encourage us to give conclusions to the experiments".
30) Most students (64.8%) say "Teachers usually give assignments".

Table 32: Results of students' responses on "Teachers activities during M/S lessons

	Question	0	1	2	3	4	No Answer
14	Teachers usually tell us to do some activities *individually* during lessons.	19.9	12.4	16.3	26.8	23.1	1.4
15	Teachers usually tell us to do some *group* activities during lessons.	9.7	8.3	17.5	32.4	30.7	1.3
16	Teachers usually encourage us to discuss in groups during lessons.	9.2	9.4	18.4	30.4	31.8	0.7
17	Teachers usually encourage us to give our own experiences on the topic before they explain.	14.1	10.6	18.5	30.6	25.2	1.0
18	Teachers usually encourage us to suggest the possible results of activities.(Predicting)	9.3	11.9	24.4	33.7	19.2	1.4
19	Teachers usually encourage us to make our own observations on the results of activities.	10.9	12.8	23.8	31.1	19.6	1.9
20	Teachers usually ask us whether their lesson was good or not at the end of the lessons.	25.5	16.6	18.3	21.0	16.7	2.1
21	Teachers often demonstrate experiments during lessons.	13.2	11.7	22.8	26.8	22.2	3.4
22	Teachers often let us conduct experiments in groups.	12.5	10.7	17.9	28.8	25.1	5.1
23	Teachers usually encourage us to give conclusions to the experiments.	9.6	9.3	18.4	32.2	28.5	2.1
24	Teachers usually explain theories/concepts related to the experiments clearly.	10.1	10.0	20.5	31.4	25.9	2.1

25	Teachers often conduct experiments using locally available resources.	16.3	15.4	23.4	25.3	17.0	2.6
26	Teachers usually use materials easily available in our surroundings.	11.5	12.0	19.8	29.7	22.9	4.2
27	Teachers often produce some equipment/materials using locally available resources.	16.2	17.6	24.7	25.2	13.5	2.8
28	Teachers usually encourage us to use materials made from locally available resources.	16.9	19.7	24.2	23.3	13.4	2.5
29	Teachers usually prepare enough materials for our use.	16.5	14.2	20.2	23.8	21.7	3.7
30	Teachers usually give assignments.	6.9	6.7	19.0	29.2	35.6	2.6
31	Teachers usually revise marked assignments on time.	11.1	9.9	19.8	28.3	27.9	3.1
32	Teachers often observe each others' lessons.	25.5	14.2	20.2	21.1	16.8	2.1

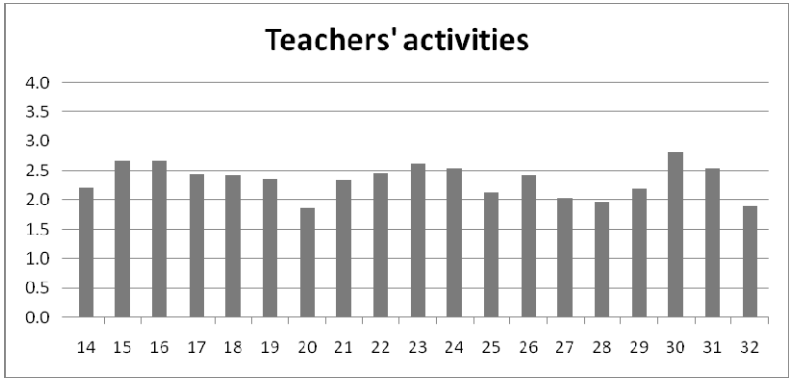


FIG 45: Results on teachers activities

Fig 46 shows the results according to their type of school. The followings are shown below;

- The result of question 14 shows that teachers in CDSS don't include individual activities during lessons frequently rather than the rest teachers.
- The result of question 18 shows that teachers in CDSS don't encourage students to predict frequently rather than the rest teachers.
- The result of question 19 shows that teachers in Government day and CDSS don't encourage students to make own observation frequently rather than the rest teachers.

- The result of question 21 shows that teachers in CDSS don't demonstrate frequently rather than the rest teachers.
- The result of question 22 shows that teachers in Government day and CDSS don't let students to conduct experiment frequently rather than the rest teachers.
- The result of question 23 shows that teachers in CDSS don't encourage students to give conclusion to the experiment frequently rather than the rest teachers.
- The result of question 24 shows that teachers in CDSS don't explain theories/concept related experiment clearly rather than the rest teachers.
- The result of question 26 shows that teachers in Government boarding use materials in students' surrounding frequently rather than the rest teachers.
- The result of question 28 shows that teachers in Grant aided don't use locally available resources frequently rather than the rest teachers.
- The result of question 29 shows that teachers in CDSS don't prepare enough materials rather than the rest teachers.
- The result of question 30 shows that teachers in CDSS don't give assignment frequently rather than the rest teachers.

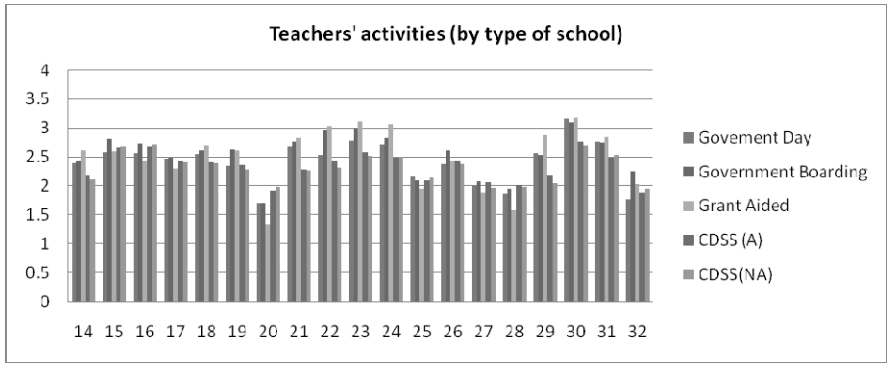


FIG 46: Results on teachers activities (by type of school)

In order to verify the problems, students' questionnaire was developed so as to be made the companion to the ASEI-PDSI check list. The relationships are described in Table 33.

Table 33: Relationship between students' questionnaire and ASEI-PDSI checklist items

No	Students' questionnaire		ASEI-PDSI checklist	
1	8	Teachers enjoy teaching maths/science.	1	Did the teacher appear to be enjoying the teaching?
2	11	Teachers pay attention to our problems/needs during maths/science lessons.	2	Was the teacher sympathetic to the problems/needs of each student?
3	12	Teachers are patient with us during maths/science lessons.	3	Did the teacher exercise patience with students?
4	13	Teachers encourage both boys and girls to study maths/science.	4	Was the teacher gender-sensitive?
5	14	Teachers usually tell us to do some activities *individually* during lessons.	5	Did the teacher incorporate activities for students into the lesson?
6	15	Teachers usually tell us to do some *group* activities during lessons.	5	Did the teacher incorporate activities for students into the lesson?
7	16	Teachers usually encourage us to discuss in groups during lessons.	9	Did the teacher give students appropriate tasks for discussions?
8	17	Teachers usually encourage us to give our own experiences on the topic before they explain.	11	Did students give their prior experiences or explain their ideas related to the content?
9	18	Teachers usually encourage us to suggest the possible results of activities.(Predicting)	12	Did students come up with their own predictions/suggestions for concepts/theories/rules/ methods etc. in the lesson?
10	19	Teachers usually encourage us to make our own observations on the results of activities.	15	Did students present their own observations/results of their activities?
11	20	Teachers usually ask us whether their lesson was good or not at the end of the lessons.	18	Did students evaluate the lesson?
12	21	Teachers often demonstrate experiments during lessons.	19	Was an experiment conducted?
13	22	Teachers often let us conduct experiments in groups.	19	Was an experiment conducted?
14	23	Teachers usually encourage us to give conclusions to the experiments.	20	Did students deduce theories/concepts from the activities/experiment?
15	24	Teachers usually explain theories/concepts related to the experiments clearly.	21	Did the teacher relate activities/experiment to theories/concepts clearly?
16	25	Teachers often conduct experiments using locally available resources.	24	Did the teacher use improvised equipment/materials for activities?
17	26	Teachers usually use materials easily available in our surroundings.	23	Did the teacher utilise materials available in students' immediate environment?
18	27	Teachers often produce some equipment/materials using locally available resources.	24	Did the teacher use improvised equipment/materials for activities?
19	28	Teachers usually encourage us to use materials made from locally available resources.	24	Did the teacher use improvised equipment/materials for activities?
20	29	Teachers usually prepare enough materials for our use.	27	Did the teacher prepare appropriate materials for students' use?

Fig 47 shows the deference between students' answer and the result of lesson observation. There is a big gap on almost all the items. Students evaluate teachers' activities related to ASI-PDSI as "average". However observers evaluate 0 "not at all" to 1 "a little" on almost all the activities.

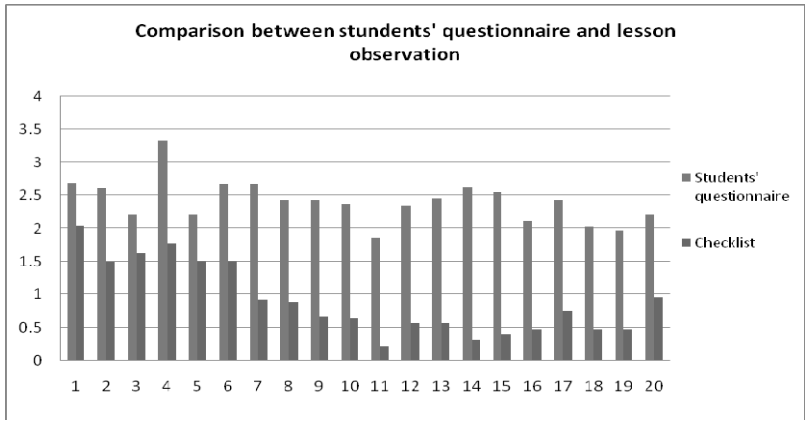


FIG 47: Comparison between students' questionnaire and lesson observation

Summary on the students findings:

- Most students have positive attitude towards mathematics and science.
- Some students point out the negative attitude of M/S teachers
- Students evaluate teachers' activities related to 'ASEI-PDSI' as average, however observers didn't find teachers' activities as students evaluated.

6.2 Findings from Lesson Observation

The purpose of observing lessons was to find out the currents situation in the teaching and learning of mathematics and science Using ASEI checklist. ASEI checklist looks into eight aspects in a lesson; attitude of a teacher during the lesson, Activity, Student centeredness of a lesson, experiments, improvisation, planning ,seeing and improving. A total of 74 lessons were observed in Form 1 and Form 3 in five divisions.

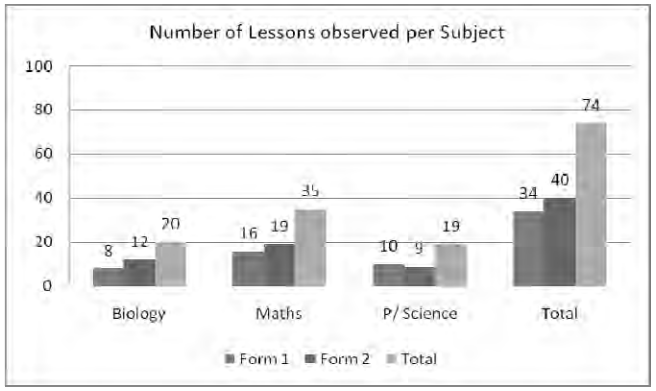


FIG 48: Number of lessons observed per subject

More lessons were observed in Mathematics as compared to Biology and Physical science this was so because among other reasons.

1. Physical science in not taught in some of the schools that we visited.
2. Teachers had already taught their lessons the time we arrived at the school.

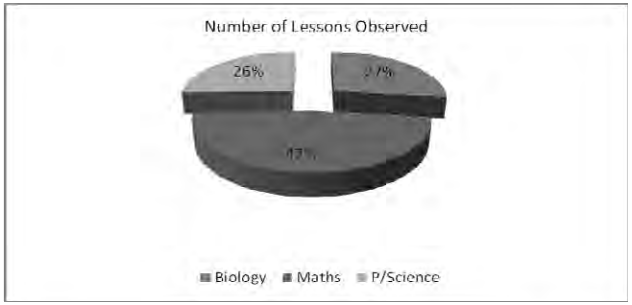


FIG 49: Number of lessons observed per subject (by percentage)

(1) Overall observation

It was observed that lessons are categorized into three major groups.

(1) Teacher-centered lesson; Teachers explain everything one-sidedly. Students listen and copy what teachers explain and/or write on writing board.

(2) Surface student-centered lesson; although interaction between teachers and students are very active, students only repeat what teachers said or read/present the textbook says.

(3) Student-centered lesson; Students understand what they should learn during the lessons, think actively and find solutions/rules/concept/theory by themselves.

Type (1) was rarely observed during the exercise. It was found that most lessons were belongs to type (2). Three lessons were categorized close to type (3). The examples are shown as good lessons in page 85.

(2) Lesson Observation Results

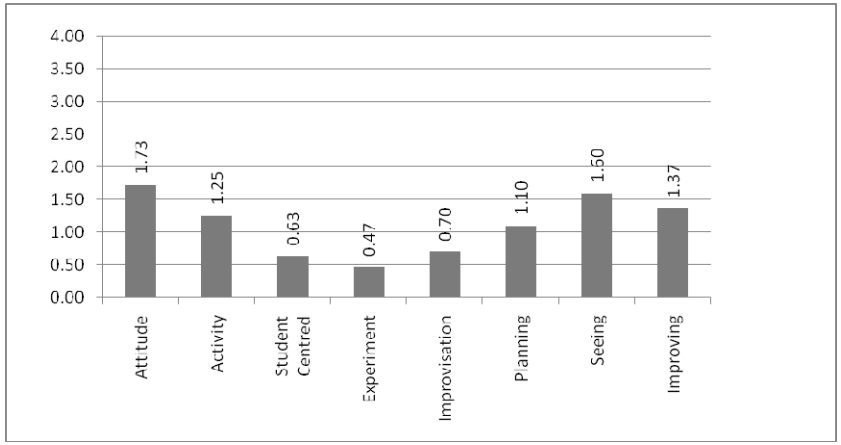


FIG 50: Results on lesson observation

Although all the areas are below average of 2 on a scale of 0 to 4, teachers' performance is significantly lowest in conducting experiments followed by student centred, then

improvisation which are all below one. It is therefore important to analyse their results basing on each aspect of these category.

1) Attitude

It was observed the followings during the lesson observations.

- Most teachers seem comfortable to teach math/science.
- Most teachers tried to give both boys and girls chances to answer.
- When students answered wrong answer, teachers didn't ask them the reasons why they answered so and explain why the answers were wrong. Teacher or other students explained correct answer.

(Example 1): changing the subject of the formula

Question was making T subject for S=D/T. Students answered that "subtract S", "add T", etc.

(Example 2); logarithm

Students were given $\log_{10}2$and $\log_{10}3$ to calculate $\log_{10}5$. Students answered $\log_{10}5=\log_{10}(2+3)$ instead of $\log_{10}10/2$. Thereafter students answered $\log_{10}10/2=\log_{10}10-\log_{10}2=\log_{10}8$.

Table 34: Results under "Attitude category" in the ASEI/PDSI checklist

Attitude		
1	Did the teacher appear to be enjoying the teaching?	2.0
2	Was the teacher sympathetic to the problems/needs of each student?	1.5
3	Did the teacher exercise patience with students?	1.6
4	Was the teacher gender-sensitive?	1.8

2) **Activity**

It was observed the followings during the lesson observations.

- Full class learning style was utilized for most classes. Teachers asked questions to the whole class and only a few students answered. The rest students were only listening and watching.
- Interaction between teachers and students were very active. However students only answer about what textbooks say.
- Although students were engaged in the activities, students copied the textbook to their notebook.

(Example 1) characteristics of snail

Students were divided into small groups and given tasks and textbooks. Students copied from the text book and present what they copied. Students didn't have chances to raise their interest, prior knowledge and experience about snails.

(Example 2) plant nutrient

Students were divided into small groups and given tasks and textbooks. Students copied from the text book and present what they copied. Students didn't have chances to raise their interest, prior knowledge and experience about growing plant.

- Although students memorize definitions, theorem or theory, they don't understand what they mean.

(Example); circle theorem

Students were able to say one of circle theorems. However, they were not able to use the theorem to solve questions.

Table 35: Results under "Activity category" in the ASEI/PDSI checklist

Activity		
5	Did the teacher incorporate activities for students into the lesson?	1.5
6	Did the teacher successfully engage students in the activities?	1.3
7	Did the activities arouse students' interests?	1.3
8	Were the activities meaningful for enhancing students' understanding?	1.3
9	Did the teacher give students appropriate tasks for discussions?	0.9

3) Student Centeredness.

This section looks at chat students do in a lesson and there are nine 9(question 10 to question 18) items in this section

Q10. Did students do anything to show the whole class or the group?

Q11. Did students give their prior experiences or explain their ideas related to the content?

Q12. Did students come up with their own predictions/suggestions for concepts/theories/rules/ methods etc. in the lesson?

Q13. Did students discuss the difference in their own predictions/suggestions?

Q14. Did students verify their predictions/suggestions on their own?

Q15. Did students present their own observations/results of their activities?

Q16. Did students discuss the differences in their observations/results of their activities?

Q17. Did the teacher summarise the lesson by giving clear explanation?

Q18. Did students evaluate the lesson?

The results on each aspect from the lessons observed are as follows;

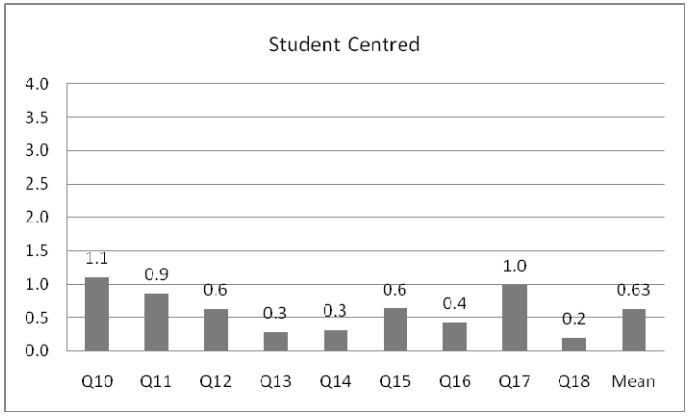


FIG 51: Results on student-centred

The results indicate that although teachers attempt to involve students in the teaching/learning process, their performance is in most cases below a little in most aspects more especially in item 13 and 14 where it is lowest(almost zero). This means that although teachers ask students to give their experiences they do not allow them (learners) to discuss their differences/misconceptions and verify whether their thoughts are correct or not. This could be because of lack of skills in how to let students successfully participate in the teaching and learning process. In summary under this category it was noted that;

- Most teachers are not able to make students predict, discus and verify.
- There were interactions between the Teachers and students but the contents of interactions could not make the students think.
- Students were divided into groups and given tasks and text books students copied and present what they had found.
- When learners were asked to give their experiences they were not allowed to discuss their responses and never given chance to verify what they thought was correct.
- Although students wrote answers and/or solutions on boards, they didn't explain why they came up with the answers.

Table 36: Results under "Students centred category" in the ASEI/PDSI checklist

Student-Centred		
10	Did students do anything to show the whole class or the group?	1.1
11	Did students give their prior experiences or explain their ideas related to the content?	0.9
12	Did students come up with their own predictions/suggestions for concepts/theories/rules/ methods etc. in the lesson?	0.7
13	Did students discuss the difference in their own predictions/suggestions?	0.3
14	Did students verify their predictions/suggestions on their own?	0.3
15	Did students present their own observations/results of their activities?	0.6
16	Did students discuss the differences in their observations/results of their activities?	0.4
17	Did the teacher summarize the lesson by giving clear explanation?	1.0
18	Did students evaluate the lesson?	0.2

4) Experiments.

Experiments (these are activities to verify the predictions/suggestions of the students). The low results is an indication that although teachers conduct experiments in their lessons the results show that they do not allow students to deduce theories from the experiments and their abilities in relating the activities/experiments clearly is to a great

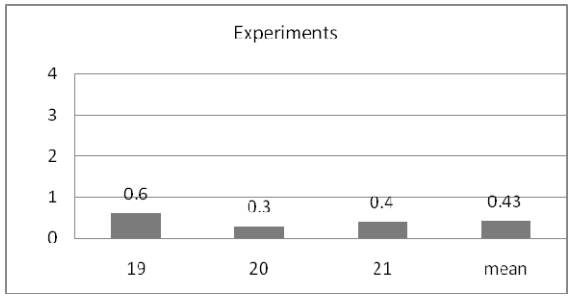


FIG 52: Results on experiments

It was observed the followings during the lesson observations.

- Experiments were conducted very rarely. Only 4 lessons were involved experiments such as magnetic effect of current, photosynthesis, separation of mixtures and chemical effect of current respectively.
- The nature of the experiments could not allow students to discover knowledge by themselves, teachers were giving the students all the procedures and the students were just following what the teacher gave them.
- Although experiments were conducted during the lessons, students were not given chance to deduce theories/concepts from the experiments. Students were given the result of experiments before they tried the experiments.

(Example 1) magnetic effect of current

Before the experiment, the teacher explained "Current has magnetic effect. Let us try experiment. I will show you the procedure……." Thereafter students conducted to confirm whether what the teacher said was correct or not. Students didn't have chances to come up their predictions and verify the predictions through experiments.

(Example 2) separation of mixtures

Before the experiment, the teacher explained "Evaporation is used to separate sugar from sugar solution". Then the teacher demonstrated. Students didn't have chances to come up their suggestion how we can separate sugar from sugar solution and verify the suggestions through experiments.

Table 37: Results under "Experiment category" in the ASEI/PDSI checklist

Experiments (i.e. Activities to Verify the Predictions/Suggestions of the Students)		
19	Was an experiment conducted?	0.6
20	Did students deduce theories/concepts from the activities/experiment?	0.3
21	Did the teacher relate activities/experiment to theories/concepts clearly?	0.4

5) Improvisation

From ASEI lesson observation checklist improvisation looks at basically three questions (questions 22 to 240

Q22. Did the teacher simplify methods for activities, in consideration of efficient resource use?

Q23. Did the teacher utilise materials available in students' immediate environment?

Q24. Did the teacher use improvised equipment/materials for activities?

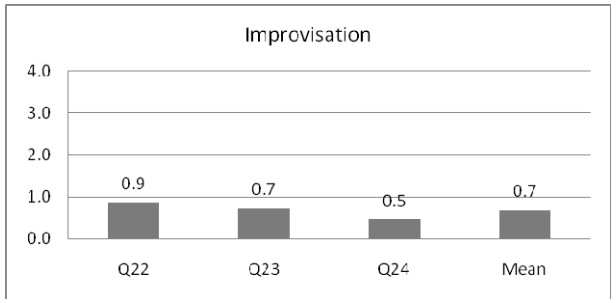


FIG 53: Results on improvisation

All the questions are rated below zero. This means that even though teachers feel teaching M/S is greatly affected by inadequate teaching and learning materials they take little if not any effort to use improvised equipment/materials in their lessons.

It was observed the followings during the lesson observations.

- Although local materials are available for enhancing students' understanding, teachers didn't prepare them.

Table 38: Results under "Improvisation category" in the ASEI/PDSI checklist

Improvisation		
22	Did the teacher simplify methods for activities, in consideration of efficient resource use?	0.9
23	Did the teacher utilize materials available in students' immediate environment?	0.7
24	Did the teacher use improvised equipment/materials for activities?	0.5

6) Planning

It was observed the followings during the lesson observations.

- Most teachers didn't prepare lesson plans and though they had lesson notes they didn't follow them in most cases which led to lessons taking longer oe ending abruptly.
- Teachers didn't manage to finish the lesson within 40 minutes.
- Teachers introduced group activities before 5 minutes to finish the lesson.
- Teachers spend a lot of time to review the previous lessons.
- Teachers incorporate a lot of students' activities which they couldn't manage to finish within the lessons.
- Some teachers gave questions which had no answers (students or teachers could not come up with the answers)

Table 39: Results under "Planning category" in the ASEI/PDSI checklist

Planning		
25	Did the teacher prepare a lesson plan?	0.5
26	Was the lesson presentation well organized (not in a haphazard way)?	1.9
27	Did the teacher prepare appropriate materials for students' use?	1.0

7) Seeing

It was observed the followings during the lesson observations.

- Most teachers visited the students to advice their work during the lessons.
- Most teachers managed to keep good eye contact with students.
- Most teachers invited questions from students only at the end of the lessons.

Table 40: Results under "Seeing category" in the ASEI/PDSI checklist

Seeing		
28	Was the teacher paying attention to the progress of students during class work?	1.7
29	Was the teacher keeping good eye contact?	1.9

30	Did the teacher invite questions from students in the course of the lesson?	1.1
31	Did the teacher ask the questions to check the level of students' understanding?	1.6

8) Improving

It was observed the followings during the lesson observations.

- Some teachers stuck to their plans. They misunderstand they should follow the plan anytime.
- Most teachers indicated "necessity of the preparation of teaching and learning materials" to improve their lessons. They didn't indicate points which are related to teaching methods.

Table 41: Results under "Improving category" in the ASEI/PDSI checklist

Improving		
32	Did the teacher rephrase questions/instructions where necessary?	1.5
33	Did the teacher give further guidance to students on activities?	1.4
34	Did the teacher adjust the lesson where necessary?	0.9
35	Was the teacher able to indicate some points to improve?	1.5

9) Other aspects

It was observed the followings during the lesson observations.

- Some teachers didn't understand the teaching contents.

  (Example 1) pictogram

  Teacher gave exercise which is not able to be shown as a pictogram.

  (Example 2) chemical reaction

  Teacher was not able to write equation of chemical reaction correctly.

  (Example 3) trigonometry

  Teacher doesn't understand elevation and depression correctly.
- One teacher taught the contents (stomach) which was not included in teaching syllabus.
- Most teachers taught repeated lessons.

Good Lessons Observed

Although the team that conducted the survey came across so many poor lessons, the team observed some few lessons with almost all the characteristics of the good lessons. The lessons had the following in general;

a) The teachers prepared detailed lesson plans.
b) The teachers included meaningful activities in the lessons that enhanced reasoning and thinking in the learners hence promoting understanding of the concepts taught.
c) Teachers gave opportunity to the learners to discuss among themselves and able to report their findings from the results of the activities.
d) Students were encouraged to come up with conclusions by themselves basing on the results of the activities before the teacher came up with her conclusion.

e) The teacher also gave the students ample time to ask questions during and at the end of the lessons. This helped the learners to remove their misconceptions by asking the questions.
f) The teachers summarised the lessons well by giving the clear explanation of all the concepts that have been taught in the lesson.

6.3 CONCLUSION

The survey was conducted without major problems and it is noted that what the secretariat wanted to achieve has been achieved. The schools visited were so cooperative that resulted to the exercise being done smoothly. On the part of M/S teachers, a number of them were willing to be observed in their M/S lessons because they understood the purpose of the exercise. However from the M/S teachers' questionnaire, it has been noted that most teachers were willing not to expose their challenges/problems as much as possible because their ratings on the questionnaire and that of lesson observation are not matching. Teachers seem not to have many problems in teaching mathematics and science through the M/S questionnaire while the lesson observation checklist indicates that teachers are having so many problems in teaching mathematics and science. It was noted that many teachers had big challenges in incorporating activities/experiments in the lesson, improvising teaching and learning materials as well as involving the students successfully in the lesson.

6.4 RECOMMENDATIONS

In order to enhance the quality teaching and learning in mathematics and science lessons, following points are recommendable.

(1) Support from stakeholders

- M/S teachers need to be fully supported by School, Divisions and MoEST through constant supervision
- Schools need to create good relationship amongst its members of staff so that teachers can be willing to expose their weaknesses in order to improve their teaching through assisting each other.

(2) Lesson Implementation

- Teachers need to be equipped with skills to incorporate activities/experiments which students can deduce the theory/concepts in their lessons
- Teachers need to be equipped with skills to develop T/L materials
- Teachers need to be equipped with skills on how to conduct student-centred lessons which students can come up with new knowledge using their prior knowledge and experience
- Teachers need to be given content knowledge
- Teachers need to be made aware on the importance of lesson planning
- Teachers need to be equipped with skills to build their knowledge using their mistakes/misconceptions

To achieve recommendations above, teachers need to change their attitude such as laziness, overconfidence, attitude of 'know-it-all' to improve their teaching

7. Lesson Learnt

- Survey/lesson observation should be conducted during term 1 or 2.
- Questionnaire should be compact.
- Questions should be designed to be able to get real answer/information

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The SMASSE Secretariat would like to sincerely thank all stake holders who assisted in the planning and implementation of the 1st SMASSE Divisional INSET especially all six Education Divisions for giving their fullest cooperation and support during the INSET, MoEST through DTED and JICA for providing funds and technical support for the INSET, National Trainers, Divisional Trainers and all those who assisted in one way or the other.

Report on
2010 SMASSE Divisional INSET

Final Draft

SMASSE Secretariat

DTED, MoEST

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List of Abbreviations

ASEI	Activity, Student-centered, Experiment, and Improvisation
CEED	Central East Education Division
CWED	Central West Education Division
DCE	Domasi College of Education
DEM	District Education Manager
DTED	Department of Teacher Education and Development
DTs	Divisional Trainers
EDM	Education Division Manager
HEC	Home Economics
INSET	In-Service Education and Training
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
MoEST	Ministry of Education, Science and Technology
M/S	Mathematics and Science
NED	North Education Division
NTs	National Trainers
PDSI	Plan, Do, See, and Improve
PEA	Primary Education Advisor
PEMA	Principle Education Methods Advisor
PTA	Parents – Teachers Association
SCM	School Management Committee
SEED	South East Education Division

SEMA	Senior Education Methods Advisor
SHED	Shire Highlands Education Division
SMASSE	Strengthening of Mathematics and Science in Secondary Education
SWED	South West Education Division
ToT	Training of Trainers
SMASE-WECSA	Strengthening of Mathematics and Science Education in Western, Eastern, Central and Southern Africa

TABLE OF CONTENTS

1. INTRODUCTION

Strengthening of Mathematics and Science in Secondary Education - In Service Education and Training (SMASSE – INSET) Phase II is the role out phase to all six divisions after success stories from the pilot project (phase I) in South East Education Division (SEED). Phase I lasted for three years from October, 2004 to September, 2007. Phase II was started on 8th August, 2008 and was officially launched on 10th December, 2008, by the Deputy Minister of Education responsible for Secondary Education and the Secretary for Education, Science and Technology at Mulunguzi Secondary school. Phase II has had two National INSETs which were held from 25th May to 5th June, 2009 and from 4th to 8th January, 2010 respectively. 2010 Divisional INSET is the first of its kind since the inception of SMASSE Phase II activities in Malawi and it took place from 24th to 28th May 2010. The training targeted 3400 Mathematics and Science (M/S) teachers from all six Education Divisions; North Education Division (NED), Central East Education Division (CEED), Central West Education Division (CWED), South East Education Division (SEED), Shire Highland Education Division (SHED) and South West Education Division (SWED).

This report is going to discuss the 2010 Divisional INSET on preparation, implementation, monitoring and Evaluation during the Divisional INSET and after the INSET. In SEED, the area of focus for the INSET was "Planning, a tool for effective teaching and learning". In other five Divisions, the INSET focused on "Attitude change" and enhancement of ASEI-PDSI paradigm. SEED had a different focus as they had already covered the essence of attitude change in teaching and learning of M/S in Phase I implementation.

In SEED the objectives of the Divisional INSETs were two-fold:

a. To enhance the practice of planning for effective teaching and learning of Mathematics and Science (M/S)
b. To expose topics considered challenging by both teachers and students to participants.

In other five Divisions, the objectives of Divisional INSETs were as follows:

a. Changing the attitude of participants towards the teaching of M/S.
b. To make participants understand Activity, Student-centered, Experiment, Improvisation – Plan, Do, See, Improve (ASEI-PDSI) approach as an effective way to teaching and learning of M/S.
a. To expose topics considered challenging to both teachers and students to participants.

2. BACKGROUND

Since the inception of free primary education in 1994, primary schools experienced massive enrollment which also affected secondary schools enrollment. This resulted into poor performance of students especially in M/S during national examinations. This poor performance is due to the following reasons:

1. Shortage of qualified teachers
2. High teacher-pupil ratio
3. Inadequate teaching and learning materials
4. Negative attitude towards planning for effective teaching and learning that result into adoption of lecture method commonly called "chalk and talk"
5. Poor background of pupils especially in M/S resulted by poor teaching at primary school

Malawi Government through Ministry of Education Science and Technology (MoEST) in conjunction with development partners has made several attempts to arrest some of these challenges in secondary schools.

Table 1: some of the governments' attempts to alleviate the problems faced by secondary schools

NATURE	PROGRAMME	DETAILS
Comprehensive	Education Sector Support Project (ESSUP).	World Bank funded the project by increasing the access to secondary education especially for girls in rural areas through construction of 20 new day secondary schools; provision of teaching and learning materials; training methods advisors, deputy heads, heads of departments and new head teachers; development and distribution of HIV/AIDS teaching and learning materials for forms 1 to 4; building a new teachers training college, rehabilitating facilities for teacher training universities, facilitating distance learning for secondary school teachers at Chancellor college, training university lecturers, rehabilitating facilities at CDSS and distributing science kits to secondary schools
Upgrading	Distance Education Programme (DEP).	This programme was initially funded by Canadian International Development Agency (CIDA) through the project called Secondary School Teacher Education Project (SSTEP). In this project, under qualified teachers from Community day Secondary Schools (CDSS) upgrade their content knowledge and methodological skills through distance learning through Domasi College of Education (DCE)
In-service Training	SMASSE INSET Malawi (Phase I)	This project was established in 2004 with funding from Japanese International Cooperation Agency (JICA). The project was implemented as a pilot in SEED comprising of five education districts these are Machinga, Zomba Urban, Zomba Rural, Balaka and Mangochi with its Secretariat at DCE. The project was initiated because of low prospective in M/S which resulted into poor performance in national examinations. The project is aimed at improving the quality of teaching and learning of Mathematics and Science in secondary schools by establishing regularized and institutionalized INSETs for M/S teachers in Malawi
	SMASSE INSET Malawi (Phase II).	The project started in 2008 after the end of phase I. Phase II was established after success stories from phase I. This is a roll-out phase to all six Education Divisions. It is aimed at improving secondary school students in M/S through provision of quality INSETs. In this project teachers are to be trained through regular INSETs in their respective Divisions.
	Cluster System.	MoEST with funding from Danish International development Aid (DANIDA) used to conduct INSETs for secondary teachers in all the subjects. Cluster leader schools were selected as Cluster INSET centres. After the withdrawal of Danish aid, cluster system has not been sustained very well. They have been mostly used for communication from Division offices. Since 2009 some clusters revived activities by Divisional EMAS in collaboration with JICA volunteers as a follow up to Divisional INSET activities.

SMASSE INSET Malawi is a technical cooperation between Malawi Government through Ministry of Education Science and Technology (MoEST) and government of Japan through Japan International Cooperation Agency (JICA). The project has four major outputs, these are: strengthening the capacity of Divisional trainers, strengthening national and divisional INSET centers as resource centers, implementing National and Divisional INSETs, implementing Monitoring and Evaluation (M & E), strengthening sustainable INSET management system.

SMASSE INSET Malawi phase II has its secretariat at Department of Teacher Education and Development (DTED), it commenced in August, 2008 after a formal agreement between the Government of Malawi through MoEST and the government of Japan through JICA. Currently the project is implementing its activities in all the six divisions, namely NED, CWED, CEED, SEED, SHED, and SWED. In SEED the project focuses on four subjects; Mathematics, Physical Science, Biology and Home Economics (HEC) while in other five divisions the project focuses on three subjects; Mathematics, Physical Science and Biology. In other five divisions HEC will be considered when enough funds are available. SMASSE INSET Malawi adopted a cascade

style in which National Trainers (NT) are tr ained outside and within Malawi, who train Divisional Trainers (DT) during National INSETs, and DTs train all M/S teachers during Divisional INSETs.

In phase II, DTs were recruited and trained during 1st and 2nd National INSETs, Intensive Training, Information Communication & Technology (ICT) and Training of Trainers (ToT). Secondary M/S teachers have been trained during Divisional INSETs by DTs.

3. PREPARATION FOR THE DIVISIONAL INSET

3.1 PREPARATION IN INSET MANAGEMENT

DTED, through SMASSE s ecretariat in conjunction with Divisions and INSET centres made necessary preparations for th e Divisional INSETs. Some of these preparations were: rehabilitation of INSET centres; procurement of INSET equipment and materials, sensitization meetings of Head Teachers and Parent Teacher Associations (PTA), delivery of invitation letters to participants and publicizing the INSET through radio and newspapers.

3.1.1 Rehabilitation of INSET Centers

Secretariat gave Divisions the mandate of selecting schools to become INSET centres. The schools were chosen basing on their boarding facilities with good conditions to be able to accommodate 100-200 participa nts, easiness of accessibility to be resource centres, and having laboratories. The number of INSET centres per Division was chosen basing on the number of M/S teachers from each Division. Successful schools were recommended for approval by National Steering Committee which conducted its meeting in July, 2009. 19 Schools were approved as INSET centres.

Table 2: Recommended INSET centres

DIVISION	INSET CENTRE
NED	Chitipa Secondary School
	Mzuzu Secondary School
	Euthini Secondary School
	Mzimba Secondary School
CEED	Chayamba Secondary School
	Madisi Secondary School
	Salima Secondary School
CWED	Lilongwe Girls Secondary School
	Dedza Secondary School
	Mchinji Secondary School
	Namitete Secondary School
SEED	Balaka Secondary School

	Lisumbwi Secondary School
	Mulunguzi Secondary School
SWED	Ngabu Secondary School
	Blantyre Secondary School
	Mwanza Secondary School
SHED	Mulanje Secondary School
	Thyolo Secondary School

Those selected schools were visited by a team from DTED to co nduct an assessment on conditions of physical and material environment to determine areas to be rehabilitated. They used a checklist. The initial assessment started in October, 2 009 with SHED and finished in November, 2009 with CWED. During this exercise, it was discovered that hostels needed to be maintained especially window panes, doors and walls which needed painting, ablution blocks, classrooms, dining halls, laboratories, kitchen and SMASSE offices.

Soon after the assessment was finished the secretariat procured rehabilitation materials which included paint, brushes, doors, locks, bulbs, taps, window panes, putty, light fittings, tube light, crack filler, rocker handle, curtains, shower curtains, hand wash basins, toilet tanks, toilet sits, shower rose turpentine, toilet cistern, sockets and switches. Delivery of rehabilitation materials started on 30th December, 2009 and INSET centres started rehabilitations soon after receiving the materials. Some centres delayed rehabilitation since they wanted to do a thorough work after students had gone for holiday. Before the INSETs, DTED together with respective Divisions visited INSET centres to check how prepared the centres were and some were found to be not ready.

3.1.2 Procurement of INSET Equipment and Materials

Procurement of INSET materials was made by SMASSE secretariat. The following is the list of materials which were procured and delivered to the 19 INSET centres through JICA funding: rehabilitation materials, boarding materials, equipment, stationary, consumables and text books.

In addition to the above materials, each INSET centre was allocated with money amounting to K5, 000.00 which was meant for buying additional teaching and learning materials during the INSET.

Table 3: Shows the summary of total amount of money in kwacha spent on each INSET centre for INSET materials:

DIVISION	INSET CENTRE	AMOUNT (K)	SUB-TOTAL (K)
NED	CHITIPA	3,927,996	**16,824,167**
	EUTHINI	3,935,485	
	MZUZU	4,413,676	
	MZIMBA	4,546,947	
CEED	CHAYAMBA	4,358,824	**12,638,093**
	SALIMA	4,247,945	
	MADISI	4,031,324	
CWED	LILONGWE GIRLS	4,461,139	**19,136,296**
	DEDZA	5,195,696	
	NAMITETE	4,635,258	
	MCHINJI	4,844,203	
SEED	LISUMBWI	921,041	**3,531,927**
	BALAKA	1,096,959	
	MULUNGUZI	1,513,927	
SWED	BLANTYRE	5,706,152	**13,557,435**
	MWANZA	3,846,787	
	NGABU	4,004,496	
SHED	MULANJE	3,903,731	**7,589,200**
	THYOLO	3,685,469	
GRAND TOTAL (MK)			**73,277,118**

For more details see a sample in **Appendix 1.**

3.1.3 Sensitization Meetings of Head teachers and Parent Teacher Associations (PTA) Representatives

Education Division Office and SMASSE secretariat organized sensitization meetings which targeted all schools' representatives (Head Teachers, Deputy Head Teachers) and PTA representatives. These meetings were held from December, 2009 to January, 2010 in all the Divisions. At the end of the meetings 1,261 participants were met. The aims of these meetings were:

- To provide head teachers and members of PTA with opportunity to understand basic information on SMASSE INSET Malawi, and to encourage them to support SMASSE activities.
- To explain the cost sharing Approach to conduct the Divisional INSETs. The approach was adopted for financial system sustainability. The arrangement was that;
  - JICA would provide the initial cost of the INSET activities through procurement of equipment and materials, maintenance of infrastructure such as boarding facilities including painting and repairing of toilets at the INSET Cen tres and

overseas training for resource persons from MoEST and Trainers to strengthen their capacity.

- MoEST would cover the running cost such as meals, facilitation allowance, transport costs for facilitators and teachers from non-cost centres, utilities (water and electricity), and wages for support services
- While schools and community should meet participants' out-of-pocket allowance (MK500 per day) and transport.

Cost sharing approach was chosen because it would ensure sustainability of INSETs and improve teaching and learning of M/S in secondary schools. On other hand Schools and communities will follow-up the progress of teaching and learning in schools as one of their responsibility hence improving the quality of education and economic development of the country.

3.1.4 Budget Formulation and Disbursement

The first draft of the budget for food stuffs, allowances, utilities, services, and transport was made in December, 2009, by DTED together with Division and respective INSET centres basing on the experiences from SEED, 1st and 2nd National INSETs. This first draft was shared to Senior Education and Methods Advisors (SEMA) from all six Divisions during the stakeholder's workshop in January, 2010. The budget was amended several times through consultation with various stakeholders such as SEMAs, Head teachers etc. Secretary for Education and Director of Finance (from MoEST) were communicated through letters and several meetings which were held at different times. The budget was approved by MoEST and advised DTED to continue with the programme of Divisional INSETs.

INSET centre managers were asked to collect quotations from suppliers they already deal with. These quotations were collected through Internal Procurement Committees (IPC) of concerned centres. The quotations were sent to the Ministry through DTED.

Payment of food items, allowances, services, transport reimbursement was to be made through the INSET centres while utilities Ministry was to pay directly to Water Boards and Electricity Supply Commission of Malawi (ESCOM) through cheques.

Budgeted amount of money for each INSET centre depended on the number of expected participants for each centre which the divisions provided. Total budget for all INSET centres was K19, 375,901.53. For more details on the budget see **Appendix 2.**

Disbursement of funds was planned to be made one week before the INSETs begun; however, there was a delay in disbursement of cheques due to some logistical problems.

3.1.5 Invitation of Participants

DTED made necessary communications to all six Divisions to inform DTs and all M/S teachers to attend the INSET which was scheduled from 24th to 28th May, 2010. Divisions also made necessary communications to DTs and participants through letters to their respective schools. The letter indicated that all divisional trainers should arrive at designated INSET centres on

Saturday, 22nd May, 2010 and all participants were advised to arrive at designated INSET centres on Sunday, 23rd May, 2010.

A Press release was also made from 19th to 22nd May, 2010 through Daily Times News paper, Malawi Broadcasting Corporation and Zodiak Radios to invite DTs and M/S teachers to Divisional INSETs. For more information about the news paper and radio advertisements see **Appendix 3.**

3.1.6 Divisional Coordination Committee (DCC) Meetings

Divisions organized DCC meetings that were held in all six divisions chaired by Education Division Managers (EDM) from 26th to 30th April, 2010. Members of these committees included: Principal Education Methods Advisors (PEMA), Senior Education Methods Advisors (SEMA), INSET Centre Managers (Head Teachers), JICA experts and INSET centre Coordinators (representative of trainers). The aim of these meetings was to get the report of how Divisional INSET centres were prepared for conducting INSETs. Centre managers reported to have received INSET materials however; some centres had not finished painting, ground work, fixing sockets, curtains, shower curtains, shower roses, fluorescent tubes and bulbs which they said they were waiting for departure of students.

The following are some of the agreements which were made during DCC:

- INSET centre managers were to speed-up preparation activities so that they finish before the INSET commenced.
- It was agreed that INSET centres should not host students during Divisional INSETs hence; they were advised to conduct holiday teaching during the final week of the holiday.
- INSET centres were to close earlier possibly 19th May, 2010 to allow centres to finalize the preparation activities. This was to be done after getting Ministry's consent on the matter.
- INSET centres were to follow the guidelines on how to use the INSET equipment.
- INSET centre managers were advised to be strict so that participants and trainers keep discipline; sensitize cooks so that they should be smart and that food should be well prepared.
- Certificates were to be prepared and delivered to successful participants after the INSET.

3.2 PREPARATION FOR INSET SESSIONS

In preparation for the 2010 Divisional INSET sessions, DTs from all six divisions (NED, CEED, CWED, SEED, SWED, and SHED) underwent several trainings to strengthen them on how best they could facilitate and manage sessions. Other trainings targeted all trainers, while some a cross section of trainers was targeted so that in return they could brief their fellow trainers in their respective INSET centres. Currently the number of registered DTs is 234 from all divisions.

Table 4: Number of divisional trainers for each division

DIVISION	NUMBER OF DTs
NED	49
CEED	36
CWED	48
SEED	41
SWED	36
SHED	24
Total	**234**

3.2.1 Preparation for Five Divisions

(1) Two National INSETs

The first National INSET started from 25th May to 5th June 2009 at the National INSET Centre -DCE. The purpose of the INSET was to equip DTs with the capacity in preparing, implementing and evaluating Divisional INSETs by acquiring knowledge and skills to: change attitude towards the teaching and learning of mathematics and science, manage INSETs and understand ASEI/PDSI approach as an effective way to teaching and learning of mathematics and science. The INSET was attended by 192 DTs.

The second National INSET started from 4th to 8th January 2010 at DCE. The purpose of this INSET was especially to enhance the skills the DTs acquired in the first National INSET in attitude change towards mathematics and science, understand ASEI/PDSI approach as an effective way to teaching and learning of Mathematics and Science, and expose them to one of the challenging subject topics. The topics were identified during the base line survey that was conducted in September, 2009. The INSET was attended by 177 DTs.

The attendance for the National INSETs varied due to a number of factors which include: lack of commitment of some DTs, on health grounds, some had gone for further studies, problem in communication to the DTs, just to mention a few.

Both INSETs were successful because of managerial support of DCE and the encouragement of high order government officials including the Minister of Education Science and Technology who graced the closing Ceremony.

Table 5: Number of Divisional Trainers who attended National Trainings for each subject

	No. of participants registered For the 1st National INSET	No. of participants registered For the 2nd National INSET
Biology	64	58
Mathematics	64	58
P/Science	64	61
Total	192	177

For more details, see 1st and 2nd National INSET Report.

(2) Kenya Training

A ten member group of DTs (**Two** from each Division except SEED) joined training on *ASEI & PDSI Approach in Mathematics and Science Education for Africa* in Kenya from 21st September to 16th October 2009. The training is organized by Strengthening of Mathematics and Science Education in Western, Eastern, Central and Southern Africa (SMASE-WECSA) network in collaboration with JICA. It was aimed at empowering trainees to start organized teacher skills upgrading based on In-Service Training.

(3) ICT Training

This training was conducted in the five divisions and targeted DTs responsible for the keying in of INSET Evaluation data during divisional INSET. It was arranged to enable them understand each instrument that would be used during INSET and how they could key in the data.

Table 6: The program for ICT training

DIVISION	DATE	VENUE	No. OF PARTICIPANTS
NED	15th February 2010	Katoto Sec. School	8
CEED	16th February 2010	Chayamba Sec. School	6
CWED	17th February 2010	Lilongwe Girls Sec. School	9
SWED	18th February 2010	Blantyre Sec. School	6
SHED	19th February 2010	Mulanje Sec. School	4
Total			33

(4) TOT

In readiness for the implementation of 2 010 Divisional INSETs, a num ber of T oTs were organized for DTs to have a common understanding on how to conduct Divisional INSETs. It was during these trainings that procedures of conducting Divisional INSETs, allocation of DTs at each centre within the division was reviewed, development of session plans for each write-up and logistics for 2010 division INSET were discussed. The trainings were conducted from 6th to 13th May 2010.

Table 7: The programme for TOTs

DIVISION	DATE	VENUE	PARTICIPANTS
NED	06/05/10 (THUR)	KATOTO SEC SCHOOL	26
	07/05/10 (FRI)	MAGHEMO SEC SCHOOL	12
CEED	10/05/10 (MON)	CHAYAMBA SEC SCHOOL	33
CWED	11/05/10 (TUES)	LILONGWE GIRLS SEC SCHOOL	31
SWED	12/05/10 (WED)	CHICHIRI SEC SCHOOL	26
SHED	13/05/10 (THUR)	MULANJE SEC SCHOOL	17
TOTAL			145

3.2.2 Preparation in SEED

SEED being a division in which Phase I was implemented, their preparation was done separately to that of the five divisions.

(1) Development of Write-Ups (TOT)

In preparation for the 2010 SEED INSET, 40 DTs attended a TOT o n 9th July 2009 in order to prepare and develop curriculum. From this training the theme for 2010 SEED INSET was agreed to be *"Planning a tool for effective teaching and learning"*.

Basing on an Open Forum discussion of 2008 SEED INSET, topics for 2010 Divisional INSET curriculum were identified and write-up developers' were chosen.

Table 8: Topics selected and developers chosen for each subject

PHYSICAL SCIENCE		
	TOPIC	**Write- Up Developer**
1	Electricity	Mr. R. Yaya (Domasi Demonstration SS)
2	Power and Machines	Mr. E. Kuzemba (Mangochi SS)
3	Acids and Bases	Mrs. F. Nthumbu (St. Michaels Girls SS)
BIOLOGY		
	TOPIC	**Write-Up Developer**
1	Human Nutrition	Mr. Nyambalo/Mr. Katona
2	Environment (Ecology)	Mr. Nanga/Mr. Mkwapatira
3	Man and Disease	Mr. Somanje/Mr. Chimberenga
MATHEMATICS		
	TOPIC	**Write- Up Developer**
1	Irrational Numbers	Mr. H Dzingo. (Mulunguzi Secondary School)
2	Indices and Logarithms	Mr. P Moyo.(Domasi College of Education)
3	Density and Mixtures	Mr. M Kajawo.(Balaka Secondary School)
HOME ECONOMICS		
	TOPIC	**Write- Up Developer**
1	Textile Technology	Mrs. Mbwembwe.
2	Food Additives	Mr. Kaponda and Mr. Makaika
3	Management of Human Resources in the Home	Mrs. Kamala and Mr. Chamba

Other TOTs were als o organized in order to develop training manuals and plan way forward together so that DTs have a c ommon understanding on the curriculum to be used in 2010 Divisional INSET.

Table 9: Programme for SEED TOTs

DATE	VENUE	No. OF PARTICIPANTS
30th October 2009	DCE	32
18th December 2009	DCE	34
22nd January 2010	DCE	40
23rd April 2010	DCE	25

Note: At initial stage, it was agreed to develop three write-ups per subject. However, two write-

ups were finally developed per subject because the training period was reduced from 2 weeks to 1 week due to change of school calendar.

(2) Intensive Training

This training was conducted from 1st to 5th February 2010 at Malawi Institute of Education. The Training was aimed at:

- Giving opportunity to trainers to rehearse on how they can facilitate the training manuals.
- Making sure that all problems with the manuals were rectified before the actual implementation of the INSET.
- Trying out activities that were featured in the manuals such as experiments.

Though the registered number of trainers in SEED is 41, 26 DTs attended this training. The drop in attendance was due to a number of reasons such as; some went for further studies, lack of commitment of some DTs and some transferred to other divisions.

As a challenge, it was planned for five days but instead it took only three days as DTs went on strike demanding an increment of allowances.

(3) Malaysia RECSAM Training

Two groups of SEED DTs joined training at RECSAM (Regional Centre for Education in Science and Mathematics) in Malaysia. The number of first group was 11 and joined from 30 January to 15 February 2009. Second group was 21 DTs and joined from 13 to 27 November 2009. The training aimed at (1) enhancing understanding of student-centered approach, (2) enhancing capacities of understanding students' ideas including their misconceptions and common mistakes, (3) enhancing understanding of mathematical/scientific thinking, skills and literacy, (4) improving skills of developing teaching/learning materials utilizing locally available resources, and (5) improving facilitation skills especially in leading and concluding discussions.

4. IMPLEMENTATION OF THE DIVISIONAL INSET

The INSET was centered on the following theme: "Attitude change towards the teaching and learning of mathematics and science through ASEI/PDSI approach". The purpose was to instill, in the participants, positive attitude in teaching science and mathematics. SEED had "planning as a tool for effective teaching and learning of M/S" as a theme.

The theme was developed basing on findings of baseline survey conducted from 24th August, 2009 to 30th September, 2009 which noted the following challenges:

- Inability to incorporate activities/experiments in lessons
- Teachers not successfully involving students
- Lack of improvisation of teaching and learning materials

The objectives of the INSET were as follows:

(a) Changing the attitude of participants towards the teaching of M/S
(b) Participants should understand ASEI-PDSI approach as an effective way of teaching and learning of M/S
(c) To expose topics considered challenging to both teachers and learners
(d) To enhance the practice of planning for effective teaching and planning of M/S (for SEED only)

4.1 Meeting of Divisional Trainers

Divisional Trainers arrived at their respective centers on Saturday 22 May 2010. They conducted meetings together with Centre Managers and Centre Coordinators to remind each other of their responsibilities. Trainers were reminded of topics to facilitate. The meetings focused on the need to work as a team, having hard working spirit and discipline. In some centers some DTs did not report for the INSET, hence their topics were shared amongst those present.

4.2 Arrival of Participants

Most of the participants arrived at their respective centers on Sunday 23rd May 2010.On this day the following activities were done:

- Registration of participants
- Distribution of mattresses and mosquito nets and allocation of rooms
- Preparation of opening ceremony by the trainers

All participants were expected to reside at the INSET centre.

4.3 Opening Ceremony

All INSET centres conducted opening ceremonies and the INSET was officially opened by officials from Ministry of Education. In their remarks, they thanked the Governments of Malawi and Japan for planning and organizing the INSET to take place. They also emphasized on the importance of the SMASSE programme as shown by improvement in examination performance of students in SEED and other countries like Kenya.

Participants were encouraged to actively participate so as to improve their teaching capacity in Mathematics and Science, which in turn will improve the quality of Education in Malawi.

Table 10: List of guests of honour for each INSET Centre

DIVISION	INSET CENTRE	OFFICIALS
NED	Chitipa	District Commissioner for Chitipa
	Mzuzu	Mrs Annie Sichinga (District Education Manager)
	Euthini	Mr LR Mwasikakata (District Education Manager)
	Mzimba	Mr DM Thawe (Division Manager)
CEED	Chayamba	Mr TM Mkandawire (PEMA)
	Madisi	Mr SM Musopole (SEMA)
	Salima	Mrs Banda (Acting Division Manager)
CWED	Mchinji	Mr Hauya (District Education Manager)
	Namitete	Mr Matengo (SEMA)
	Lilongwe Girls	Mrs Kaliu (Center Manager)
	Dedza	Mr Billy Banda (District Education Manager)
SEED	Balaka	Mr G Alufandika (Division Manager)
	Lisumbwi	Mr J Kamkuza (PEMA)
	Mulunguzi	Mr G Alufandika (Division Manager)
SHED	Mulanje	Mr C Ziwa (PEMA)
	Thyolo	Mrs H Manda (Division Manager)
SWED	Mwanza	Mr Henry Gwede (District Education Manager)
	Blantyre	Sister Dambo (Division Manager)
	Ngabu	Mrs Carol Moto-Mwale (PEMA)

4.4 Session Facilitation

A day was divided into four sessions. The sessions were categorized into general and subject based sessions.

The general sessions covered findings of the baseline survey, attitude and ASEI/PDSI approach. In the session about baseline survey, participants were enlightened on the current situation of mathematics and science teaching and learning in schools and challenges teachers face in teaching mathematics and science. The main aspects covered included Attitude, students centered lessons, incorporation of activities and experiments in lessons, improvisation in science

teaching, lesson planning , seeing and teachers' willingness to improve. Participants contributed fully in the discussions.

Subject based sessions covered Biology, Mathematics and Physical science for all the Divisions except SEED which had Home Economics as an additional subject.

Table 11: Topics covered during 2010 divisional INSETs

In 5 Divisions

THEME	TOPIC	
	General	**Subject topic**
Attitude change towards the teaching and learning of M/S through ASEI/PDSI approach	Findings of Baseline survey	Mathematics -Arithmetic and geometric progression
	Attitude	
	ASEI/PDSI approach	Physical science -Oscillations and waves
		Biology -Investigative skills

In SEED

THEME	TOPIC	
	General	**Subject topic**
Planning a tool for effective teaching and learning	Planning	Biology -Ecology -Nutrition
		Mathematics -Indices and logarithms -Density and mixtures
		Physical science -Acids and bases -Current electricity
		Home economics -Cleaning aids -Labour saving

During the INSET, participants identified challenging topics, prepared ASEI lesson plans and applied ASEI/PDSI through peer teaching. Constructive critiquing during the peer teaching was followed by positive reactions from the presenters (participants).

4.5 Attendance and Certification

Attendance was good. Out of 3400 Participants expected, 2931 teachers participated (both teachers and trainers) representing 86% attendance rate. Participants were awarded with certificate of attendance based on 90% session attendance. Out of 2722 participants 2258 were certified representing 83.0%.

Table 12: Attendance and number of participants certified for 2010 Divisional INSETs:

	INSET center	Number of trainers	Number of participants (only teachers)	Number of participants (teachers) certified	% (teachers certified)
1	Chitipa	10	135	104	77.0
2	Euthini	9	64	59	92.2
3	Mzuzu	17	256	145	56.6
4	Mzimba	9	127	88	69.3
5	Chayamba	12	162	135	83.3
6	Madisi	12	120	105	87.5
7	Salima	12	140	132	94.3
8	LL Girls	11	190	172	90.5
9	Dedza	11	201	198	98.5
10	Namitete	9	114	109	95.6
11	Mchinji	10	72	66	91.7
12	Mulunguzi	13	131	83	63.4
13	Balaka	10	140	113	80.7
14	Lisumbwi	9	111	102	91.9
15	Blantyre	14	264	228	86.4
16	Mwanza	10	37	32	86.5
17	Ngabu	9	117	112	95.7
18	Mulanje	11	155	148	95.5
19	Thyolo	11	186	127	68.3
	TOTAL	**209**	**2722**	**2258**	**83.0**

In some centers number of participants certified is lower than other centers. This could have been caused by

- Commuters reporting late for sessions
- Lack of seriousness on part of the trainers in administering attendance registers (for higher percentages)
- Absenteeism of participants

Table 13: Certification rate by subject for all the 6 Divisions, based on the 90% session attendance.

	TOTAL	NO CERTIFIED	PERCENTAGE (%)
BIOLOGY	982	817	83
MATHEMATICS	985	827	84
PHYSICAL SCIENCE	755	614	81
HOME ECONOMICS	47	35	74

4.6 General Observations

4.6.1 Successes

(1) Successes on Management

The 2010 Divisional INSET registered a number of successes in the area of management of the INSET. The following are some of the important successes worthy noting from the INSET;

i. Budget

- There was proper formulation and timely submission of budget for food stuffs. The budget was very easy to follow and this eased the work of INSET centre managers.

ii. Facilities and services

- Accommodation of partic ipants in hostels wa s of a n acceptable standard. SEED registered that there has been an improvement in sanitation compared to the standard in previous INSETs.
- The quality of meals was rated good in many centres and SEED reported an improvement in the quality of meals. In addition, meals were mostly served in time which enabled daily programme to go according to schedule.

iii. Human resource

- The realization of the INS ET in all the 19 centres was a success. This was possible because of the good cooperation among all stakeholders in the preparation and implementation of the INSET.
- In many INSET centres, the turn up of trainers and participants was good.
- There was a rep resentative of the Division or Dis trict Education Office during the opening and closing ceremonies of the INSET in the centr es. The prese nce of the officers attached great importance to the SMASSE INSET.

- Most of the participants of the INSET behaved well. SEED reported that there were more disciplined participants compared to past years. The participants properly presented their concerns. Participants understood problems of delayed meals and failure of management to adequately cater for those on special diet. Participants still attended training sessions well, although there were hiccups on transport reimbursement and out of pocket allowance. Therefore, there were no threats of strike in many centres.
- Trainers were also disciplined. Reflection meetings had 100% attendance of trainers. This enabled them to review daily sessions and plan for the next day's sessions.

(2) Successes on Session Facilitation

Facilitation of sessions during the INSET achieved a number of successes as follows;

- There was high team spirit among DTs who were always present in sessions.
- DTs were also organized and prepared thoroughly for sessions. This enabled them to facilitate well.
- DTs observed punctuality and so managed time very well. The planned work was therefore covered successfully and objectives of sessions were achieved.
- DTs exercised shared responsibilities very well.
- The attendance of participants to sessions was high and most of them were punctual and participated actively in the sessions. This resulted in a high percentage of the participants getting the 90% attendance rate required for certification.
- Participants were eager to share and acquire knowledge and they also arranged their own discussions on other professional areas in the evenings.
- Participants' evaluation during the open forum showed that the content of sessions of the INSET captured needs of participants. The sessions also instilled the spirit of teacher helping teacher which they can continuously apply in their schools.
- Participants gained skill in improvisation and confidence to handle challenging topics.

4.6.2 Challenges

(1) Challenges on Management

Management of the INSET met some challenges.

i. Budget

- There was a delay in disbursement of funds for purchasing food items in the INSET centres. This caused panic especially in the first two days of the INSET. INSET managers resorted to purchasing food items on credit and some suppliers demanded cash or cheque before supplying the food stuffs. In some cases it was not easy to get

items like bread, milk and salt on credit. Due to this, the menu was not followed and food could be served late which delayed daily programme.
- Complications in purchasing the food items also arose when a compound cheque was issued for 2 or 3 centres.
- The INSET budget did not consider eventualities for example; there was no provision for transport to hospital or clinic in case somebody falls sick.
- The budget on food items did not include needs of those on special diet.
- Underestimation of budget for transport reimbursement saddened participants.

ii. Facilities and services

- Although rehabilitation was done, sanitation in the hostels was poor.
- There were no dining tables in many centres which forced participants to take food to hostels or eat while standing.
- Some centres had water problems e.g. Lisumbwi, Madisi, Ngabu and Chitipa and in other centres there was no better access to drinking water in the hostels.
- Some centres had no firewood to be used in times of power failure and so meals ended up being served very late.
- Watchmen and drivers were not included in deployment of service providers but played important roles during the INSET.

iii. Human resource

- In some Divisions, there was no proper communication to participants on where to attend the INSET. This resulted in some participants reporting two days after commencement of INSET.
- Participants could not be easily identified by the INSET manager when distributing boarding materials because they had no letter of introduction from Head teachers.
- Some participants were commuting which made them not to be punctual for sessions.
- Some centres had too many participants e.g. Blantyre, Dedza, Mzuzu and Lilongwe Girls while others had few participants e.g. Mchinji, Euthini and Mwanza.
- In a number of centres participants were leaving before end of INSET.
- DTs failed to thoroughly hand over materials in SMASSE room to INSET manager because they were supposed to leave the same day the INSET closed.
- Participants had little knowledge on SMASSE project so they came with high expectations which resulted in them attempting to strike as the cases of Mwanza and Madisi centres.
- Some schools failed to send all the M/S teachers.

(2) Challenges on Session Facilitation

In the 2010 Divisional INSET, there were some challenges met in the facilitation of the sessions.

- Time for exposition of some write ups was not adequate especially in SEED. Some participants felt that too much content was planned so it could not be thoroughly covered in the short period of one week.
- Execution of shared work among DTs was not well done. This did not give some DTs enough time to rehearse sessions so some were just reading through write-up or rushing in their presentations.
- DTs failed to handle different needs of qualified and under qualified teachers. This was more challenging to DTs in centres where the number of participants in subject groups was high.
- DTs failed to clear out participants subject content misconceptions during peer teaching.
- Mode of facilitation is not varied, i.e. using group discussion only.

4.6.3. Open Forum (Requests from participants)

An open forum with the participants was held immediately after participants had filled in the post-INSET and overall evaluation forms on the last day of the INSET. During this time, participants were expressing their evaluation of the INSET in all areas orally. They were also requested to give subject topics that they would like to be discussed in the next INSET.

(1) Requested Topics (in order of priority)

(i) TOPICS IN MATHEMATICS
- Linear programming
- Vectors
- Three dimensional figures
- Probability
- Transformations
- Matrices
- Trigonometry
- Logarithm
- Quadratic functions

(ii) TOPICS IN BIOLOGY
- Genetics and Evolution
- Ecosystem
- Coordination

- Cancer
- Reproduction
- Locomotion (in birds and fish)
- Microorganisms
- Transport in plants

(iii) TOPICS IN PHYSICAL SCIENCE
- Nuclear physics
- Electricity and electromagnetic induction
- Chemical reactions
- Organic chemistry
- Moles and molarity
- Force and motion
- Scientific investigations

(iv) TOPICS IN HOME ECONOMICS (Mulunguzi INSET centre)
- Rechauffe' dishes
- Garment construction process (facing, seams, stitches, methods of controlling fullness, cross way strips)
- Planning and practice for practical work
- Financial management (insurance)

(2) Management

In areas of management, participants requested the following;
- The next INSET should dwell much on subject topics.
- The duration of training should be two weeks. They also wished if the INSET could be held twice in a year.
- For effective application of ASEI/PDSI, peer teaching should be substituted with actualization i.e. using real students.
- Concerned authorities should instruct school management to provide already printed lesson plan formats to science teachers.
- The Secretariat to invite the media to INSET so that the project is publicized.
- Concerned authorities should communicate to schools properly about the INSET.
- Division offices should urge school administrators to support science teachers by providing teaching and learning materials.
- Participants were not happy with the type of accommodation offered. In some centres, they requested partition of shower rooms for their privacy. They also

proposed if the kitchen could be providing hot water to those who were not ready to take a cold shower.

- Provision of pain killers.
- Participants were not satisfied with the quantity of food given.
- Special diet should be catered for.
- They also did not like having tea at break time. They said would prefer soft drinks to tea. They also suggested if buns could be alternated with biscuits or doughnuts as snacks.
- They would be very happy to receive SMASSE T-shirts and certificates during the closing ceremony.
- They requested that out of pocket allowance should be raised from K500 to K1000 per day.

4.7 Closing Ceremony

The closing ceremony for the INSET was scheduled at 10:30 am on the last day. A sample programme for the ceremony was already given to the centres. Guests of honour in the different centres included EDMs, DEMs, PEMAs, SEMAs, or INSET managers. Primary Education Advisors (PEAs), members of PTA or School Management Committee (SMC) and Head teachers of nearby secondary schools were also in attendance in some centres. The director of ceremony was the Centre coordinator or one of the trainers and gave the welcome remarks. The centre coordinator read out names of participants who had qualified for certification. Participants were informed that the certificates will be delivered to them later. Speeches were made by a representative of the participants, INSET manager followed by the Guest of Honour. In their speeches, guests of honour emphasized that participants should go and apply the knowledge and skills acquired in the INSET in their classrooms. The ceremony ended before 12 noon and participants went to take their lunch and then left for home.

5. EVALUATION OF THE DIVISIONAL INSET

INTRODUCTION

According to the Project Design Matrix, the project purpose is that quality INSETs for secondary mathematics and science teachers are provided by Divisional Trainers to improve the quality of teaching and learning of mathematics and science in secondary schools in the country. The May 2010 SMASSE Divisional INSET was organized in order to expose teachers to ASEI/PDSI approach as an effective way to teaching, promote attitude change towards mathematics and science, and enhance effective planning for effective teaching and learning in five divisions and SEED respectively. Evaluation of Divisional INSET was twofold; during the INSET and after the INSET.

5.1. EVALUATION DURING THE INSET

To assess the quality of the INSET provided, two indicators were used and these are; Divisional-Trainers' Evaluation Index and INSET Evaluation Index. Evaluation instruments were developed for each indicator. Four instruments were developed to assess INSET itself (see Appendices 4, 5, 6, 7a and 7b) and two instruments were developed to assess the Divisional-Trainers capacity (see Appendix 8).

Table 14: An Extract of SMASSE Malawi Project Design Matrix

	Indicator	**Evaluation Instrument**
Project Purpose [Quality INSETs for secondary mathematics and science teachers at Divisional level are provided	INSET Evaluation Index	Overall INSET Evaluation Instrument by Participants Overall INSET Evaluation Instrument by Facilitators INSET Session Evaluation Instrument by Participants Pre and post INSET Evaluation by participants
	Divisional Trainer's Evaluation Index	Divisional Trainers' Capacity (from Overall INSET Evaluation Instrument by Participants)] Self Evaluation Instrument by Facilitator

These instruments are analyzed on a five-point ordinal scale (0-4) and interpreted according to the set standards of interpretation. The ordinals are interpreted according to the key **table 15** below;

Key	**Interpretation**
0	Strongly Disagree
1	Disagree
2	Not Sure
3	Agree
4	Strongly Agree

According to the Project Design Matrix, Benchmarks were set against each instrument.

Table 16: Shows the set benchmarks from the Project Design Matrix (PDM)

Evaluation Instrument	**Benchmark by the end of the project**
National/Divisional Trainers' Capacity (from Overall INSET Ev aluation Instrument by Participants)]	3.0
Overall INSET Ev aluation Instrument by Participants	2.5
Overall INSET Ev aluation Instrument by National/Divisional Trainers	2.5
INSET Session Evaluation Instrument by Participants	2.5
Pre and Post INSET Evaluation Instruments by participants	2.5

Therefore the project purpose can be said to be achieved if and only if the mean is equal to or above the set benchmark in the PDM.

Table 17: EVALUATION THROUGH PDM

	Indicator	Evaluation Instrument	**Benchmark**	**2010 Divisional INSET**	Remarks
Project Purpose [Quality INSETs for secondary maths and science teachers at Divisional level are provided.]	Divisional Trainer's Evaluatio n Index	Divisional Trainers' Capacity (from Overall INSET Evaluation Instrument by Participants)] Self E valuation by Facilitator	**3.0**	**3.2** **3.7**	Above the set benchmark
	INSET Evaluatio n Index	Overall INSET Evaluation Instrument by Participants	**2.5**	**3.2**	Above the set benchmark
		Overall INSET Evaluation Instrument by Facilitators	**2.5**	**3.4**	Above the set benchmark
		INSET Session Evaluation Instrument by Participants	**2.5**	**3.5**	Above the set benchmark
		Post INSET Evaluation Instrument by participants	**2.5**	**3.0**	Above the set benchmark

From the figures above it shows that the first Divisional INSET was a success because all the figures in the PDM are above the set benchmarks.

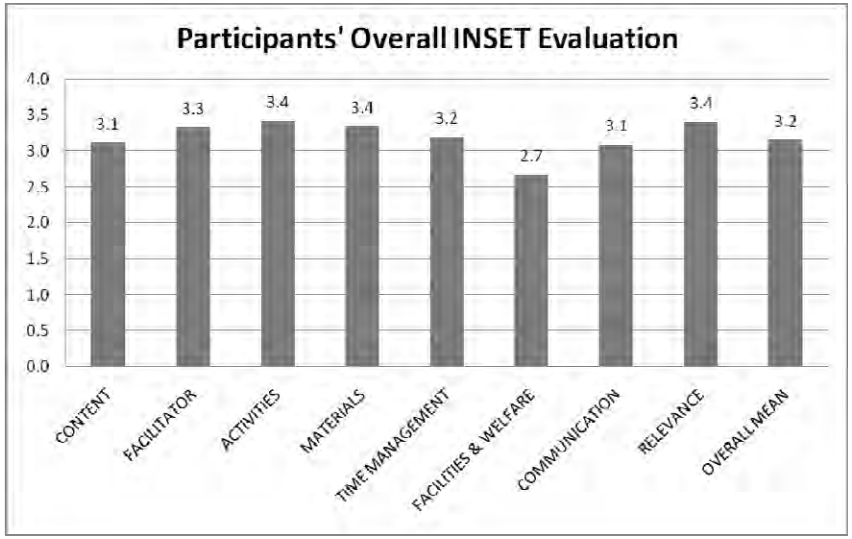
It is important to interpret and analyze the figures in the PDM and this will be done through each instrument. This will help to assess the achievement of the project and find areas that need improvement.

5.1.1. Overall INSET Evaluation by Participants

Going by statistics across the divisions, the overall mean for ev aluation by participants is 3.2 implying that the quality of 2010 Divisional INSET was good because it is above the set bench

mark of 2.5. From this perspective of the evaluation it shows that the purpose of the INSET was achieved countrywide. Participants Overall INSET Evaluation comprised of the following aspects: Content, Facilitators, Activities, Materials, Time Management, Facilities/Welfare, Communication and Relevance.

Figure 1: Summarized results of the INSET Overall Evaluation of Participants



It is important to critically analyze the results on each aspect so as to identify areas that can still be improved.

Content:
This category comprises of items that checks on whether the content of the INSET managed to achieve its purpose and expected out comes and also if it was adequate for the period of one week. Participants in all centres evaluated that the purpose and expected outcomes of the sessions were clear. Looking at individual ratings on quantity of content, participants fairly distributed ratings from strongly disagreeing through not being sure to strongly agreeing that the INSET content was adequate for one week. This means that some were on one hand agreeing that the content was enough while on the other hand, they had wished they utilized this first INSET to learn more, so they indicated 'not sure'. It can also be speculated that the difference in qualification of the participants made their evaluation of the content to be different. The under qualified would need more time to understand the content than the qualified teachers which

would make the former disagree because the content could be too much for them for one week while the latter agree.

Facilitators:
This category has items that check whether the facilitators are conversant with the INSET content or not and whether the facilitators are focused during the sessions or not. It also checks on whether the facilitators are able to manage the group discussions well during the INSET or not. In this INSET DTs were rated 3.3 above the set bench mark of 3.0. This shows that facilitators had a capacity to facilitate well and were focused during sessions however deliberate effort should be made to improve in areas of mastery of content as well as interjecting wherever possible so as to achieve quality discussions in their sessions.

Activities:
This category has items that check if the activities during the sessions are thought provoking. The category also checks whether the activities during sessions are being varied or not, that is, whether both hands-on, minds-on etc type of activities are included. This component was rated highly with an overall mean of 3.4 due to participants' appreciation in the use of participatory methods throughout INSET facilitation.

Materials:
This category has items that checks whether the training materials are effectively and economically used in the sessions or not. It also checks whether the training materials distributed to the participants are of high quality or not. This component was also highly rated to the mean of 3.4. This was due to availability of quality training materials (manuals, stationary etc), that were distributed during the INSET.

Time management:
This category has items that checks whether time management is good during the INSET or not. The results show that time was properly managed as participants and facilitators observed time schedule. Again this was possible due to the assistance of well coordinated support staff in the INSET centres. However it is also noted that some centres such as Balaka and Mulunguzi registered lower mean on time management which came about due to some delays in serving of meals.

Facilities/welfare:
This category has items that checks whether facilities i.e. classrooms, laboratories at the INSET centre are effectively and carefully used during the INSET or not. The category also checks on whether participants' welfare i.e. accommodation, meals etc is up to standard or not. The results for 2010 INSET on facilities and welfare is rated lower (2.7) unlike all categories in the instrument as the rest are rated above 3.0. There were a number of reasons for the participants to

rate this category lower than any, these include: Poor accommodation for participants; Quality and quantity of meals prepared in various INSET centres; The state of ablution block was not quite good in various centres; The welfare of participants left a lot to be desired especially in centres that were isolated.

Communication:
This category checks on whether communication to participants prior to the INSET and during the INSET was effective or not. Participants agreed that communication was properly made in time. As already stated under '**Preparation for the Divisional INSET'**, invitation of participants was well planned and selection of office bearers among participants for presidency, welfare and entertainment on the first day of the INSET created better communication channels between the INSET management and the participants.

Relevance:
This category has items that find out if the INSET content is relevant to the participants needs or not. It checks whether the INSET is able to address participants' needs or not. This category was rated highly as participants saw usefulness of the knowledge gained in the INSET to address the problems they encounter in teaching mathematics and science in their respective schools.

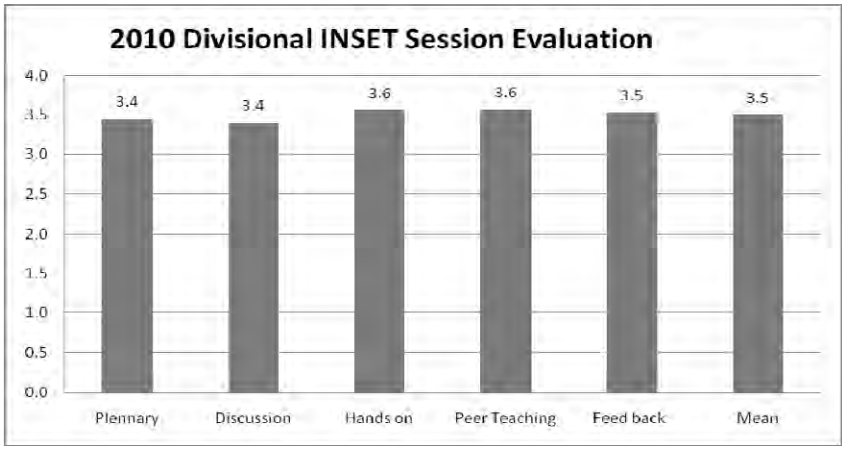
Generally, it was observed that categories that concern facilitation such as content, facilitators, activities, materials, time management, relevance and communication were rated high as opposed to those that concern management such as facilities and welfare. This is because of Cascade Model of curriculum delivery which is deployed in Phase II. The good part of this model is that it is developed at one point by National Trainers (National INSET) and is passed on down to Divisional INSET. In this way quality of materials prepared is maintained.
Areas that involve management were rated lowly as such effort should be made to improve in all areas especially those that are directly related to welfare of participants.

5.1.2 Session Evaluation by Participants

According to the PDM, one of the indicators for quality INSETs is the capacity of Divisional Trainers to conduct INSET which is measured through INSET overall evaluation by participants through items 6 to 10 which evaluates the ability of facilitators in their facilitation. The other instrument used to assess the INSET is through INSET session evaluation by participants.

INSET sessions are evaluated by participants on five components which include: plenary, discussion, hands-on activities, peer teaching and feedback on peer teaching.

Figure 2: Summarized Divisional INSET session evaluation

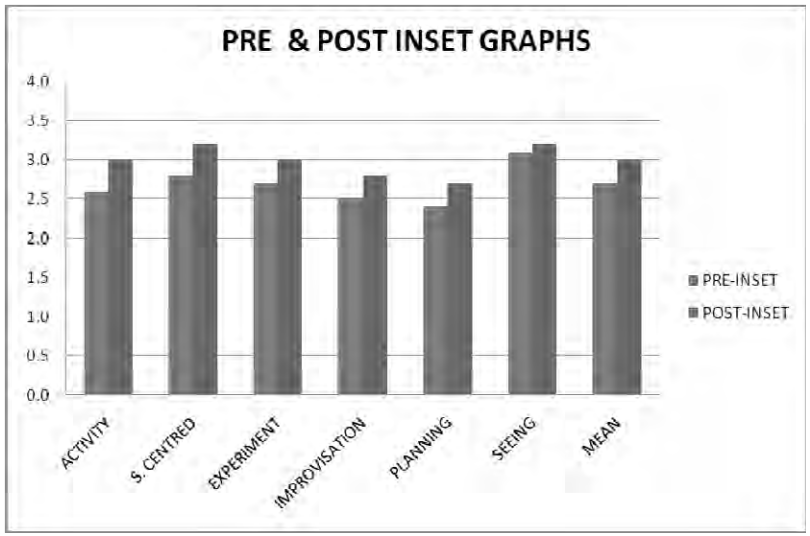


The results from session evaluations for the 2010 Divisional INSET show that the quality of INSET provided was very high. This is indicated by the overall mean of 3.5 which is far above the set benchmark of 2.5. In addition to that the ratings in all divisions are almost the same an indication that INSET offered was of the same quality. This is also an indication that the capacity of DTs in the Divisions is quite good. This implies that participants were satisfied with the training they underwent.

5.1.3. Pre and Post INSET evaluation

In Pre and Post INSET Evaluation, a questionnaire is administered with a purpose of finding out participants' opinion on certain aspects of M/S teaching in their respective schools, before and after participating in the INSET. This is aimed at checking the immediate impact of the INSET on participants' attitude towards key aspects in ASEI/PDSI approach. The Pre and Post INSET evaluations seek teachers' opinions on different aspects which include: activities, student centeredness, experiments and improvisation, planning and seeing.

Figure 3: Summarized results of Pre and Post INSET evaluation



The results show that there were positive changes in all aspects which mean that teacher's attitude before and after INSET were different. The INSET therefore brought about change in teachers' ideas and thinking for positive classroom practices. The results have also indicated that teachers are aware about importance of including activities in the lesson, involving learners, inclusion of experiments where necessary, improvising for a lesson, planning for a lesson and even assessing lesson outcomes. Despite the knowledge of how important planning is, participants still rated it low. One cause may be probably due to the school tradition that secondary school teachers do not require lesson plans. As was indicated by some teachers in baseline survey report, heavy workload of teachers and time consuming could also be the reason for the participants not to like writing of lesson plans.

5.1.4 Overall INSET Evaluation by Facilitators

This is an instrument used by the facilitators to evaluate the INSET. This is done after the INSET has taken place. The instrument has seven categories and these are: Planning, Content, Materials, Doing, Seeing, Improving and General.

Planning: Under this category there are items that checks at the way INSET is planned and organized both by the facilitators and the secretariat itself.

INSET Content: This looks at the relevance of the content and the quality of the training manuals developed whether the INSET content is addressing the need of the participants or not.

INSET Materials: This looks at the effectiveness of the materials in achieving the objectives of the INSET and the adequacy of the materials during the INSET.

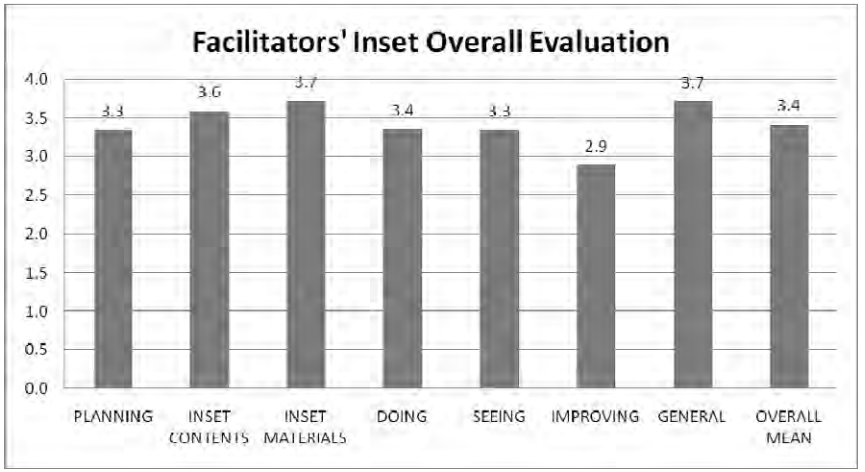
Doing: This checks at how the INSET is implemented and also the uses of other facilities like laboratories etc. It also checks the welfare of the participants, whether the participants are given good accommodation, meals etc.

Seeing: This category includes items that checks whether the facilitators/secretariat are keen enough to check the progress of the INSET. Also checks the ability of facilitators to identify problems during the INSET and being able to solve them so that the INSET is not affected in any way.

Improving: This checks whether the facilitators/secretariat is able to solve problems faced by the participants in the most effective and efficient manner.

General: This checks the general organization, implementation and success of the whole INSET.

Figure 4: Summarized results of Overall INSET Evaluation by Facilitators



From the summary of the results, the overall mean of the INSET evaluation by facilitators is 3.4, which is above the set benchmark of 2.5. This is an indication that facilitators were satisfied with

the way the INSET was organized in all aspects from planning all the way through implementation.

Just like participants, DTs rated all categories highly except those that had to do with management.

According to overall INSET management DTs were not satisfied with the way problems of participants were handled by the secretariat. This is observed almost in all centres that Improving has been rated lowly than any other category. It is therefore advisable that proper channels and means of communication are established between the INSET Centres and Division office in order to improve the state of affairs in implementation centres for quality INSETs.

5.1.5 Facilitators' Self Evaluation

The purpose of this instrument is to enable a DT evaluate oneself about his/her performance in facilitation throughout the INSET. It checks on general preparation made by facilitators before and during the INSET, the way he/she was managing INSET sessions, welfare issues to do with participants, and monitoring of the entire INSET among other things.

According to facilitators they rated themselves highly at 3.7 which is above the participants' rating of 3.3 with a difference of 0.4. This slight difference is indicating that the DTs feel more confident and well prepared to conduct the INSET, more than the participants' views. This is a true reflection that the whole process of preparation for conducting the INSET equipped the DTs with confidence enough to carry out all the duties expected of them very well at the INSET centre.

At this point, it can be concluded that quality INSET has been provided to secondary mathematics and science teachers in 2010 Divisional INSET.

5.2. EVALUATION AFTER INSET

The 2010 Divisional INSET was also evaluated after the INSET. This is done in order to assess the impact of the INSET and identify the needs of M/S teachers to be addressed in the next INSET. The impact of Divisional INSET is assessed through classroom observation. This is done by observing classroom practices in the participants' lessons in their respective schools. This uses lesson observation checklist instrument. See **Appendix 9.** The instrument looks into eight aspects in a lesson. These are; Attitude of teacher during the lesson, Activity, Student centeredness of a lesson, Experiments, Improvisation, Planning, Seeing and Improving. Findings from the classroom observations, upon being evaluated, assist in assessing the extent to which participants apply the knowledge and skills acquired in the INSET. The impact of the Divisional INSET therefore, can be evaluated.

Lesson observation checklist instrument is analyzed on a five-point ordinal scale (0-4) and interpreted according to the set standards of interpretation.

Table 18: The interpreted of ordinates of ASEI lesson observation checklist

Key	Interpretation
0	Not At All
1	A Little
2	Average
3	Adequately
4	A Great Deal

EVALUATION THROUGH PDM

As outlined in the PDM, the set benchmark for the ASEI/PDSI checklist index of 2.5 is to be used in assessing the project overall goal. 2010 classroom observations obtained a mean of 1.6 which is below the set benchmark. The reason for this is that 2010 INSET is the first Divisional INSET so it is a starting point to reaching the goal. This is indicating that there is still some time to realize the goal.

5.2.1 Implementation of Classroom Observations

(1) Programme

The activity of classroom observations was scheduled to take place in five weeks from the 13th of June to the 2nd of July then it continued from the 11th to the 23rd of July 2010. The activity sampled schools from all the six Education Divisions. Three lessons were planned to be observed in a day. A discussion to evaluate the lesson with the teacher followed after every observation. See programme of M&E 2010 in **Appendix 10.**

(2) Target Schools

The programme targeted 72 public secondary schools representing 10% of all public secondary schools in Malawi. See table 19 below.

Table 19: Target Schools for Classroom Observation

DIVISION	APPROVED CDSSs	NON APPROVED CDSSs	GOVERNMENT BOARDING	GOVERNMENT DAY	GRANT AIDED	TOTAL
NED	3	12	1	1	1	**18**
CEED	5	4	1	1	-	**11**
CWED	7	5	1	1	1	**15**
SEED	4	3	1	1	-	**9**
SHED	7	-	1	1	-	**9**
SWED	3	4	1	1	1	**10**

TOTAL	**29**	**28**	**6**	**6**	**3**	**72**
PERCENTAGE	10%	10%	10%	10%	10%	10%

3) Personnel

The secretariat in collaboration with Divisional EMAS conducted the lesson observations in all the six Education Divisions.

(4) Number of Lessons Observed

A total of 67 lessons were observed out of 72. The lessons were observed in Forms 1, 2, 3 and 4. The number of lessons observed was as follows;

Table 20: Number of lessons observed per subject

SUBJECT	NUMBER OF LESSONS OBSERVED
Mathematics	28 (42%)
Biology	22 (33%)
Physical Science	16 (24%)
Home Economics 1 (1%)	

More lessons were observed in Mathematics as compared to Biology and Physical science because the total number of Mathematics periods per week is higher than those of the other two subjects. Home economics is only applicable in SEED INSET and is also an optional subject with a small number of periods per week.

It was not possible to observe all the lessons because school programme was disturbed by some eventualities in some schools, and at an other school students had already started writing examinations.

(5) Procedure

All personnel involved were observing a lesson together using ASEI/PDSI checklist. In addition to this, common characteristics of lessons were summarized for each lesson obse rved. See **Appendix 11**. These were meant to give a general overview of mathematics and science lessons in Malawi which can be utilized in developing strategies for improvement. After every observation, there were discussions with the teacher. These were meant to continue the process of lesson improvement which was started in the INSET. It was also aimed at giving guidance to

teachers on how they can use the school situation by observing each others' lessons so that they improve.

At the end of a day 's observations, the personnel discussed one of the lessons observed. They were also developing improved lessons from them.

5.2.2 Findings from Classroom Observations

The Project Document stipulates the use of c lassroom observations in assessing the impact of Divisional INSETs. This can be done by comparing results of 2010 classroom observations with those of baseline survey.

(1) Comparison with Results of Baseline Survey

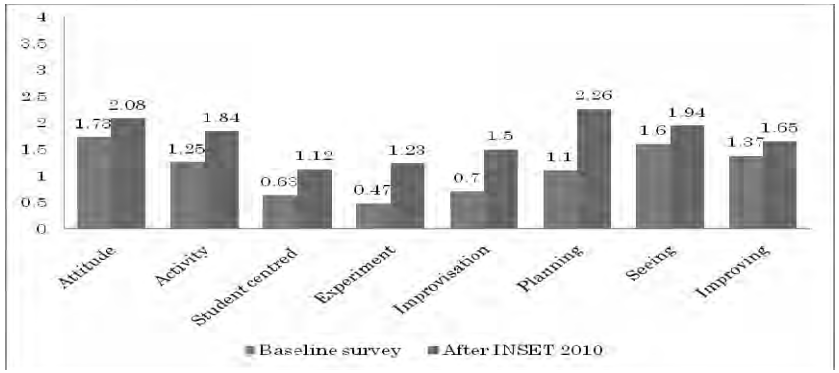
Table 21 shows results of classroom observation during baseline survey and after 2010 divisional INSET.

Table 21: Summarized results of comparison between classroom observation during Baseline survey and after 2010 Divisional INSET

	Baseline survey	After 2010 INSET
Results of classroom observation	1.1	1.6

The mean for the checklist after 2010 INSET is higher than the mean obtained during the baseline survey. This shows that the INSET had a positive impact on how teachers handle lessons. The INSET had managed to change the attitude of the teachers towards the teaching and learning of M/S.

Figure 5: Comparison of results on each aspect of the ASEI/PDSI checklist with the baseline survey for all the six Divisions



Based on the information above, the following are the observations

- There is improvement in all the eight attributes of the ASEI/PDSI checklist.
- Despite the improvement, all the attributes are below the set benchmark of 2.5 for the overall goal. As expected, the one week INSET is not enough to bring about much change considering the fact that change takes time.
- Teachers are able to plan their lessons especially after being informed of the lesson observation exercise in advance.
- There is greater improvement in conducting experiments and improvisation. This can be attributed to a positive change in attitude towards the teaching and learning of mathematics and science after attending the INSET. However, performance in these two aspects still remains significantly lower in the ASEI/PDSI checklist. Teachers could not initiate the process of deducing theories/concepts from the experiments and had problems relating experiments to theories/concepts clearly. This might be due to lack of skills in experimentation coupled with inadequate resources and lack of skills in improvisation.

It is important to analyze these results basing on each aspect of the categories.

1. Attitude

Despite showing little improvement, teachers' attitude is slightly above average. Teachers were mostly showing that they were comfortable handling the subject matter as well as the students. They were also mindful of involving both boys and girls in the class. Some of the teachers were not very sympathetic to problems of learners especially when they give incorrect answers. They rushed to explain correct concepts or give correct answers without allowing students to think. Teachers are starting to learn how to cope with the situation where they allows tudents to

contribute more in the lesson. They are now in the mid way of teacher-centered and student-centered approach in terms of how to respond to students problems in the classroom.

Generally, the attitude of the teachers during teaching is good. This is an indication that the INSET had a positive impact on the attitude of the teachers which was the theme of the Divisional INSET. The improvement of attitude is a very good starting point for the teachers to make Mathematics and Science lessons to be more student-centered.

Table 22: Comparison of results on Attitude between Baseline survey and lesson observation after 2010 Divisional INSETs

Attitude		Baseline	After INSET 2010
1	Did the teacher appear to be enjoying the teaching?	2.0	2.4
2	Was the teacher sympathetic to the problems/needs of each student?	1.5	1.8
3	Did the teacher exercise patience with students?	1.6	1.9
4	Was the teacher gender-sensitive?	1.8	2.1

2. Activity

As evidenced from the graph, teachers show that they are beginning to learn how to incorporate meaningful activities in the lessons as they had learnt from the INSET. Teachers were able to incorporate some activities of average relevance to the lesson topic but had problems in engaging the students in the activities. This was mostly because instructions for the activities were not very clear to the students or the nature of activities did not provoke students' thinking. As such, points of discussions could not come out clearly to the students which affected the meaningfulness of the activities in the lesson.

For example, one teacher managed to prepare an activity to derive formula for probability using tossing of coin to record number of events and possible outcomes. Students were stranded in the groups because instructions were not very clear. They therefore made a lot of noise disturbing

the lesson. The teacher upon failing to instruct one group after another ended up giving out the formula.

Table 23: Comparison of results on Activity between Baseline survey and lesson observation after 2010 Divisional INSETs

Activity		Baseline	After INSET 2010
5	Did the teacher incorporate activities for students into the lesson?	1.5	2.1
6	Did the teacher successfully engage students in the activities?	1.3	1.8
7	Did the activities arouse students' interests?	1.3	1.9
8	Were the activities meaningful for enhancing students' understanding?	1.3	1.8
9	Did the teacher give students appropriate tasks for discussions?	0.9	1.6

3. Student centeredness

Teachers have improved in conducting students centered lessons, though rated the lowest.

Most teachers allowed students to;

- show something, especially subject content which they already learnt to the whole class or groups
- present results of activities

However, teachers still have problems in

- using students' prior experiences from daily life
- allowing students to;
  - explain their ideas related to the content
  - come up with own predictions or suggestions in the lesson with reasons
  - discuss differences in their predictions
  - verify their predictions by themselves
  - present and discuss their observations with explanations
  - evaluate the lessons by showing what they learn or not.

Teachers were able to summarize the activities but mostly the summaries were very short with no clear explanations of concepts learnt in the lesson.

Table 22: Comparison of results on student Centeredness between Baseline survey and lesson observation after 2010 Divisional INSETs

Student-Centred		Baseline	After INSET 2010
10	Did students do anything to show the whole class or the group?	1.1	1.9
11	Did students give their prior experiences or explain their ideas related to the content?	0.9	1.5
12	Did students come up with their own predictions/suggestions for concepts/theories/rules/ methods etc. in the lesson?	0.6	0.8
13	Did students discuss the difference in their own predictions/suggestions?	0.3	0.4
14	Did students verify their predictions/suggestions on their own?	0.3	0.5
15	Did students present their own observations/results of their activities?	0.6	1.6
16	Did students discuss the differences in their observations/results of their activities?	0.4	0.7
17	Did the teacher summarize the lesson by giving clear explanation?	1.0	1.4
18	Did students evaluate the lesson?	0.2	1.1

4. Experiments

Teachers rarely conducted experiments. 8 lessons out of 67 included experiments; such as refraction of light, testing organic compounds, probability, testing acids and bases, determining focal length of lens, identifying exothermic or endothermic reactions, identifying physical or chemical reactions and osmosis. During baseline survey, only 4 lessons out of 74 included experiments. There was improvement in the number of lessons that included experiments.

However, it was observed that students didn't have opportunities to conduct experiments in some lessons although the experiments were necessary to understand the concepts clearly. For

example, in one lesson, the teacher tried to demonstrate movement of water and salts in plants by digging up roots of some plants and cutting stem of a pumpkin plant to see water inside it. This could have been well illustrated through an experiment of dipping freshly cut stems with leaves in coloured water and leaving for 20 minutes then cutting longitudinally to see movement of the dye.

Where experiments were done very few teachers could allow students to deduce theories /concepts from activities.

For example 1, in the lesson where students experimented on refraction of light, students just observed and reported that the ruler appeared bent when dipped in water. The teacher did not provide instructions in steps for the students to think on the reasons why the ruler appeared bent. Such type of instructions if provided could allow the students to deduce the concept of what happens to light as it passes from one medium to another.

Example 2, in order to experiment exothermic and endothermic reactions, a teacher gave meaning of the two terms and allowed groups to conduct the experiment, feeling the temperature of the beaker with reactants instead of using a thermometer. Students could have been allowed to deduce the concept if they were allowed to conduct experiment using a well laid down procedure where the initial temperatures of reactants and products are measured. Then students could have been able to suggest definitions of the terms at the end.

Example 3, in the lesson where students reacted alkene with bromine, students just observed the colour of bromine was disappeared. The teacher didn't provide an opportunity to students to think why the colour was disappeared. The teacher also didn't explain because alkene has double bonds and bromine reacts with the double bonds.

Table 24: Comparison of results on Experiments between Baseline survey and lesson observation after 2010 Divisional INSETs

Experiments (i.e. Activities to Verify the Predictions/Suggestions of the Students)		Baseline	After INSET 2010
19	Was an experiment conducted?	0.6	1.6
20	Did students deduce theories/concepts from the experiment?	0.3	1.0
21	Did the teacher relate activities to theories/concepts clearly?	0.4	1.3

5. Improvisation

Improvisation is a challenge to many teachers. A lot of teachers could not use materials available in students' immediate environment. Examples are;

- Teacher could not request students to bring samples of food stuffs from their homes to use in learning about nutrition.
- Teacher could not use students to demonstrate excretion by breathing onto a glass surface (may be using classroom window panes) to give examples of excretory organs and products.
- Not illustrating physical digestion by allowing students to chew some groundnuts.
- Using only laboratory acids and bases as unknown solutions in an experiment to identify acids and bases while local acids like lemon juice, solution from baobab fruit and water as well as local bases such as *chidulo* and soap solution could also be used.
- Teacher did not use houses close to the school for students to identify and describe bottled, *libanda* and *ngomi* types of houses.

Most of the improvisations observed were in form of using locally available resources (seems to be contradicting with above) e.g. use of clear plastic bottles cut as beakers. However, teachers did not use improvised equipment where necessary.)

For examples,

- In an experiment of identifying solutions as bases or acids, the teacher only provided beakers as containers for solutions which made the groups to be very large. If test tubes, conical flasks, measuring cylinders or cups could be used to improvise for the beakers, there could have been many groups which could increase individual participation in the experiment.

In an activity to find volume of irregular object, calibrated beakers or jugs could be used in addition to the measuring cylinders so that the number of students per group could be reduced.

Table 22: Comparison of results on Improvisation between Baseline survey and lesson observation after 2010 Divisional INSETs

Improvisation		Baseline	After INSET 2010
22	Did the teacher simplify methods for activities, in consideration of efficient resource use?	0.9	1.7
23	Did the teacher utilise materials available in students' immediate environment?	0.7	1.6

24	Did the teacher use improvised equipment/materials for activities?	0.5	1.3

6. Planning

There is a great improvement in planning which has a mean of 2.3 from 1.1. Teachers are able to prepare lesson plans. The lesson presentation in many cases was orderly from introduction through development to summary of the lesson. However, teachers still need improvement in designing lessons where the development part can make students think/come up with concepts and also in preparing appropriate materials for student-centered lessons.

Table 25: Comparison of results on Planning between Baseline survey and lesson observation after 2010 Divisional INSETs

Planning		Baseline	After INSET 2010
25	Did the teacher prepare a lesson plan?	0.5	3.1
26	Was the lesson presentation well organised (not in a haphazard way)?	1.9	2.2
27	Did the teacher prepare appropriate materials for students' use?	1.0	1.7

7. Seeing

There is a slight improvement in the performance of teachers in this category. Most of them, being professional teachers, have mastered the skill of paying attention to students' progress as well as keeping good eye contact during teaching. Teachers were also asking questions to students mainly where content to be learnt related to some concepts that were already learnt.

Teachers rarely invited questions from students in the course of the lesson. In the few cases where this was done, it was at the end of the lesson. This is evidence that teachers are still having some aspects of teacher centered lessons.

Table 22: Comparison of results on Seeing between Baseline survey and lesson observation after 2010 Divisional INSETs

Seeing		Baseline	After INSET 2010
28	Was the teacher paying attention to the progress of students during class work?	1.7	2.2
29	Was the teacher keeping good eye contact?	1.9	2.3
30	Did the teacher invite questions from students in the course of the lesson?	1.1	1.2
31	Did the teacher ask the questions to check the level of students' understanding?	1.6	2.0

8. Improving

Teachers' performance in 'improving' is below average. Teachers are not used to adjusting lessons or rephrasing questions instructions given to students. In many cases, teachers were not adjusting because they were not able to evaluate the performance of learners in the various instructions given in the lesson.

After lessons, most teachers said "The lesson was good" and "The objectives were achieved". In general, teachers did not review their lessons critically.

Table 26: Comparison of results on Improving between Baseline survey and lesson observation after 2010 Divisional INSETs

Improving		Baseline	After INSET 2010
32	Did the teacher rephrase questions/instructions where necessary?	1.5	1.8
33	Did the teacher give further guidance to students on activities?	1.4	1.9
34	Did the teacher adjust the lesson where necessary?	0.9	1.3
35	Was the teacher able to indicate some points to improve?	1.5	1.6

(2) General Characteristics of Lessons Observed

In many of the lessons observed, teachers were mindful of go ing from introduction to development of the lesson, but they were not very conscious to giving clear summaries of the lesson. The following are good points and areas to be improved in the lessons**.**

Introduction: Most teachers revised previous lessons by asking questions and went straight to the Development.

Good points;

- The previous knowledge asked was related to concept to be learnt in many of the lessons observed.

Areas to be improved

- Teachers need to link previous knowledge given by students to the concept to be learnt in the lesson.
- Introduction should be relevant to lesson topic.
- It should not be long
- There is need to vary style of introducing lessons not only using question and answer.

Development: teachers were first giving out the concept to be learnt in the lesson and allowed students to do an activity using given instructions and then summarised the activity.

Good points

- Teachers showed that they appreciate the importance of participatory approach by including activities in their lessons that were done in groups with the supervision of the teacher. They also allowed the groups to present findings or di scussions from the activities.
- Teachers involved both boys and girls in their lessons.
- There was an attempt by many to give rationale of lesson and use examples from daily life.
- The lesson flow and chalkboard work was mostly good.
- Teachers could reward students giving positive responses in reinforcing them.
- Most teachers were confident in subject matter and appeared to be enjoying the teaching.

Areas to be improved

- Teachers need to allow students to predict or give suggestions.

- Teachers needed to ask students to explain their predictions suggestions and results of activities.
- Teachers should allow students to deduce theories/concepts from activities/experiments.
- Teachers need to clarify concepts at the end of activities and discussions.
- They also need to correct misconceptions by even using contributions from other students.
- Teachers should use misconceptions to clarify concept to be learnt.
- They should discourage chorus answers.
- Teachers need to give clear instructions for activities before students go in groups.
- Teachers need to vary type of activities in a lesson and mode of involving learners.

Summary: most teachers were not conscious to giving clear summaries of the lesson. In cases where it was done, they summarized by asking questions on concept learnt in lesson.

Good points:

- Most teachers could indicate next lesson or give assignment on covered work to make students work after classes.
- Students were given chance to ask questions at the end of the lesson.

Areas to be improved

- Teachers should be conscious of giving a summary at the end of the lesson.
- Teachers should identify areas students understand and those they don't so that they give clear explanations.

Other observations:

- Some teachers showed lack of enough content knowledge
- Poor time management e.g. lesson ending before time, single lesson extend to double lesson
- Poor questioning techniques and inability to manage classes well
- Giving too much content in one lesson
- No variations in teaching methods
- Laboratory safety measures not adhered to.
- Teachers not correcting students wrong answers
- Rationale missing in some lessons
- Teachers giving unclear instructions to students
- Many lessons were repeated and/or staged lessons

6. CONCLUSION

The results show that the Divisional INSET was a success and of high quality as evidenced by the overall means in all the instruments which are above the set benchmarks for all the indicators. This shows that preparations for the 2010 INSET were well-done. It also indicates that the quality of facilitation was very high with relevant content.

Classroom observation results also indicate improvement compared to baseline survey which is a step ahead towards achievement of the overall goal of the project. However teachers lack skills in incorporating activities that are thought provoking which illustrates the fact that the INSET impact in classroom is still low.

In lieu of this it can be said that the INSET equipped mathematics and science teachers to plan and teach using ASEI/PDSI approach with a positive attitude.

7. RECOMMENDATIONS

If the quality of INSETs is to be sustained so as to bring about desirable classroom practices the following recommendations should be considered:

To MoEST

- MoEST should be ready to disburse funds for Division INSETs a week before the INSET.
- To encourage school/cluster leaders to be organizing school-based/cluster INSETs for teachers.
- The authorities should consider reviewing the current amount of Out of Pocket allowance for this has been the concern from participants.

To Education Divisions

- Divisional Coordinators should also make sure that DTs are co mmunicated about all INSETs in time and get feedback about their confirmations.
- Divisions should be encouraged to notify the participants well in advance about any forthcoming Divisional INSET and details should be clear. i.e. Which subject they are supposed to attend, where to go(Venue), Number of teachers from each school, etc.
- Divisions should arrange a vehicle to serve during Divisional INSET at each centre for assistance during INSET in case of eventualities.
- Division in collaboration with INSET Managers should come up with transport estimations for participants from non cost centres.
- Divisional Coordinators should work hand in hand with the Divisional Planning Office to have real statistics of science teachers in their Divisions for easy planning.

- Invited guests for opening or closing ceremonies should include members of PTA, Head teachers of nearby schools etc.
- There is need for thorough needs assessment of the INS ET centres before commencement of the INSET and efforts should be made to make sure that schools continuously maintain the centres after rehabilitation.

To INSET Centre Managers

- INSET centres should send 3 copies of quotations to MoEST to quicken the process of funding for the INSET.
- Centre Managers should train the catering personnel to improve on quality of meals and sanitation of the kitchen.
- Centre Managers should make sure that they maintain the rehabilitated status of INSET Centres for better accommodation of participants especially the ablution blocks.

To Head Teachers

- School administrators should communicate everything from SMASSE sensitization proceedings. Teachers should be m ade aware that SMA SSE is geare d for capacity building for all science teachers to improve their professionalism.
- Head teachers should encourage their participating teachers to be accom modated in the hostels for maximum gain from INSET.
- Head teachers and Hea ds of Departments should encourage their teac hers to ac tualize knowledge and skills they gain through INSET at classroom levels.
- Head teachers and Heads of Departments should promote class room observations among teachers in order to improve their teaching skills.

To Secretariat

- Secretariat needs to intensify on TOTs that dwell much on INSET curriculum to strengthen DTs capacity
- EMAS from Ministry Head quarters and Divisions should evaluate INSETs using the instruments for external evaluation

＜上位目標(b)： ASEI/PDSI チェックリスト＞

SMASSE INSET MALAWI LESSON OBSERVATION CHECKLIST

INTERPRETATION

KEY: 0 – Not At All; 1 – A Little; 2 – Average; 3 – Adequately; 4 – A Great Deal; N/A – Not Applicable

		Interpretation
Attitude		
1	Did the teacher appear to be enjoying the teaching?	This is rated on impression that the teacher gives to the observer, it includes how the teacher looks prepared for the lesson, how he/she starts the introduction of the lesson
2	Was the teacher sympathetic to the problems/needs of each student?	This is rated on how the teacher takes care and handles the need for each student from the beginning of the lesson until the end.
3	Did the teacher exercise patience with students?	This rated on how the teacher handles slow learners, students' misconceptions and the use of T/L materials by all the students. How long does the teacher wait after posing a question to students?
4	Was the teacher gender-sensitive?	This is rated on how the teacher involves all students regardless of their sex, it could also be rated from examples that the teacher selects. This is applicable even in a single sex class.
Activity		
5	Did the teacher incorporate activities for students into the lesson?	This is rated using the availability/presence of activities in a lesson, clarity of instructions used.
6	Did the teacher successfully engage students in the activities?	This is rated on how the teacher engages the learner in the lesson, does the activity make the students think and how does the teacher use learners thoughts, ideas, responses, suggestion in making them understand the concepts.
7	Did the activities arouse students' interests?	This rated on how eager students are to do the activity ;it could be evidenced by how curious students are in answering questions, the numbers of questions they ask, time they take to finish the activity.
8	Did the activities meaningful for enhancing students' understand?	This is rated on how the activity is bridged/linked to the development of the concept.
9	Did the teacher give students appropriate tasks for discussions?	This is rated on how appropriate the task is to the students; it includes the level of students, vocabulary used e.t.c
Student-Centred		
10	Did students do anything to show the whole class or the group?	This is rated from the interaction among students in a class when carrying out an activity, how they share what they are doing or have done to each other: it could be through presenting what they have to the whole class, groups, pairs. It should be noted that when a student responds to a question to a teacher is showing what s/he thinks to the whole class.
11	Did students give their prior experiences or explain their ideas related to the content?	This is rated on whether learners are given chance to explain the experiences that they have from either the previous lesson or their daily life that are related to the concepts that they are going to learn in a lesson
12	Did students come up with their own predictions/suggestions for concepts/theories/rules/ methods etc. in the lesson?	This is rated on how students express their thoughts on what they think about the concepts/theories/rules they are going to learn. Are students given chance to make suggestions/predictions for theories/concepts/rules/definitions/methods before they carry out the activity that leads to the development of the concepts.
13	Did students discuss the difference in their own predictions/suggestions?	This is rated according to how the students discuss the differences in their explanations to suggestions/predictions/rules/methods/definitions that they make before they do the activity/experiment.
14	Did students verify their predictions/suggestions on their own?	This rated by looking at whether the learners conduct an activity to verify their suggestions/predictions on their own.
15	Did students present their own observations/results of their activities?	This is rated on how students present their results to others; Does their presentation show that they understand the concepts. Do they explain their results to the class, group or each other clearly?
16	Did students discuss the differences in their observations/results of their activities?	This is rated on how the students discuss the results found from their activities. Are students given chance to compare their findings/results and does it assist them in understanding the concepts?
17	Did the teacher summarise the lesson by giving clear explanation?	This is rated on how the teacher summarises the students' findings, how the teacher does handles or correct misconceptions from the students in the lessons. How does the teacher use students responses to make them understand the concepts/theories etc,
18	Did students evaluate the lesson?	This rated on whether students are given chance to rate the lesson: This could be done by asking what they have learnt in the lesson, whether the lesson was interesting or not: It should be noted that if students say they enjoyed the lesson or not doesn't give enough information about how they the quality of the lesson-the teacher should probe by asking question like which part was more challenging/interesting
Experiments (i.e. Activities to Verify the Predictions/Suggestions of the Students)		
19	Was an activity/experiment conducted?	This is rated on whether an activity/experiment was conducted. It should be noted that experiment could be conducted even in Maths lessons (This where learners predict/suggest and verify.
20	Did students deduce theories/concepts from the activity/experiment?	This rated on whether learners are able to deduce theories/concepts from the activity or experiment
21	Did the teacher relate activities/experiments to theories/concepts clearly?	This is rated on how the teacher bridges the experiment to the concept/theory.
Improvisation		
22	Did the teacher simplify methods for activities, in consideration of efficient resource use?	This is rated on how the teacher puts effort to simplify methods/T/L materials used in the lesson. It rates how efficient the teacher uses the methods and resources.
23	Did the teacher utilise materials available in students' immediate environment?	This rates the teaching and learning using locally available resources-this are the materials in learners environment i.e. those materials that the learners interact with in daily life.
24	Did the teacher use improvised equipment/materials for activities?	This rates the use of materials used when conventional materials are not available, use of conventional equipment for purposes they were not intended for and use of materials chemicals in smaller materials.
Planning		
25	Did the teacher prepare a lesson plan?	This checks the availability of a lesson plan.
26	Was the lesson presentation well organised (not in a haphazard way)?	This rates the flow of the lesson from introduction development of the lesson and conclusion.
27	Did the teacher prepare appropriate materials for students' use?	This rates the materials used, can they assist to achieve the objectives, are they appropriate for a particular level of students, does it attract students interest?
Seeing		
28	Was the teacher paying attention to the progress of students during class work?	This rates on how the teachers checks on the students' learning. This could be by asking questions, guiding students individually, in groups or pairs as they are carrying out the activities.
29	Was the teacher keeping good eye contact?	This rates on how the teacher checks the behaviour of each student in a lesson, involves all students
30	Did the teacher invite questions from students in the course of the lesson?	This rates on how often the teacher gives opportunity to students to ask questions at every step in the lesson.
31	Did the teacher ask the questions to check the level of students' understanding?	This rate on the type of questions that the teacher asks to check students' understanding. Does the teacher ask questions in the course of the lesson (Formative evaluation) and after the lesson (summative evaluation)
Improving		
32	Did the teacher rephrase questions/instructions where necessary?	This checks on whether the teacher make efforts to improve on the instruction/questions/methods/procedure to make students understand in the lesson.
33	Did the teacher give further guidance to students on activities?	This is rated on how students help groups, class and individuals to conduct and understand what they are supposed to do in the activities.
34	Did the teacher adjust the lesson where necessary?	This rate on how the teacher varies the procedures/ methods/time in a lesson.
35	Was the teacher able to indicate some points to improve?	This rates the quality of the teachers self evaluation that can assist in improving the lesson that he has presented. This is usually done at the end of the lesson.

General Comments:

＜プロジェクト目標： INSET 質指標(1) 参加者による研修の全体評価指標＞

SMASSE INSET MALAWI
INSET for Maths/Science Teachers in Secondary Schools
INSET Overall Evaluation Questionnaire

INSET Centre: _____

Qualification	B. Ed. or M. Ed.		Subject(s) currently teaching	Biology		Years of teaching experience at Secondary	Less than 3 yrs	
	UCE			Physical Science			3 – 5 yrs	
	Dip. Ed.			Mathematics			6 – 10 yrs	
	MSCE						More than 10 yrs	

The purpose of this questionnaire is to evaluate the INSET participants' overall opinion on the INSET in which they participated.

Please consider each of the following statements and indicate the response that reflects your opinion about the INSET by ticking (✓) the appropriate column on this sheet.

Key: 0 – Strongly Disagree; 1 – Disagree; 2 – Not Sure; 3 – Agree; 4 – Strongly Agree

		0	1	2	3	4
1	The purpose of each session was clear.					
2	The expected outcomes of each session were clear.					
3	The purpose and expected outcomes of each session were generally achieved.					
4	The content of the INSET was adequate in quantity for 1-week sessions.					
5	The INSET taught me lots of new things I had never known so far.					
6	Facilitators were fully conversant with the contents of their sessions.					
7	Facilitators were focused during their sessions.					
8	Facilitators guided group activities well.					
9	Facilitators interjected at the right time during their sessions (e.g. to keep the groups focused, etc.)					
10	Facilitators were keeping good eye contact on participants.					
11	The quality of participation (of the participants in the sessions) was high.					
12	Participatory approach was frequently used during the INSET.					
13	Variety of activities (hands-on, minds-on, presentations etc.) were included during the INSET.					
14	The size of groups was suitable for the group activities.					
15	Visual aids for the sessions were effectively used.					
16	The training materials were distributed adequately.					
17	The training materials were used effectively (i.e. to achieve intended objective).					
18	The training materials were used efficiently (i.e. economic use).					
19	The quality of the distributed write-ups was high.					
20	The distributed write-ups were useful during the INSET.					
21	The distributed write-ups will be useful during my ordinary classroom teaching.					
22	Punctuality was observed during the INSET.					

23	During the whole INSET, time management was good.					
24	The use of the room for general sessions (i.e. hall) was appropriate.					
25	The use of the room for subject-based sessions (i.e. classroom) was appropriate.					
26	The use of laboratories was appropriate.					
27	Meals were acceptable.					
28	The state of accommodation (beds etc.) was acceptable.					
29	The state of ablution block was acceptable.					
30	The welfare of the participants was well taken care of.					
31	The problems the participants faced were properly handled by the facilitators.					
32	Prior to the INSET, communication regarding the INSET was properly made in time.					
33	During the INSET, necessary information was properly given to the participants in time.					
34	The INSET was relevant to my needs in relation to math/science teaching.					
35	The INSET was effective for addressing the problems I had been facing in my math/science teaching.					
36	It was worth attending this INSET.					

Please give us freely your comments on the INSET.

Thank you for the thought, time and effort you have put into completing this questionnaire!

＜プロジェクト目標： INSET 質指標(2) ファシリテーターによる研修の全体評価指標＞

SMASSE INSET MALAWI
INSET for Maths/Science Teachers in Secondary Schools
INSET Overall Self-Evaluation Checklist

INSET Centre: Subject:

The purpose of this checklist is to evaluate this INSET by compiling the viewpoint of the INSET organisers (facilitators) themselves.

Please consider each of the following statements and indicate the response that reflects your opinion about this INSET by ticking (✓) the appropriate column on this sheet.

Key: 0 – Not at all; 1 – A little; 2 – Fairly adequately; 3 – Adequately; 4 – To a great extent

	PLANNING	**0**	**1**	**2**	**3**	**4**
1	Planning for the INSET was properly done.					
2	Tasks were equitably and fairly distributed among the Divisional Trainers during the preparation of the INSET.					
3	The deadline for each task was clearly given to the Divisional Trainers.					
4	The number of preparatory meetings for the INSET was enough.					
5	The attendance for the preparatory meetings was good.					
6	Prior to the INSET, communication regarding the INSET was properly made in time.					
	INSET CONTENTS	**0**	**1**	**2**	**3**	**4**
7	The content of the INSET was adequate in quantity for 1-week sessions.					
8	The content and/or approach of the INSET was original and innovative (i.e. something new) for the participants.					
9	The content of the INSET was relevant to the needs of the participants in relation to math/science teaching.					
10	The timetable for the INSET was appropriate.					
11	The purpose of each session was clear.					
12	The expected outcomes of each session were clear.					
	INSET MATERIALS	**0**	**1**	**2**	**3**	**4**
13	The write-ups and other materials for the INSET were produced in time.					
14	The write-ups and other materials for the INSET were adequate (in quantity).					
15	The write-ups were useful to the participants during the INSET.					
16	The write-ups will be useful to the participants during their ordinary classroom teaching.					
17	The materials procured for the INSET were adequate (in quantity).					
18	The materials procured for the INSET were relevant and useful.					
19	The materials procured for the INSET were appropriate for the purpose of the INSET.					
20	The materials for the INSET were procured in time.					

	DOING	**0**	**1**	**2**	**3**	**4**
21	The Secretariat was organised in implementing the INSET.					
22	The facilitators were organised in implementing the INSET.					
23	The facilitators were enthusiastic and professional in implementing the INSET.					
24	Flexibility (ability to adjust plan) was observed during the INSET.					
25	The purpose and expected outcomes of each session were generally achieved.					
26	Tasks were equitably and fairly distributed among the facilitators during the INSET.					
27	During the INSET, necessary information was properly given to the participants in time.					
28	There was a good communication between the Secretariat and each INSET Centre during the INSET.					
29	The use of the room for general sessions (i.e. hall) was appropriate.					
30	The use of the room for subject-based sessions (i.e. classroom) was appropriate.					
31	The use of laboratories was appropriate.					
32	Meals were acceptable to the participants.					
33	The state of accommodation (beds etc.) was acceptable to the participants.					
34	The state of ablution block was acceptable to the participants.					
35	The welfare of the participants was well taken care of.					
	SEEING	**0**	**1**	**2**	**3**	**4**
36	The facilitators were sensitive enough to promptly identify the problems during the INSET.					
37	The Secretariat was sensitive enough to promptly identify the problems during the INSET.					
38	There was an appropriate mechanism to identify the problems at the INSET Centre level. (e.g. wrap-up meetings, etc.)					
	IMPROVING	**0**	**1**	**2**	**3**	**4**
39	The problems the participants faced were properly handled by the Secretariat.					
40	There was an appropriate mechanism to report the problems to the Secretariat.					
	GENERAL	**0**	**1**	**2**	**3**	**4**
41	Willingness and commitment was evident among the Core Trainers.					
42	Facilitators were given enough academic support for the INSET.					
43	Facilitators were given enough administrative support during the INSET.					
44	The INSET was effective for addressing the problems the participants had been facing in their math/science teaching.					
45	The implementation of this INSET was successful.					

Please write freely your thoughts on this INSET.

＜プロジェクト目標： INSET 質指標(3) 参加者による講義（セッション）評価指標＞

SMASSE INSET MALAWI - SESSION EVALUATION SHEET

Divisional INSET

INSET Centre:	Date:	Session Title/Topic

Key	0 – Strongly Disagree; 1 – Disagree; 2 – Not Sure; 3 – Agree; 4 – Strongly Agree

	It was interesting.					It was relevant to my needs.					The involvement of participants was good.					Time management was good.				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
Plenary																				
Discussion																				
Hands-on activities																				
Peer teaching																				
Feedback on Peer Teaching																				

＜プロジェクト目標： INSET 質指標(4) 参加者による研修前＆研修後の自己評価指標＞

SMASSE INSET MALAWI
INSET for Maths/Science Teachers in Secondary Schools
Pre- & Post- INSET Evaluation Questionnaire

INSET Centre: _____

Qualification			Subject(s) currently teaching			Years of teaching experience at Secondary		
	B. Ed. or M. Ed.			Biology			Less than 3 yrs	
	UCE			Physical Science			3 – 5 yrs	
	Dip. Ed.			Mathematics			6 – 10 yrs	
	MSCE						More than 10 yrs	

The purpose of this questionnaire is to evaluate the INSET participants' opinion on certain aspects of maths/science teaching in their respective schools, before the INSET begins.

Please consider each of the following statements and indicate the response that reflects your opinion about maths/science teaching by ticking (✓) the appropriate column on this sheet.

Key: 0 – Strongly Disagree; 1 – Disagree; 2 – Not Sure; 3 – Agree; 4 – Strongly Agree

Category A							
	"Activities" in this category refer to teachers' teaching modes such as practical work and group discussions.	**0**	**1**	**2**	**3**	**4**
1	Including activities in lessons is not time-consuming.					
2	The need to cover the syllabus does not prevent teachers from including activities in their lessons.					
3	Heavy workloads of teachers do not prevent them from including activities in their lessons.					
4	High student/teacher ratio in class does not prevent teachers from including activities in their lessons.					
5	Incorporating activities into lessons helps students enhance their abilities in maths/science.					

Category B						
	"Student-centred teaching" in this category refers to the type of teachers' teaching mode, whereby students are given such opportunities as, to a large extent, to give their own experiences, explain their own ideas, give their predictions, verify the predictions on their own, and evaluate the teachers' lessons.	**0**	**1**	**2**	**3**	**4**
6	Apart from teachers, students can be also the source of information on the topic.					
7	Teachers should not fear being asked difficult or challenging questions by students.					
8	Student-centred teaching can be effective regardless of the current abilities of students.					

9	Student-centred teaching can be effective regardless of the current level of motivation of students.					
10	Student-centred teaching is not time-consuming.					
11	The need to cover the syllabus does not hinder student-centred teaching.					
12	The situation where teaching and learning materials are scarce does not hinder student-centred teaching.					
13	High student/teacher ratio in class does not hinder student-centred teaching.					
14	Full participation of students in lessons does not disrupt class discipline.					
15	Student-centred teaching helps students enhance their abilities in maths/science.					

Category C		0	1	2	3	4
16	Teachers can always predict the results of experiments to a considerable degree.					
17	Teachers should always perform experiments prior to their lessons as part of the preparation.					
18	Experiments should be conducted even if they are not greatly featured in the exams.					
19	The situation where materials and laboratory apparatus are scarce does not prevent teachers from conducting experiments.					
20	High student/teacher ratio in class does not prevent teachers from conducting experiments.					
21	Lack of laboratory structures does not prevent teachers from conducting experiments.					
22	Experiments can still be effectively conducted even if the school does not have laboratory assistants.					
23	Experiments are not time-consuming.					
24	The need to cover the syllabus does not prevent teachers from conducting experiments.					
25	Heavy workloads of teachers do not prevent them from conducting experiments.					
26	Experiments can still be effectively conducted by a teacher without relying much on the full support from school administration.					
27	Experiments can still be effectively conducted by a teacher without relying much on the cooperation among his/her fellow teachers.					
28	Students' carelessness can be reduced by giving more opportunities for experiments.					
29	Students prefer doing experiments rather than being told the results by teachers.					
30	Experiments help students enhance their abilities in maths/science.					

Category D		0	1	2	3	4
31	Improvised equipment/materials can be as effective as conventional ones.					
32	Students can be guided to regard improvised equipment/materials as effective.					
33	Many of the conventional equipment/materials can be improvised in one way or another.					
34	Producing improvised equipment/materials is not time-consuming.					
35	Heavy workloads of teachers do not prevent them from producing improvised equipment/materials.					

36	Effective improvised equipment/materials can be produced without spending much money.					
37	Effective improvised equipment/materials can be produced even where the resources are scarce.					
38	Effective improvised equipment/materials can still be produced by a teacher without relying much on the cooperation among his/her fellow teachers.					
39	The problem of inadequate teaching and learning materials can be addressed by improvisation to a large extent.					

Category E		0	1	2	3	4
40	Lesson plans are for the use of teachers themselves, not of supervisors such as headteachers and SEMAs.					
41	Lesson plans have a number of important features which lesson notes do not have.					
42	Lesson plans need to be prepared even by experienced teachers.					
43	Lesson plans are necessary for not only primary school teachers but also secondary school teachers.					
44	Preparing lesson plans is not time-consuming.					
45	Heavy workloads of teachers do not prevent them from preparing lesson plans.					
46	Lesson planning can still be effectively done without **lots of** reference books.					
47	Lesson planning can still be effectively done even by the teachers without sufficient content mastery.					
48	Lesson planning can still be effectively done without **lots of** resources such as notebooks, pens, paper, etc.					
49	In order to teach effectively, teachers must always prepare lesson plans.					

Category F		0	1	2	3	4
50	High student/teacher ratio in class does not prevent teachers from giving assignments to students.					
51	Teachers can give assignments to students in any subjects.					
52	All teachers have something to improve on in their lessons, regardless of experience and qualification.					
53	Accepting the weaknesses is the first step for improving lessons.					
54	Teachers' lessons can be assessed by teachers themselves for their own improvement, not only by supervisors.					
55	Self-assessment can be as effective as external assessment.					
56	Self-assessment is not time-consuming.					
57	Heavy workloads of teachers do not prevent them from assessing their lessons.					
58	Self-assessment can still be effectively done even by the teachers without sufficient content mastery.					
59	In order to teach effectively, teachers must always assess their own lessons for further improvement.					

Thank you for the thought, time and effort you have put into completing this questionnaire!