

Training Modules on Multigrade Teaching for Multigrade Teachers in Sri Lanka

Introduction

Hello! Welcome to Teacher Training modules on multigrade teaching. You may be a teacher who has to take responsibility of two, three, four or even five grades at the same time. This is quite a challenge.

You may or may not have had received some training in multigrade teaching. You may or may not be teaching in a multigrade class on a daily basis. However, if you are a teacher who has to handle more than one grade within a timetabled period this working through these modules will be useful. As a multigrade teacher you may be facing many challenges. Very few attempts are made to train teachers for multigrade teaching. You may have used or possess the Distance teacher education module and/or other training materials given by NIE.

This set of modules will be of use to you to improve your quality of teaching. If children are to learn effectively in multigrade settings, teachers need to be well trained, well resourced and hold positive attitudes to multigrade teaching

Teachers in monograde classes also would be able to use these modules to organise their teaching to suit the different ability levels of students in the same grade.

This training package for multigrade teaching is made up of three modules. The titles of the modules are as follows:

Module 1: The concept of multigrade teaching: A generic training module

Module 2: The context of Multigrade teaching: Reflecting on the challenges and needs analysis

***Module 3: Learning and teaching of mathematics in multigrade/multilevel settings
adopting a learner and materials centred approach***

This training material has been designed to be used either during in-service training sessions or as self-study materials. Each of these modules outlines the sub topics related to each module title and a series of learning activities. Please start with Module 1 and work through to Module 3. We hope you enjoy using these modules.

Module 1

The concept of multigrade teaching: A generic training module

1.0 Introduction

The first module in this series introduces you to the concept of multigrade teaching. You may be either a teacher who has been engaging in multigrade teaching for a number of years or a teacher who was recently recruited to a multigrade school. You might also be a monograde teacher who has to address multigrade situations at times. Nevertheless, this module will help you to understand the concept of multigrade teaching.

1.1 Learning outcomes

With the completion of the Module 1 you will have

- understood the meaning of multigrade teaching
- recognized the prevalence of multigrade teaching in the world
- considered the conditions under which multigrade teaching becomes a necessity
- paid special attention to local prevalence of multigrade teaching
- assessed the need for multigrade teaching in Sri Lanka and in your school
- considered the significance of improving the quality of multigrade teaching

1.2 Meaning of multigrade teaching

The term ‘multigrade teaching’ generally refers to a teaching situation where a single teacher has to take responsibility for teaching pupils across more than one curriculum grade within a timetabled period. Schools with multigrade classes are referred to as multigrade schools.

In most of the world’s education systems, formal education is expected to be imparted in a monograde teaching environment, where one teacher is responsible for a single curriculum grade within a timetabled period.

Although this is the general norm, in many countries in the world there are schools in which all classes function as multigrade classes. These schools are called “fully multigrade schools”. In some other schools only some of the classes function as multigrade classes while others function as monograde classes. These are called as “partially multigrade schools”.

1.3 Prevalence of multigrade teaching in the world

Multigrade classes exist in many countries. Most of these education systems do not publish statistics on prevalence of multigrade teaching. The following statistics are cited by Little in the book *Education for All and Multigrade Teaching: challenges and opportunities* (2006: 5-6).

- In England in 2000, 25.4% of all classes in primary education
- In France in 2000, 34% and out of these 4.5% were single-teacher schools
- In Ireland in 2001, 42% of primary school classes
- In Norway in 2000, 34% of all primary schools
- In Nepal in 1998, almost all primary classes
- In Peru in 1988, 21,100 primary schools and 41,000 multigrade teachers.
- In India in 1986, 84% of primary schools had three teachers or less.

1.4 Why do multigrade schools function in the world?

Multigrade teaching has been commonly understood as a teaching condition arising as a result of shortage of teachers. In this type of a situation educationists believe that multigrade teaching has a significant role to play if the goals of the World Declaration for ‘Education for All’, affirmed in Jomtien in 1990 and the Dakar Framework of Action in 2000 are to be reached. Multigrade teaching may be the only option available for children who live in low population areas and other marginal conditions where small numbers of children do not justify the provision of one teacher for each curriculum grade.

Most systems of education which face such conditions, adopt multigrade teaching as it becomes the only option or the last resort. In such systems the quality of multigrade schools are poor. Only a few systems of education have transformed this necessity into a positive teaching approach.

One example is the Escuela Nueva programme in Colombia. This programme is implemented in rural areas. A multigrade curriculum and teaching strategies are adopted with the support received from the education system. Many other countries also have adopted this programme

However, ‘necessity’ is not the only reason why multigrade teaching is adopted. Certain systems of education deliberately adopt multigrade teaching considering the advantages that can be drawn out of this approach. An example from England is given by Little (2006:21). In England in order to implement the child-centred approach vertical grouping rather than horizontal grouping was encouraged through which children are encouraged to learn through social interaction of the different grade groups.

The following arguments are used in support of multigrade teaching. It

- Provides an efficient means of providing basic education in thinly populated areas, utilizing scarce educational inputs, such as trained teachers, classrooms, and materials
- Helps in maintaining a rural school as an important centre in building village identity and cultural life
- Promotes students to ‘learn to learn’ and ‘learn to teach’ through independent inquiry and peer tutoring
- Promotes the social learning of students

1.5 Local prevalence of multigrade teaching

According to 2002 School Census carried out by the Ministry of Education the number of schools with four or less teachers is 1377. Most of these schools are primary schools having grades up to 5. In these schools at least two grades need to be put together to form a multigrade class if students are to learn during the entire school time. However, in

most of these schools the principal is also a teaching principal which aggravates the effects of the lack of a teacher per grade. There are schools having both primary and secondary grades lacking the required number of teachers to impart monograde teaching in all grades. The number of such schools cannot be counted from the school census report. Thus one can only say that the estimate of 1377 gives the minimum number of schools having multigrade needs.

An estimate of prevalence of multigrade teaching done based on number of teachers in a school given by the School Census data in Sri Lanka carried out by Vithanapathirana (2005) revealed that the provinces with 'very high' prevalence of multigrade teaching schools are the Northern (30.78%) and the Eastern provinces (28.83%). Other provinces with 'high' percentages are Sabaragamuwa (21.61%), the North-Central (19.15%), the Central (18.69%), the Uva (17.60%) and the North-Western (12.29%) provinces. With low prevalence are the Western (9.49%) and the Southern (7.57%) provinces

1.6 Do we need multigrade teaching in Sri Lanka?

Sri Lanka's achievements in literacy are high when compared to other South Asian countries. Over the past few decades these rates have increased. One major factor influenced the improvement in the literacy rates is the establishment of a large number of schools especially primary schools. In Sri Lanka the net work of schools is such that almost every primary child has a primary school within 2km from his/her residence. As a result there are a large number of schools situated in remote areas where monograde teaching situations are not available.

Multigrade teaching has been and will continue to be a necessity for Sri Lanka for several main reasons. In spite of the fact that Sri Lanka had continued to recruit a large number of teachers the schools having teacher shortages, especially when the conditions of access to schools are difficult exceed several thousands. One reason for this is the policy of teacher deployment which indicates that small schools having less than about 100 school are not entitled for a teacher for each grade. Another reason is the *ad hoc* teacher

transfers which result in frequent fluctuations of teacher numbers in remote schools. Still another reason for the lack of a teacher per grade is teacher absenteeism

If your school has faced the need to adopt multigrade teaching, make an attempt to do the Activity 1.1.

Activity 1.1

- What are the outcomes of adopting multigrade teaching in your school compared with the outcomes of abandoning the students in grades for which there are no teachers?
- What are your feelings regarding the usefulness of multigrade teaching **IF** systematically carried out?

1.7 Why does your school need to adopt multigrade teaching?

The following is a comprehensive list of conditions found from schools of different countries that have been found to make multigrade teaching a necessity.

- 1) Schools in areas of low population density where schools are widely scattered and inaccessible and enrolment is low;
- 2) Schools that comprise a cluster of classrooms in different locations, in which some classes are multigrade and some are monograde;
- 3) Schools in areas of declining population, where previously there was monograde teaching, and where now, only a small number of teachers is employed;
- 4) Schools in areas of population growth and school expansion, where enrolment in the expanding upper grades remains small;
- 5) Schools in areas where parents send their children to more popular schools within reasonable traveling distance, leading to a decline in enrolment and a fewer teachers in the less popular school;

- 6) Schools in which the official number of teachers deployed justify monograde teaching but where the actual number deployed is less. The inadequate deployment arises from a number of reasons including inadequate supply of teachers, teachers not reporting fully though posted to a school or teachers going on medical or casual leave;
- 7) Schools in which the number of students admitted to a class comprise more than 'one class group', necessitating a combination of some of them with students in a class group of a different grade;
- 8) Schools in which teacher absenteeism is high and 'supplementary teacher' arrangements are 'non-effectual' or 'non-existent'.

(Little, 2001)

Activity 1.2

- What are the conditions that apply to your school from the given list?
- If you know about any schools in your area where multigrade teaching is a necessity compare the conditions that prevail in those schools with the list given above.

1.8 Effects of multigrade teaching on student learning outcomes

Many teachers are reluctant to adopt multigrade teaching since they feel that it is a second rate teaching approach. They feel this way because they have not experienced the effects of systematic multigrade teaching. There are research evidence from the world where it says the effects of achievement are the same with both monograde and multigrade teaching if carried out systematically.

There is evidence from a research carried out in Sri Lanka (Vithanapathirana, 2005) to indicate that multigrade teaching when effectively carried out yields in positive student outcomes.

An intervention to improve multigrade teaching was implemented with 16 teachers in 10 schools teaching to Grades 3, 4 and 5 different multigrade combinations. Table 1.1.

indicates the test scores for mathematics for Grades 4 and 5 before and after the interventions were done.

Table 1.1 Mean scores of pre- and post-tests for mathematics in intervention classes where teachers had training in multigrade teaching

<i>Grade Group</i>	<i>Pre-intervention test mean</i>	<i>Post- intervention test mean</i>	<i>% Gain</i>
Grade 4	40.6	77.6	+37.0
Grade 5	49.5	74.0	+24.5

Table 1.1 shows the pre-intervention mean scores, post-intervention mean scores and percentage gain in score in mathematics of students from Grades 4 and 5 learning in multigrade classes from 10 schools in Sri Lanka. All the teachers had received training in Multigrade teaching.

Table 1.2 shows the results from the same tests in five schools having similar conditions. However in these schools the teachers did not participate in the training intervention

Table 1.2 Mean scores of pre- and post-tests for mathematics in non-intervention classes where teachers did not have training in multigrade teaching

<i>Grade Group</i>	<i>Pre-test mean (no intervention)</i>	<i>Post- test mean (no intervention)</i>	<i>% Gain</i>
Grade 4	47.6	50.0	+2.4
Grade 5	31.0	37.0	+6.0

Table 1.2 shows clearly that the % Gain in score is very small in schools where teachers were not given any training. And the gain is extremely small when compared with the classes taught by the teachers who were trained to implement the new approach.

1.9 Preparing to transform the ‘necessity’ into a ‘positive pedagogy’

Having been through a lot of challenges and problems most multigrade teachers prefer to teach in monograde classes. However, teachers who participated in the intervention mentioned in the Section 7.0 indicated that they were highly satisfied with multigrade teaching as they were able to make a positive impact on the student achievement and also it eased their task.

References

Little, A.W. (2001) ‘Multigrade Teaching: towards an international research and policy agenda’ *International Journal of Educational Development*, 21, 6, 481-497

Little, A.W. (2006) ‘Education for all: Multigrade realities and histories’, in Little, A.W. (ed) *Education for All and Multigrade Teaching: challenges and opportunities*, Dordrecht, the Netherlands, Springer

Vithanapathirana, M. (2005) ‘Improving multigrade teaching: action research with teachers in rural Sri Lanka’, unpublished PhD thesis, Institute of Education, University of London

Module 2

The Context of Multigrade teaching: Reflecting on the challenges and needs analysis

2.0 Introduction

Multigrade teaching is considered more challenging than monograde teaching. Simultaneous provision of learning opportunities for children of different grade groups needs to be carried out through multigrade teaching. Teachers need to be trained for multigrade teaching. In some countries where multigrade teaching is recognised by educational policy as a useful and effective strategy teachers are trained for multigrade teaching.

In Sri Lanka teachers are trained for monograde teaching and the National Curricula for schools are prepared to suit monograde teaching. However a large number of teachers face the situation where they have to adopt multigrade teaching on a day to day basis. Working on the necessary adaptations to suit the multigrade learning and teaching in their own school remains to be the responsibility of the multigrade teacher. Multigrade teachers are usually isolated in their own schools. They have no opportunities for sharing of experiences. Often the teachers feel neglected and demotivated having to face the challenges alone.

This module intends to provide support for systematic reflection on the challenges of multigrade teaching. Working through this module will help to analyse your needs as a multigrade teacher.

2.1 Learning outcomes

By the end of Module 2 you will have

- considered challenges of organising instructional settings such as:
 - combining grade groups in Sri Lankan rural multigrade settings
 - timetabling practises of multigrade school
 - physical arrangements in multigrade classes/schools
- analysed your needs as a multigrade teacher

2.3 Combining grade groups

Read the following descriptions of the three schools having multigrade teaching needs in the Sabaragamuwa province in Sri Lanka. There are many other schools depicting similar conditions. None of the schools have a teacher per grade group. These schools have not had a teacher for each grade for many years. The three schools were located through a research study conducted by Vithanapathirana (2005) to study the nature of multigrade teaching in the primary grades. When reading the descriptions focus your attention on the available resources and the grade combinations adopted in each school.

School 'A' is an isolated, difficult-to-access small, village primary school (A Type 3 school). The annual average enrolment in School 'A' has been around 50 or fewer students over the past decade. In the current year the enrolment is 46. The distribution of students across the five grades is given in Table 2.1.

Table 2.1 Students in School 'A' by grade

Grade	No. of Students
1	12
2	8
3	7
4	12
5	7
	46

The school has only two teachers including the principal. The principal who lives in the town often is late to arrive in school or absent from school. In accordance to the circular the school is entitled to have only two teachers. The teacher is allocated with the Grades 1 and 2, while the principal is responsible for Grades 3, 4 and 5.

Activity 2.1

Express your views about the grade combinations of the school A

- When considering the student number what are your views of teaching to more than one grade group?
- According to your experience are there specific advantages of combining Grades 1 and 2?
- What are your views about combining three grades 3, 4 and 5 together in this school?
- What are the challenges the teacher would face when the principal is absent from school?

School B is a Type 3 school which has permission to function up to Grade 8. However, only five grades function in this school. Students from several villages attend this school as there is no other school for them to attend in the next 5km distance. The distribution of 126 students enrolled across the five grades are given in Table 2.2.

Table 2.2 Students in School 'B' by grade

<i>Grade</i>	<i>No. of Students</i>
1	26
2	39
3	24
4	24
5	13
	126

School B is officially entitled (according to Ministry guidelines) to seven teachers: five primary teachers, one primary English teacher and a principal. However, the school had been facing a severe shortage of teachers for more than a decade. At present there is a shortage of five primary teachers. The school had only a principal and an English teacher. The main reasons for the teacher shortage are the distance from the town, poor transport facilities, and lack of residential facilities. The Principal is the only qualified teacher from this community. The English master is from a distant town and he faces difficulties in finding a suitable place to live. He returns to his home village weekly. He is generally absent from school on Mondays and Fridays. In order to compensate for the lack of teachers two volunteers who have sat for GCE O/L from the community are mobilised by the principal as voluntary teachers. With these arrangements the grade groups are allocated among the members in the following manner.

Grade 1 and Grade 2 are assigned to the two volunteers. The Grades 3 and 4 are taught by the English Master and the Grade 5 is taught by the principal.

Although allocations are made in this manner this arrangement has not been practical due to irregularities of the presence of all members of the staff. Often the school has only one teacher.

Activity 2.2

Express your views about the grade combinations of school B

- What are your views about assigning the responsibilities of Grades 1 and 2 to volunteers who are not teachers recruited by the ministry ?
- What are your views about assigning a separate teacher for Grade 5 ?
- What do you think are the challenges this school face in combining grade groups when compared to School A?

School C is a village school having both primary and secondary grades in the same school premises (A type 2 school). The numbers of students across the grades are given in Table 2.3.

Table 2.3 Students in School ‘C’ by grade

<i>Grade</i>	<i>No. of students</i>	<i>Sub totals</i>
1	16	Primary students = 61
2	23	
3	5	
4	11	
5	6	
6	0	Secondary students= 17
7	3	
8	7	
9	5	
10	2	
	78	78

The school has a principal and a staff of six teachers. Of the six, three are assigned to the five primary grades and the other three are assigned to secondary grades. The number of teachers in the school changes frequently, as teachers are moved to and from the school through *ad hoc* transfers. Only three of the teachers are from this village and the others have to use the very poor transport facilities to reach this school which is 10 km away from the town. The teachers are assigned with the five grade groups in the following manner:

Grade 1 and 2 are assigned with two separate teachers while Grades 3 and 4 are assigned to one teacher. The Grade 5 has no teacher. The other three teachers are assigned with the teaching to the secondary grades. The principal when time permits would teacher the Grade5.

Activity 2.3

Express your views about the grade combinations of the school C

- What do you think are the challenges the School C faces in relation to the organisation of grade groups for multigrade teaching as a result of having secondary grades in the school?
- Do you think there are specific advantages of assigning separate teachers for Grades 1 and 2?
- What are your views about combining Grades 3, 4 and 5 together?

The research study which incorporated Schools A, B and C was extended to study the grade combinations of 38 schools. The following grade combinations were found to exist in 38 schools included in the study (see Figure 2.1).

Figure 2.1 Grade combinations of primary multigrade classes in 38 schools

<i>Grades</i>	<i>Grade combinations</i>											
1	X				X	X	X	X	X			
2	X				X	X	X			X	X	
3		X		X	X	X	X				X	X
4		X	X	X	X		X			X		
5		X	X		X				X		X	X
Total number of each combination	13	9	7	5	2	1	1	1	1	1	1	1

Figure 2.1 gives the grade combinations of the 38 schools. Rows titled as Grades represent grades 1 to 5. Each row represents one grade. The grade combinations are denoted with 'X' marks in the columns. The number of times that each combination is found among the 38 schools is given in the last row. For example there are 13 Grade 1+2

combinations among the 38 schools. The addition of grade combinations given in the last row adds up to more than 38 because in some schools there is more than one multigrade class.

Activity 2.4

- According to the Figure 2.1 there are more ‘consecutive’ or ‘adjacent’ grade combinations, than ‘discrete’ combinations. What are the possible reasons for this occurrence?
- According to the figure 2.1 there is a relatively a higher prevalence of Grade 1+2 and Grades 3+4+5 combinations. What do you think are the reasons for maintaining these grade combinations?

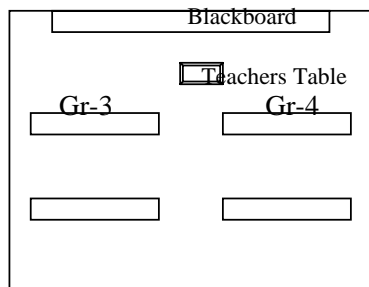
Activity 2.5 Grade combinations prevailing in your school

- How are the grade/student groups organized in your school?
- Which grade groups constitute your multigrade class?
- What are the numbers of student groups in each grade?
- What are the reasons for deciding on these grade combinations?

2.4 Physical arrangements of grade groups

In the above section we considered the possible combinations grade groups among the available teachers. The next important aspect is the physical arrangement of the grade groups of a multigrade class. At times the nature of the school building is an important factor determining the physical layout of multigrade classes. The following diagrams show the different physical layouts observed by Vithanapthirana (2005) in the 38 schools belonged to the study.

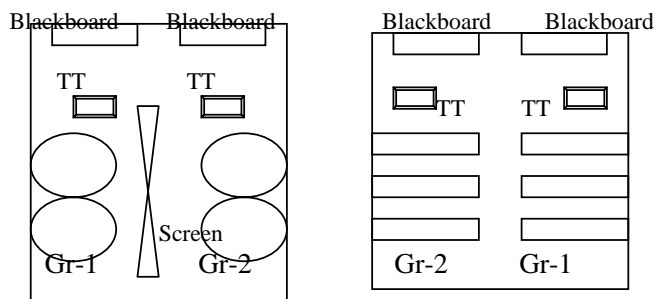
Figure 2.2 Grade groups in the same classroom facing a single blackboard



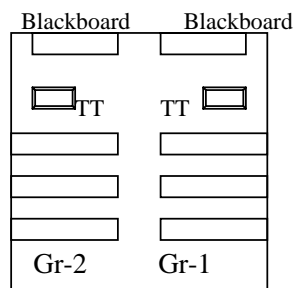
Layout A

Layout A: Here two grade groups are arranged separately in the same classroom facing a common black board and a single teacher's table.

Figure 2.3 Grade groups in the same classroom facing their own blackboards



Layout B

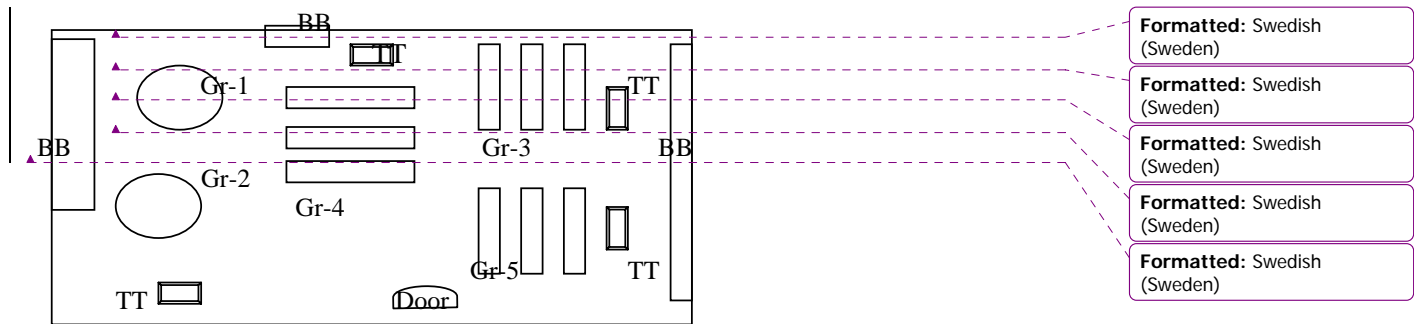


Layout C

TT- Teacher's Table, S- Screen

Layouts B and C. Here two grade groups are arranged in the same classroom side by side as two different classes. However in Layout B the grade groups are separated by a screen or a cupboard while in Layout C they separated only by a space. They face two separate blackboards and two teacher's tables. The teacher moves between the two tables and blackboards. In Layout B the grade groups are arranged as groups around a table while in Layout C the grade groups are arranged as rows.

Figure 2.4 Multigrade arrangement in hall type buildings



Layout D

BB- Blackboard, TT- Teacher' Table

Layout D: Here grade groups are arranged in a large hall with no partition. Some grades face their own blackboard and others sharing a common black board. Some grades sit circles and some are arranged in rows. Frequently two to three teachers are responsible for these grade groups. The un-partitioned open hall was preferred by the teachers as it enabled them 'to have an eye on all the grade groups' during the absence of each other.

Figure 2.6: Grade groups in separate classrooms



Layout E

BB- Blackboard, TT- Teacher's Table

Layout E: here the different grade groups are arranged in different classrooms and single teacher is in-charge and moves between the two rooms.

Activity 2.6

Look at the five layouts A to E of the multigrade classes.

- What might be the reasons for these arrangements of the classrooms?
- What are the advantages and the disadvantages that might result out of these arrangements in each situation ?
- Suggest possible classroom arrangement/s for your own multigrade class considering the above aspects.

Activity 2.7

Think about the grade combinations and their physical arrangement in your school.

- What are the reasons considered in deciding on arrangements of the classroom?
- What are the advantages and the disadvantages that might result out of these arrangements when adopting different timetabling techniques
- Suggest possible classroom arrangements for your own multigrade class considering the above discussed aspects.

Module 3

**Learning and teaching of mathematics in multigrade/multilevel settings
adopting a learner and materials-centred approach**

3.0 Introduction

In Sri Lanka the National Institute of Education develops National Curricula for monograde teaching. National curriculum frameworks are graded for cohorts of learners who entered school within the same calendar year.

The effectiveness of multigrade instruction is dependent on the support provided to teachers in planning and implementing teaching and learning. Teachers in multigrade classes need to maximise students' 'time on learning tasks'. This poses a greater challenge for multigrade teachers than for monograde teachers. This module intends to provide support to you in multigrade teaching and preparing learning materials.

This module will provide an example of an approach to curriculum in multigrade classes. The example is *mathematics*. This approach will also be useful for teaching in multi-level settings within monograde classes where the diversity of achievement among learners is great.

3.1 Learning outcomes

By the end of Module 3 you will have

- reviewed the distribution of themes and topics across grades in the existing national curriculum for mathematics
- appreciated the resequencing of topics for multigrade/multilevel teaching
- considered a multigraded curriculum based on a learner and materials-centred (work card) approach
- evaluated the roles of the multigrade teacher and the learner in adopting the new work card approach in multigrade teaching for combined classes of Grade 3, 4 and 5.

3.2 Learning Materials

For this module you will need to have with you

The five Teacher Guides for Grades 1-5 published by the National Institute of Education between 2001 and 2004.

3.3 The distribution of themes and topics across grades

Activity 3.1 Understanding the organisation of curriculum

Turn to the mathematics syllabus for each grade on the following pages

Grade 1 pp ix – x, Grade 2 pp ix – x, Grade 3 pp xii-xiii, Grade 4 pp ix – xii,
Grade 5 pp ix - xi

Formatted: Swedish
(Sweden)

Compare the list of contents across the 5 grades in two ways:

1. main headings e.g. 1.0, 2.0 etc
2. subheadings e.g. 1.1, 1.2, 2.1 etc

- What are your observations about the main headings?
- What are your observations about the subheadings?

From now on we shall call the main headings **THEMES** and the subheadings **TOPICS**

- Identify the similarities and differences in the **THEMES** (i.e. 1.0, 2.0, 3.0 etc) across the five grades
 - Identify the similarities and differences in the **TOPICS** (i.e. 1.1, 1.2, 2.3, 2.4 etc) across the five grades
 - What did you find? Were you aware of these similarities and differences before?
 - What difference does this knowledge make to you as a multigrade teacher?
-

Figure 3.1 is the mathematics curriculum blueprint which shows the distribution of themes and topics across the grades. This has been prepared by primary curriculum experts at the National Institute of Education.

Figure 3.1 Curriculum Blueprint for Mathematics Grade 1 to 5, 1999, Sri Lanka

Themes	Topic	Key Stage 1		Key Stage 2		Key Stage 3
		Gr1	Gr2	Gr3	Gr4	Gr5
Pre-number Concepts	Sorting	X	X	-	-	-
	One-to-one correspondence	X	-	-	-	-
	Ordering	X	X			
Number	Counting	X	X		-	-
	Number Concept	X	X	X	X	X
	Number Patterns	X	X	X	X	X
	Fraction	-	-	X	X	X
	Decimals	-	-		X	X
	Roman numerals	-	-	-	X	X
Mathematical operations	Addition	X	X	X	X	X
	Subtraction	-	X	X	X	X
	Multiplication	-	-	X	X	X
	Division	-	-	X	X	X
Measurement	Length and distance	X	X	X	X	X
	Weight	X	X	X	X	X
	Volume and Capacity	X	X	X	X	X
	Time	-	X	X	X	X
	Area	-	-	-	X	X
Money	Identification and transaction	-	X	X	X	X
Shapes and space	Solids and plane figures	X	X	X	X	X
	Right angle	-	-	-	X	X
	Directions	-	-	X	X	X
	Spatial concepts	X	X	X	X	X
Data handling	Tables and Graphs	-	-	X	X	X
		12	14	16	20	20

Source: Primary Mathematics Project, National Institute of Education, Sri Lanka (1999)

The blueprint comprises 7 mathematical themes and 24 topics arranged across three key stages and five grades. The 7 broad themes are subdivided into 24 'topics'. Of these 24 topics, eight (e.g. number concepts, number patterns, addition, length and distance, weight, volume and capacity, solids and plane figures, spatial concepts) are common to

Grades 1 to 5 and key stages 1, 2 and 3, while 16 are common to Grades 3, 4 and 5 and key stages 2 and 3.

3.4 Resequencing of topics

Activity 3.2 Reorganising the topic sequence in the curriculum

Turn to the ‘teaching-learning sequence’ for each grade. You will find these on the following pages in your Teacher Guides

Grade 1 pp xi, Grade 2 pp xi, Grade 3 pp xv, Grade 4 pp xii

Grade 5 pp xiii

- Compare the teaching – learning sequence of the topics in each grade. What are your observations about sequence of topics?
- What challenge does this sequence of topics pose for you as a multigrade teacher?
- How might you overcome this challenge?

A group of teachers considered this challenge for Grades 3 and 4. They compared the sequences for 3 and 4 and decided to make some small adaptation to the sequences. This made it possible for them to teach students in these two grades the same topic at the same time in the school year. The outcome of their work is shown in Figure 3.2.

Figure 3.2 Combined teaching sequence for Grades 3 and 4 Mathematics

Grade 3 & 4	Grade 3	Grade 4	Topic
Week 1	Week 1	Week 1	Number understanding up to 9 999
2	2	2	Adding two three-digit numbers
3	3	3	Subtracting a number from a number less than 999
4	6	4	Number Patterns
5	11	8	Solids and Plane figures
6	8	5	Multiplication
7	9	11	Division
8	10	7	Fractions
9	5	6	Measuring lengths
10	4	19 - Lesson 1 28 - Roman Numerals	Time Roman Numerals
11	7	20	Money transaction
12			Revision
13	15	16	Number understanding up to 10 000
14	17	21	Addition
15	18	22	Subtraction
16	19	9	Handling Data
17	13	18	Angles and Directions
18	21	17	Multiplication
19	22	24	Division
20	23	23	Area
21	30	10	Weight: Kilogram and gram
22	16	14	Fractions
23	14	13	Volume and Capacity: litre and milliliter
24	20	19 Lesson 2	Time
25			Revision
26	28	29	Measuring length
27	27	27	Money transaction
28	31	26	Tables and Graphs
29	26	33	Skills related to Symmetry and Space
30	32	28 & 15	Decimals: Addition and Subtraction
31	33	31	Volume and Capacity
32	34	32	Multiplication and Division
33	29	30	Weight: Addition and Subtraction (<i>kg</i> and <i>g</i>)
34	25	19 Lessons 3 & 4	Time
35	35	34	Revision: Time
36	36	35	Revision

Activity 3.3

Please study Figure 3.2. Take two of the topics e.g. multiplication and fractions. How many times does the teaching-learning sequence address 'multiplication' in Grade 3? In which weeks? How many times does the teaching-learning sequence address

‘multiplication’ in Grade 4? In which weeks? In the ‘combined sequence’ for Grades 3 and 4 how many times is multiplication addressed and in which sequence?

Now do the same for ‘fractions’.

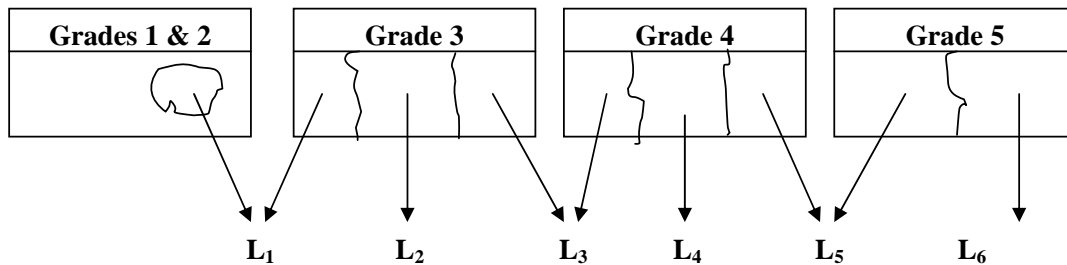
Would this type of re-sequencing make your work easier? Would it pose any obstacles for the student?

3.5 Learner-centred mathematics curricula

A *learner and materials-centred* approach is one of several approaches to a multigraded curriculum (Little, 2004). This strategy depends more on the learner and learning materials than on teacher input. The curriculum is translated into self-study graded learning guides. Learners work through these at their own speed with support from the teacher. Learning is constructed as involving a relationship between learner, learning materials and teacher.

In the following section we describe a strategy for re-organising the mathematics curriculum to enable the multigrade teacher who needs to combine Grade 3, 4 & 5. It is based on dividing the content of each mathematics topic and expected learning achievements into six levels.

Figure 3.3 Criteria for division of content and expected learning outcomes into 6 levels

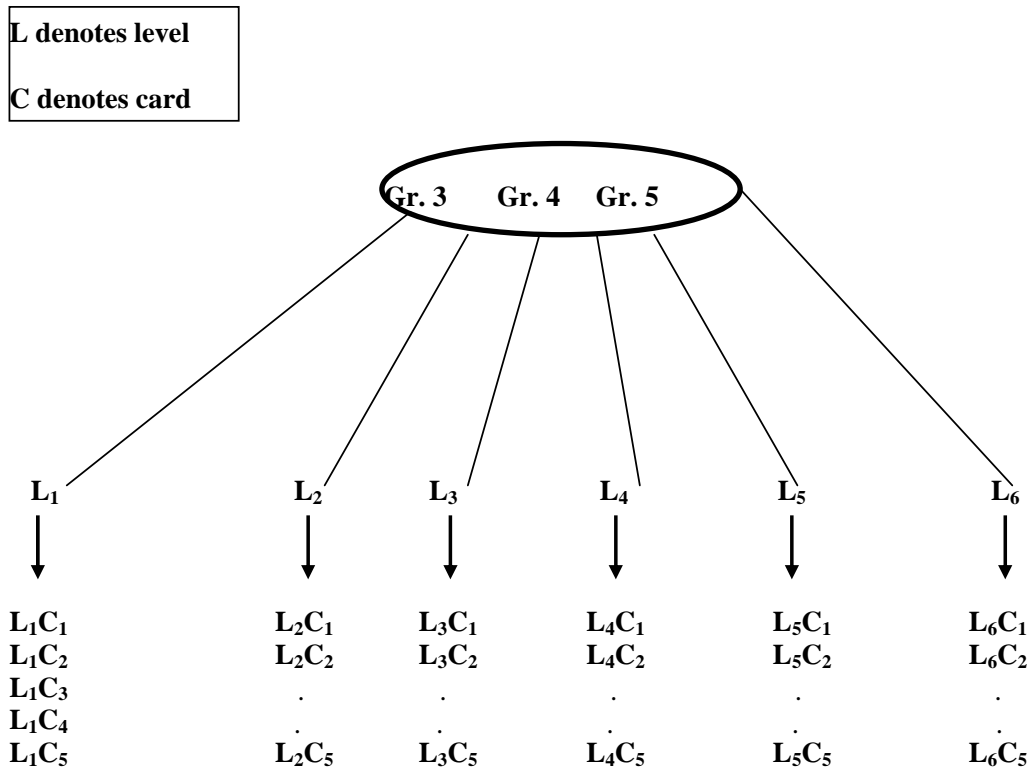


The curriculum content of a particular topic is divided into six levels. These levels are assumed to be attainable by students across Grades 3-5. In addition the lowest level L_1 is assumed to be attainable by the highest achievers in Grade 2. Similarly, the upper level of each grade is considered to be attainable by the highest achievers in one grade and the lowest achievers of the next higher grade. The symbols L_1, L_2, L_3, L_4, L_5 and L_6 , denote the levels of difficulty addressed by the curriculum topic. Hence L_6 for multiplication is considerably more difficult than L_2 .

Now look at Figure 3.4

Figure 3.4

**Structure of the pupils' learning material
Pack of assignment cards**



For each of the six levels of difficulty in a particular topic five learning activities are prepared in the form of workcards. These five are also ordered in increasing difficulty. For example L_1C_5 is the fifth work card and the most difficult activity for Level one, i.e. L_1 . L_5C_2 is the second most difficult activity for level five, L_5 .

Because we have six levels and five cards per level, there are 30 learning activities/workcards for each topic. The 30 cards enable the student to progress according to his or her level of achievement. By working successfully and successively through each card students move up the levels gradually and with mastery. If they fail to attain mastery on any single card the teacher should be encouraged him or her to repeat the card with appropriate support and guidance. In addition the teacher might suggest that guidance is provided by another student who has clearly attained mastery of the relevant learning activities.

Figure 3.5 provides an example of the structure of learning activities for one topic, subtraction, for Grades 3, 4 & 5. The six levels are presented first. Then each level is presented separately with its five learning activities/workcards.

Figure 3.5 The structure of learning activities for subtraction for Grades 3, 4 and 5

Six levels of learning (L) about subtraction across 3 grades and five types of activity card (C) per level
<p>L1 - Subtracting a number from a number less than 9 L2 - Subtracting a number from a number not greater than 99, without bringing forward L3 - Subtracting a number from a number not greater than 99 L4 - Subtracting a number from a three-digit number. Bringing forward from one place only. L5 - Subtracting a number from a three-digit number. Bringing forward in two occasions L6 - Problem solving involving subtracting a number from a number not greater than four-digits.</p>
<p><i>L1 - Subtracting a number from a number less than 9</i> L1C1 - Subtracting numbers less than 9 using material and reporting L1C2 - Subtracting numbers less than 9 using figures and reporting L1C3 - Subtracting numbers less than 9 by writing (in rows) L1C4 - Subtracting numbers less than 9 (across) L1C5 - Problem solving involving subtraction of numbers less than 9</p>
<p><i>L2 - Subtracting a number from a number not greater than 99, without bringing forward</i> L2C1 - Subtracting a number less than 20 from a number using material L2C2 - Subtracting a number from a number less than 20 (without bringing forward) L2C3 - Subtracting a number from a number less than 99 (with bringing forward without zero) L2C4 - Subtracting a number from a number less than 99 (without bringing forward with zero) L2C5 - Problem solving involving numbers not greater than 99, without bringing forward</p>
<p><i>L3 - Subtracting a number from a number not greater than 99</i> L3C1 - Subtracting a number from a number less than 20, without bringing forward (using material) L3C2 - Subtracting a number from a number less than 50 (with bringing forward without zero) L3C3 - Subtracting a number from a number less than 99 (with bringing forward without zero) L3C4 - Same as above (with zero) L3C5 - Problem solving related to subtraction less than 99 (with bringing forward and zero)</p>
<p><i>L4 - Subtracting a number from a three-digit number. Bringing forward in one place only</i> L4C1 - Subtracting a number from a three-digit number (without bringing forward) L4C2 - Subtracting a three-digit number from a three-digit number (bringing forward to unit's place only) L4C3 - Subtracting a three-digit number from a three-digit number (bringing forward to ten's place only) L4C4 - Subtracting from a three-digit number with bringing forward from one place only with zero. L4C5 - Subtracting a three-digit number from a three-digit number with bringing forward from any one place.</p>
<p><i>L5 - Subtracting a number from a three-digit number. Bringing forward in two occasions</i> L5C1 - Subtracting a number from a three-digit number (without bringing forward) L5C2 - Subtracting a three-digit number from a three digit number. (bringing forward from one place only) L5C3 - Subtracting a three-digit number from a three digit number. (bringing forward from ten's place only) L5C4 - Subtracting a three-digit number from a three digit number. L5C5 - Problem solving involving subtracting a three-digit number from a three digit number.(bringing forward from place)</p>
<p><i>L6 - Problem solving involving subtracting a number from a number not greater than four digits.</i> L6C1 - Problem solving involving subtracting a number from a number not exceeding four digits L6C2 - Subtract a four-digit number from a four-digit number (bringing forward from only place only) L6C3 - Subtracting a number from a four-digit number L6C4 - Problem solving involving subtracting a four-digit number from a four-digit number L6C5 - Problems solving involving subtracting a number from a number not exceeding four digits</p>

To date 500 workcards have been developed by groups of teachers working together with curriculum experts. These can be obtained by contacting Dr. Manjula Vithanapathirana, Faculty of Education at the University of Colombo, Reid Avenue, Colombo 3.

3.6 Incorporating these learning activities into your lesson plan

Finally, how might you incorporate the use these graded learning activities/workcards into your teaching?

The following suggestion might help. The lesson plan should have three main parts.

- whole class introduction
- differentiated learning tasks
- whole class review and homework setting).

First, select the topic that will be followed by Grades 3, 4 and 5 at the same time. Ensure that you have the relevant learning activities available for all the students (you will need to create your own activities/workcards or contact Dr Manjula Vithanapathirana, Faculty of Education, University of Colombo, Reid Avenue, Colombo 3).

Second, read the teacher's guide for Grades 3, 4 and 5, especially the sections that focus on teacher inputs at the beginning of the lesson. Compare the suggested input against the workcards that you will use with all your students. Start with the recommended whole class input for Grade 3. Then suggest that the students whom you think are achieving at Levels 1 and 2 begin work on their cards. Move on to the recommended teacher guide input for Grade 4 and suggest that students whom you think are achieving at Levels 3 and 4 begin work on their cards. Both of these whole class inputs introductions will act as important revision for Level 5 and 6 students. Complete the whole class introduction for Grade 5, followed by Level 5 and 6 learning activities. Then move around the class providing specific guidance as appropriate.

If high achieving students in Grade 3 are capable of working at a level higher than group the students accordingly. Similarly if low achieving students in Grade 4 would benefit from working at a lower level then group the students tactfully without making them feel that they are working at a lower grade level. In many cases it will be appropriate to encourage higher achieving students to help and 'teach' (peer-learning) lower achieving students. This is beneficial for both students. The lower achieving student learns from a peer. The peer consolidates his or her own learning through the act of 'teaching'.

Create a record chart for each students organised by topic, levels and cards. Mark the students work on each card. Where mastery is not achieved provide guidance. Where mastery is achieved, mark the record, giving the student due encouragement. Older students can be encouraged to fill the record themselves.

In the final 5-10 minutes of the lesson call the students together for a question and answer session (with questions posed at appropriate levels of difficulty for students working at the different levels) and the setting of homework.

After you have tried this out a few times you may wish to modify your inputs at the beginning of the lesson. You may also prefer to concentrate your input on the students working on the lower levels first, while the students working at higher levels continue to work on activities from an earlier lesson. Once the first group begin their individual work you can move to the students working at the upper levels. The important thing is to experiment and see what seems most comfortable and productive for you and the students.

Activity 3.4

- Use the cards in the classroom according to the suggested lesson plan above (i.e. whole class introduction, differentiated learning tasks and whole class review and homework setting).
- Then try another on a different topic using a lesson plan prepared according to the same structure and observe what happens to the following:

- Students' time on task,
- Independent learning of students,
- Peer collaboration to facilitate learning,
- Time management of the teacher,

➤ What are the advantages that you experience by using the differentiated learning activity approach when compared with your usual teaching practices?

➤ Do you have any concerns about this approach?

.....

3.7 Summary

The general idea of this curriculum re-organisation is the identification of topics common across grades, the examination of how each is handled in current curriculum materials, the creation of a continuum of learning objectives for the same topic across the grades, and the re-sequencing across the school year so that students in different grades are following the same topic at the same time. Since each topic will usually be revisited more than once during the school year at successive levels of difficulty the idea is to subdivide the learning objectives for each grade level into hierarchically linked sub-objectives.

All students will benefit from the teachers' inputs designed for the achievement of lower levels of learning. For students achieving at the lower levels this input will be new and challenging. For students who have experienced difficulty in achieving at this level in the past the input will act as important remediation. For students capable of achieving at higher levels the inputs will act as important revision and consolidation. Teacher inputs

designed to support higher levels of learning the same topic may be confined to those students working at these levels. Lower level students can be working on their learning activities/workcards while the teacher provides the higher level input to the upper level students.

Because the topic is basically the same and because you as a teacher are competent in each of the levels expected of the students your lesson planning task is made easier. Your challenge is in being able to assess what the student has achieved already and being able to help him or her move to the next level. If you could let us know how you managed to address this challenge and any workcards/activities that you have developed yourself, then you will be making a valuable contribute to the further development of these modules. Please contact: Dr. Manjula Vithanapathirana, Faculty of Education at the University of Colombo, Reid Avenue, Colombo 3.)