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Report
on
Afghan Education

Development of Supplementary Mathematics Materials
for
The Primary Level: Classes One through Six

Prepared
by

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2000

Development of Supplementary Mathematics Materials
for
The Primary Level: Classes One through Six

Executive Summary

Introduction

The strategy report on education for Afghans recommends certain measures to improve the provision of educational services to Afghan children. The strategy calls for, among other measures, the need to improve quality of education by emphasizing student learning as the end result of educational initiatives.

In an effort to address the issue of improving the quality of education, a series of workshops have been organized for Afghan educators by Save the Children/US in collaboration with other agencies under the sponsorship of UNICEF. The first workshop was aimed at setting Minimum Levels of Learning (MLL) or basic competencies in mathematics and language development.

The second workshop in the series is aimed at producing supplementary materials in mathematics to support the achievement of the identified basic mathematics competencies. This consultancy is sponsored by DFID to facilitate the efforts of the Afghan educators in developing the support supplementary materials in mathematics for the primary levels.

Achievements

Support Symposium on Education Materials for Afghan Children

A presentation on the role of instructional materials in learning was presented at the symposium on "Education Materials for Afghan Children". The presentation linked instructional materials to effective teaching practices to facilitate the teaching learning process.

The Supplementary Mathematics Materials Workshop

The mathematics workshop extended over 15 days, and was attended by 25 participants: 8 women and 17 men. The group represented 14 NGOs working in education in Afghanistan and Pakistan.

The participants were organized in six groups, comprising of members from different organizations including both men and women. Each group concentrated on one level of the primary cycle. The groups studied resource materials and prepared supplementary materials in support of basic mathematics competencies. Sample lessons were shared by the entire group at the initial stage of the workshop.

The participants prepared supplementary mathematics materials for the entire primary level. Each lesson was formatted to reflect the objective, review, presentation of new materials, practice, and application or problem solving. Revision exercises to review the new materials are presented before checking student's performance. An answer key has been provided for each lesson. Evaluation exercises form the final section of each unit and are designed to assess students' performance on the particular topic under study.

Teachers' Guide for Use of the Supplementary Mathematics Materials

A teachers' guide was developed to use with the supplementary mathematics materials. The guide presented the different alternatives for the use of the prepared materials.

* Part or all materials could be used to supplement textbooks to support the attainment of basic competencies in mathematics. The guide ties the materials to effective teaching practices and considers mastery of concepts and skills set at producing 80 percent correct responses on evaluation tests.

* The materials could be used as a stand-alone materials to reinforce the concepts and skills presented by the textbook. In this context the teachers are urged to group children in pairs of small groups to work through each unit, and use the answer key to check their work. The teachers' role in this context is to monitor student performance at the end of each unit by checking their evaluation exercises (Answer key for the evaluation is only presented in the teachers' guide) and ascertain whether the students have attained mastery of 80 percent correct responses on the evaluation tests. The teacher would then determine whether the students can move on to the next unit or whether they need to rework on the same unit to achieve mastery before they proceed on to the next unit.

Conclusion

The workshops provided an opportunity for the participants to:

* explore new ideas, methods, and materials;

* exchange views with members of other organizations and learn from each other experiences;

* establish networks among members of different organizations with whom they have worked over an extended period of time.

Recommendations

The supplementary mathematics materials represent the cooperative efforts of Afghan educators to enhance student performance in achieving the desired outcomes identified in the basic mathematics competencies at each level.

As such the supplementary mathematics materials become the means to:

* be utilized by teachers to supplement classroom instruction and to align instructional materials with the competencies developed for each level.

* be used by students in peer learning and small group instruction to reinforce concepts and skills acquired in the classroom.

Follow-up Activities

Agreement among Afghan educators on what constitutes basic competencies in mathematics against which student performance is measured has been the focal point in developing supplementary materials to address quality of education for Afghan children.

The development of supplementary mathematics materials has been a coordinated effort among agencies to support classroom teaching to achieve the desired outcomes. The materials supplement existing textbooks and provide support for teachers. They also support student learning by providing practice to reinforce the desired competencies.

The next step in the cycle of enhancing quality of instruction is training teachers in:

* the use of the supplementary materials emphasizing the methodology of effective teaching practices delineated in the materials;

* the content of the different mathematical competencies as mapped out in the supplementary materials; and

* classroom management skills to provide for small group and peer instruction.

Development of Supplementary Materials in Mathematics
for
The Primary Level: Classes One through Six

Introduction

The strategy report on education for Afghans recommends certain measures to improve the provision of educational services to Afghan children, whether in Afghanistan or Pakistan. The strategy calls for the need to improve access and quality of education, as well as increase the capacity of Afghan educators to develop and maintain education systems.

This consultancy is the second in a series of efforts to address the issue of improving the quality of education by emphasizing student learning as the end result of educational initiatives. Supplementary materials in

mathematics for the primary levels were developed in support of achieving the desired outcomes specified in the basic competencies of mathematics.

The Scope of Work

The terms of reference for this consultancy included the following tasks:

* Work with the Afghan educators from different agencies to develop a format for the use and preparation of supplementary materials in mathematics for the primary level, classes I through VI.

* Prepare resource materials to be used during the workshop.

* Facilitate the workshop for Afghan educators to produce a set of supplementary materials for mathematics.

* Invite participants to evaluate the workshop.

* Conduct de-briefing of the outcomes for agencies, donors and other interested parties.

* Prepare a report with detailed recommendations.

Activities

* Pre-Workshop Symposium on Education Materials for Afghan Children

A presentation on the role of instructional materials in learning was presented at the symposium on "Education Materials for Afghan Children". The presentation linked instructional materials to effective teaching practices to facilitate the teaching learning process.

Appendix 3 "The Role of Instructional Materials in Learning"

* The Workshop on the Development of Supplementary Materials in Mathematics

The tasks included:

* Preparation of resource materials for the workshop.
* Conducting the workshop and facilitating the development of supplementary materials in mathematics.
* Preparation of a teachers' guide.

* Evaluation of the workshop.

A) Preparation of Resource Materials

A number of resource materials were compiled for each level of the primary cycle classes: 1 through 6 to be used by the participants for reference.

B) Conducting the Workshop and Facilitating the Development of Supplementary Mathematics Materials

The mathematics workshop covered 15 days. It started on April 24 and ended on May 10th.

There were 25 participants: 8 women and 17 men. The group represented 14 NGOs working in education in Afghanistan and Pakistan.

Appendix 1 "Mathematics Workshop Participants

The workshop started with an opening ceremony chaired by the sponsors: Save the Children US, and UNICEF.

The participants were then divided into six groups, comprising of members from different organizations including both men and women. Each group was assigned to a level: one through six. The group was asked to study reference materials pertaining to their level (including Afghan, Pakistani, British and American textbooks); and to prepare supplementary mathematics materials based on the basic competencies drawn for that level. Sample lessons were then shared by the whole group to set a pattern for the format of the lessons.

The initial discussion with each group was conducted in English. But all other discussions within the groups were carried on in Dari, so all participants could share ideas and be involved in the process.

Each group drew an outline for developing the lessons within each unit and developed exercises for revision and evaluation at the end of each unit. The process was based on a spiral scheme for the development of mathematical skills. Each level reviewed the previous materials presented and expanded the scope and the extent of each concept and skill building on previous acquired knowledge.

Appendix 2 "Math Groups"

C) Preparation of a Teachers' Guide for Use of the Supplementary Mathematics Materials

A teachers' guide was developed to use with the supplementary mathematics

materials. The guide presented the different alternatives for the use of the prepared materials.

* Part or all materials could be used to supplement textbooks. Teachers and students can use the supplementary math materials to introduce and develop the basic competencies in mathematics when existing textbooks do not provide activities to develop a particular basic competency. The guide ties the materials to effective teaching practices and considers mastery of concepts and skills set at producing 80 percent correct responses on evaluation tests.

* The materials could be used to reinforce the concepts and skills presented by the textbook. In this context Teachers and students can use the supplementary math materials to reinforce materials already taught in class. If they are used this way, a student can work with or without a teacher. Children in pairs or in small groups work through each unit independently, and use the answer key to check their work. Teachers monitor student performance at the end of each unit by checking their evaluation exercises (Answer key for the evaluation is only presented in the teachers' guide) to determine whether students have attained mastery of 80 percent correct responses and can move on to the next unit or whether they need to do more work.

Appendix 4: "Teachers' Guide to the Supplementary Mathematics Materials"

C) Evaluation of the workshop

A form was developed to check the efficacy of the methods used in the workshop.

The participants were asked to select and provide explanation for each response.

Responses were presented on a scale of 1 through 4:
1 - being poor
2 - being less than average
3 - better than average
4 - good

The discussion questions were the following:

1. Was the organization of work in groups beneficial?

2. Were the resources for study sufficient and useful?

3. Were the presentation, explanation and feedback sufficient and helpful?

4. Have you learned something useful from the workshop that would help you in your work?

5. Are the materials you have prepared useful for your organization?

6. Was it useful for you and your work to meet and work with members of other organisations?

The responses of the participants are available at Save the children US office in Islamabad.

Appendix 4 "Evaluation of Supplementary Materials Workshop"

De-briefing
Agencies, donors and other interested parties were de-briefed about the outcomes of the workshops.

Reporting on the Workshop
A report on the workshops with detailed conclusion, recommendations, and follow-up activities was prepared.

Conclusion

The participants in the supplementary math materials workshop were dedicated and committed educators. They worked hard and long and produced impressive documents.

The workshops provided an opportunity for the participants to:

* explore ideas, methods, and materials;

* exchange views with members of other organizations and learn from each other experiences;

* establish networks among members of different organizations with whom they have worked over an extended period of time.

Recommendations

The supplementary mathematics materials represent the cooperative efforts of Afghan educators to enhance student performance in achieving the desired outcomes identified in the basic mathematics competencies at each level.

As such the supplementary mathematics materials become the means to:

* be utilized by teachers to supplement classroom instruction and to align instructional materials with the competencies developed for each level.

* be used by students in peer learning and small group instruction to reinforce concepts and skills acquired in the classroom.

Follow-up Activities

Agreement among Afghan educators on what constitutes basic competencies in mathematics against which student performance is measured has been the focal point in developing supplementary materials to address quality of education for Afghan children.

The development of supplementary mathematics materials has been a coordinated effort among agencies to support classroom teaching to achieve the desired outcomes. The materials supplement existing textbooks and provide support for teachers. They also support student learning by providing practice to reinforce the desired competencies.

The next step in the cycle of enhancing quality of instruction is training teachers in:

* the use of the supplementary materials emphasizing the methodology of effective teaching practices delineated in the materials;

* the content of the different mathematical competencies as mapped out in the supplementary materials; and

* classroom management skills to provide for small group and peer instruction.

Appendix 1

Mathematics Workshop
Participants

Mathematics Workshop
Participants

	Name	Organization
1.	Abdul Shukur Hamidi	CIC
2.	Abdul Karim Azizi	N.A.
3.	Mohammad Ibrahim Bamyani	UNOCHA
4.	Khan Shireen	S.C.A.
5.	Jan Ali Amini	Q.C.S.
6.	Abdul Haq	SAB
7.	Naim Jalili	Children in Crisis
8.	Hafiza Sai	SEIAL
9.	Dr. Aminullah Amin	SC/US
10.	Assadullah	SC/US
11.	Zarghona Shalizi	SC/US
12.	Feraidoon Zaki	SC/US
13.	Ghulam Dastagir Fazalyar	IRC
14.	Alia Helina Dost	IRC
15.	Mansura Baqeri	IRC
16.	Mohammad Ishaq	IRC
17.	Mohammad Qasim Wahaj	OI
18.	Zarmina	OI T.T. Hangu Ed. Prog
19.	Nazifa Aabedi	AIL

20. Zakia Nazari AIL

21. Abdul Raziq Azizi CARE
22. Zahira Ahmadyar Care/T.T. COPE

23. Abdul Malik Hemat GTZ BEFARE
24. 25. Sayed Ahmad GTZ AG BAS ED
25. Niaz Mohammad GTZ AG BAS ED

Appendix 2

Math Groups

Math Groups

Class I Class II

Abdul Karim Azizi (N.A.) Gulam D. Fazalyar (IRC)
M. Ibrahim Bamyani (UNOCHA) Alia Helina Dost (IRC)
Zarmina (OI)

Sayed Ahmad (AGBASED)
Hafiza Sai (SEIAL) Mohammad Ishaq (IRC)
Feraidoon Zaki (SC/US)

Class III Class IV

Khan Shereen (SCA) Dr. Aminullah Amin (SC/US)
Jan Ali Amini (Q. C. S.) Assadullah (SC/US)
Zahira Ahmadyar (CARE) Abdul Haq (SAB)
Mansura Baqeri (IRC) Zakia Nazari (AIL)

Class V Class VI

Abdul Shukur Hamidi (CiC) M. Qasim Wahaj (OI)
Abdul Raziq Azizi (CARE) Nazifa Aabedi (AIL)
Zarghona Shalizi (SC/US) A. Malik Hemat (GTZ)
M. Naim Jalili (CIC) Niaz mohammad (AGBASED)

Appendix 3

The Role of Instructional Materials in Learning

The Role of Instructional Materials in Learning

Three ingredients are necessary for learning: a student, a teacher, and an instructional program and materials.

I'll start by inking effective teaching practices that produce student learning to instructional materials and then we will look at the role of instructional materials in learning.

Teachers are agents responsible for teaching.

For teachers to be effective:

* Teachers have to know and communicate the purpose or objective of the lesson to focus learning.

* Teachers have to review the pre-requisite skills needed before presenting new materials.

* Teachers have to present the new materials in a simple concrete manner.

* Teachers have to guide the students to practice the new acquired skills.

* Teachers have to reinforce the new acquired skills by providing time for students to practice independently.

* Teachers have to check the performance of students to determine whether students have achieved the desired outcomes.

* Teachers have to re-teach and provide remediation until the students master the new concepts and skills.

Teachers affect student learning to the extent that the instructional materials help them do that. Teachers teach textbooks.

What do we look at when evaluating instructional materials:

* Instructional materials should reflect the objectives specified in the curriculum. For example if the objective is to promote thinking, does the text materials provide questions that require students to reason?

* Each lesson should have a simple and clear objective that teachers and students can identify. For example is the lesson focused on one concept or skill, or does it attempt to cover many concepts and skills in one lesson?

* Instructional materials should be sequenced logically. Materials should review pre-requisite skills needed to acquire the new skill, before attempting to teach the new skill. For example if multiplication is repetitive addition, is the skill of addition reviewed before introducing the skill of multiplication?

* Instructional materials should reflect the students' interest. Young children are interested in imaginative stories. Non-fiction is more appropriate for older children.

* Instructional materials should use language appropriate to the developmental stage of the children they are intended for.

* Is the length of the text appropriate?

* Is the language used simple?

* Are the sentences long?

* Are the vocabulary words familiar to the children and easy to understand?

* Instructional materials should present the concept or skill in a simple and concrete manner to help teachers explain the materials to the students, and aid the students in understanding the new materials.

* Instructional materials should provide enough exercises so students can practice under the teachers' guidance and independently.

* Instructional materials should present extension exercises so students can apply the new skills they have acquired in everyday life situations.

* Instructional materials should contain revaluation and test items for teachers to use to assess students performance.

* Instructional materials should have illustrations. Illustrations are not for decorations. They serve many purposes:

* They explain the text visually and enhance understanding of the content of the text.

* Children learn through concrete experiences; and illustrations are symbols representing concrete experiences. It is the interim stage before learning to read.

* illustration are an integral part of instructional materials. they are generally used to represent instructions especially in lower grades where children's ability to read is limited.

* Illustrations are also representation of the child's environment and living experiences; and as such they should reflect the reality. Illustrations should strike a balance between different groups of society, different areas of the country, and different styles of living such as men and women, girls and boys, rural and urban, different ethnic groups, different professions and occupations etc.

* Instructional materials should provide an accompanying teachers' guide. The teachers' guide should be:

* Simple to use;

* Easy to understand;

* Instructions should be clear and to the point;

* Contain the reduced pages of the student text;

* Provide an answer key.

Appendix 4

Teachers' Guide

Teachers' Guide to the Supplementary Mathematics Materials

Prepared
by

Abdul Shukur Hamidi	CIC
Abdul Karim Azizi	N.A.
Mohammad Ibrahim Bamyani	UNOCHA
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Teachers' Guide to the Supplementary Mathematics Materials

Introduction

The supplementary materials for mathematics reflect the basic competencies in mathematics for the primary grades. The purpose of the supplementary mathematics materials is to help students develop these basic competencies. The basic competencies are a description of intended learning outcomes. They describe what children should know, understand and be able to do at the end of each grade.

The supplementary materials in mathematics were developed by a group of Afghan educators from a range of agencies providing education for young Afghans. They are not linked to a specific textbook.

Teachers can use the supplementary mathematics materials in two ways:

1. Some textbooks do not contain activities that develop all the basic competencies in mathematics. The supplementary materials can be used to fill the gaps.
2. Supplementary materials can be used to reinforce and further develop the basic competencies introduced in textbooks.

This teachers' guide
* explains how the lessons are organised
* gives instructions for using the materials
* contains answers to evaluation lessons

How the Supplementary Materials are organised

New Lessons
Each new lesson is set out in the same way. The lessons are organised to encourage teachers to use effective teaching practices.

Class
The suggested class for the lesson is given at the top of the page.

Mathematical topic
The topic is identified from the basic competencies.

Number of the lesson
Each lesson is numbered within a class. Lessons are in a sequence.

Objective
Each lesson has one objective. The objectives describe the purpose of the lesson. Some objectives are about developing new skills and concepts. Some lessons review existing skills and concepts. The reviews are as important as the new objectives. They check that children have the pre-requisite skills and understanding for developing a new concept or skill.

Presentation
The new concept or skill is presented in this section. It is introduced in a concrete and illustrated form in a presentation box. The teacher should discuss the content of the box with students. The teachers should also try to use locally available resources to illustrate the skill or concept being developed.

Practice
In this section, exercises are provided for students to practice. If the lesson is new, this section is for guided practice and the teacher should work closely with the students. If students are familiar with the concept or skill they will need less help.

Application
In this section, there are exercises that provide opportunities to apply the concept or skill.

Reduced Sample Lesson

Revision
At the end of a unit or set of lessons on one topic, a revision lesson is prepared to revise the new concepts and skills covered in the topic. These lessons are called revision lessons.

Reduced Sample Revision Lesson

Answer key
Each lesson has an answer key for students to use to check their answers.

Reduced sample Answer key

Evaluation lessons

Evaluation lessons come at the end of each unit or a set of lessons on one topic. They are intended to find out what students have learned about the topic. Teachers must check the evaluation lessons. If a student can answer more than 80% of the review correctly, they can move on to the next unit. If a student answers less than 80% of the evaluation lesson correctly, they should practice the skills and concepts again with help from the teacher before they go on to the next unit. Teachers should consider re-grouping students for further practice. Sometimes a new set of peers can be helpful to a student's learning.

Reduced Sample Evaluation lesson

Evaluation Answer Key
The answer sheet for the evaluation lessons is provided in the teachers' guide. It is not in the students' book. Answer sheets are organized by class in the teachers' guide.

Appendix 4

Evaluation of Supplementary Materials Workshop

Evaluation of Supplementary Materials Workshop

Please read the following evaluation questions. Check one number and then explain your response. Discuss in Dari or Pashto and then respond in English.

Poor - 1
Less than average - 2
Better than average - 3
Good - 4

* Was the organization of work in groups beneficial?

1 2 3 4

Explain_____
_____
_____
_____

exercises, not the teacher. Help students who are having difficulty before they move to the next section.

* Students can work independently through the application section.

* Ask students to use the answer key to check their answers.

Teachers are encouraged to group students in pairs or in small groups of different abilities to use the materials. Ask them to work together and to talk about what they are doing.

Use supplementary materials to reinforce and extend skills and concepts

Teachers and students can use the supplementary math materials to reinforce and develop concepts and skills already taught in class. If they are used this way, a student can work with or without a teacher.

Teachers are encouraged to:

* Group students in pairs or in small groups of different abilities to use the materials. Ask them to work together and to talk about what they are doing.

* Explain the different steps in the lessons to your students: objective, presentation, practice, application. They must look at the objective and introduction carefully, work through the practice section and then the application section. Concepts and skills are presented and developed in sequence. Students should complete the lessons in a topic in sequence.

* Show students the answer key. Explain to them how to use it. They can use it to check their work and to re-work incorrect problems.

* Explain the evaluation lessons to your students. Evaluation lessons come at the end of a set of lessons on one topic. The evaluation lesson is to find out what they have learned. Teachers must check the evaluation lessons. If a student can answer more than 80% of the review correctly, they can move on to the next unit.

* If a student answers less than 80% of the evaluation lesson correctly, they should practice the skills and concepts again with help from a teacher.

Reduced Sample Evaluation Answer Key

How to use the supplementary materials

There are two main ways to use the supplementary materials.

1. Use the supplementary materials to introduce and develop new skills and concepts.

2. Use supplementary materials to reinforce and extend skills and concepts.

Use the supplementary materials to introduce and develop new skills and concepts.

Teachers and students can use the supplementary math materials to introduce and develop the basic competencies in mathematics. The materials can be used to supplement existing textbooks when they do not provide activities to develop a particular basic competency.

Teachers and students are encouraged to follow the steps in each lesson: presentation, practice, and application.

* Write the topic of the lesson on the blackboard.

* Read the objective of the lesson with students.

* Introduce and discuss the information presented in the presentation box. Use locally available resources to help explain the skill or concept.

* Guide the students through the practice section. Students do these

* Were the resources for study sufficient and useful?

1 2 3 4

Explain_____

* Were the presentation, explanation and feedback sufficient and helpful?

1 2 3 4

Explain_____

* Have you learned something useful from the workshop that would help you in your work?

1 2 3 4

Explain_____

* Are the materials you have prepared useful for your organization?

1 2 3 4

Explain_____

* Was it useful for you and your work to meet and work with members of other organisations?

1 2 3 4

Explain_____

Thank you

———————— Headers ————————
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To: "'Rugh, Andrea'" <ABRugh@aol.com>
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