

**Improving Multigrade Teaching:
Action Research with Teachers in Rural Sri Lanka**

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Abstract

The study focuses on prevalence, problems and effective strategies for multigrade teaching. Through an intervention, planned and implemented collaboratively with teachers, the study contributes to the improvement of multigrade teaching and status of primary education in Sri Lanka.

The five research questions addressed by the field study were as follows: (i) *What are the contextual characteristics of multigrade teaching rural schools?* (ii) *What are the current practices of multigrade teaching and the challenges faced by these multigrade teachers?* (iii) *What innovations could be planned to improve multigrade teaching?* (iv) *What is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?* (v) *What is the impact of the intervention?* The action research framework developed to address these questions was a multi-phased field study. The sample area was confined to a rural education zone.

Phase 1 involved condensed fieldwork in thirty eight schools and a study of multigrade practices through case studies in three schools. Phase 2 involved developing an innovative strategy for multigrade teaching and its adoption through an intervention with seventeen multigrade teachers from ten schools. Phase 3 studied the impact on student achievement through a pre- and post-test-one-control-group quasi-experimental design and obtaining feedback from teachers on their satisfaction.

Multigrade teaching was found to be a necessity in a range of school contexts and their quality of teaching was unsatisfactory. During the intervention the innovative lesson planning strategy accompanied by a reorganisation of mathematics curriculum was adopted by multigrade teachers over a period of seven months. In-service support was provided through workshops and school visits. The impact of the intervention was positive.

The study recommends policy adjustments for reorganisation of the national primary curricula to facilitate multigrade lesson planning, capacity building of teacher educators on multigrade teaching, incorporation of multigrade teaching in teacher education curricula accompanied by the use of collaborative frameworks in teacher capacity building. The recommendations for research include follow-up studies on the intervention, studies on prevalence of multigrade teaching, and small-scale action research to evolve successful multigrade classroom practices.

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Abbreviations

APEID	Asia and Pacific Programme of Educational Innovation for Development.
DEO	Divisional Education Office
ELC	Essential Learning Competencies
EFA	Education for All
ERA	Environment Related Activities
FAO	Food and Agriculture Organisation of the United Nations
GCE(A/L)	General Certificate of Examinations (Advanced Level)
GCE(O/L)	General Certificate of Examinations (Ordinary Level)
GDP	Gross Domestic Product
GNP	Gross National Product
Gr	Grade
IIEP	International Institute for Educational Planning (UNESCO)
ISA	In-service Advisor
KS	Key Stage
MEHE	Ministry of Education and Higher Education
NCOE	National Colleges of Education
NEC	National Education Commission
NEREC	National Education Research and Evaluation Centre
NIE	National Institute of Education
OECD	Organisation for Economic Co-operation and Development
PGDE	Post Graduate Diploma in Education
PMP	Primary Mathematics Project
PSEDP	Plantation School Education Development Programme
PSDP	Primary School Development Programme
RQ	Research Question
SIDA	Swedish International Development Cooperation Agency
SRA	Senior Research Associate
TPR	Teacher-Pupil Ratio
UNESCO	United Nations Educational, Scientific and Cultural Fund
INRULED	International Research and Training Centre for Rural Development
UNICEF	United Nations International Children's Emergency Fund
ZEO	Zonal Education Office

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Dedication

I dedicate this thesis,

**“to my dearest son, Subhash Madhawa who,
understands me and my work”**

and

**“to the teachers and students in multigrade contexts
all over the world”**

Manjula

CHAPTER 1

INTRODUCTION

This chapter introduces the reader to a study of multigrade teaching in Sri Lanka. It opens with a description of the significance of multigrade teaching from a global perspective which is followed by an explanation of the rationale and origin of the study. The major portion of the chapter describes the background to the problem under study. Finally, the purpose of the study, the research questions, the conceptual framework, and the organization structure of the thesis are explained.

1.1 Meaning and significance 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, in contrast to ‘monograde teaching’ where one teacher is responsible for a single curriculum grade within a timetabled period (Little, 2001: 477). Schools with multigrade classes are referred to as multigrade schools.

Effective multigrade teaching involves much more than assigning one teacher for several grades. The effectiveness of multigrade instruction would be determined on the quality of the teacher and the nature of suitable teaching methods. It is considered a more challenging task than monograde teaching as it involves giving the children of several different age groups their appropriate grade level knowledge, attitudes and skills in a range of subjects by a single teacher. In a well organised multigrade class, groups of students need to be engaged in various learning activities throughout the day (Thomas and Shaw, 1992).

In Sri Lanka the schools are organized for monograde instruction, where each grade is expected to be instructed by a single teacher. Multigrade teaching has

not been considered as an option for providing education within the primary education context in Sri Lanka. Two of the pioneer primary curriculum developers in Sri Lanka have admitted that multigrade pedagogy is a theme hardly addressed either in teacher education curricula or in primary curriculum materials (Peiris and Nanayakkara, 2000, MEHE, Sri Lanka: 2000c).

In most of the world's education systems, formal education is imparted in a monograde teaching environment, where age and grade are the decisive factors for forming a structure for formal schooling. In spite of these attempts, multigrade classrooms are found in many countries in the world (Little, 1995). Multigrade teaching is found to arise under what are considered to be various conditions of 'necessity'. As such, it is necessarily adopted in conditions where schools cannot be supplied with teachers for monograde teaching due to economic and demographic reasons. Multigrade classes mainly occur in schools situated in areas that are isolated, deprived and disadvantaged. Such areas are mostly located in rural localities.

Although multigrade teaching exists throughout the world, its presence is rarely recognized by the education policies of the different countries. Little (1995:7) summarises the general status of multigrade teaching within systems of education.

It is an educational condition barely addressed in national policies of education, almost non-existent in the content of teacher education courses and mostly ignored by national curriculum developers. Where the issue has been a matter for research, the findings are generally reported in journals which deal with matters rural or peripheral to the main stream of educational debate. It is essentially a problem faced by teachers and students in peripheral rural areas unsupported and unrecognised by mainstream and centralised education systems.

Nielson et al, (1993:1) identify the following as one of the reasons for the lack of attention of policy makers to multigrade teaching.

More often than not they have been considered a temporary aberration, a deficient kind of school that will whither away in time.

Little (2001) argues 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. It is also claimed that, non-enrolment in education could be the only other option available for the children who live in the marginal conditions that make multigrade teaching a necessity.

In the absence of any recognition for multigrade teaching in the education system of a country, the majority of the multigrade teachers operate with very little training in multigrade practice and have little curricular material designed to support multigrade teaching and learning. Most of the teachers who are faced with the multigrade situations are compelled to adopt suitable classroom and curriculum management strategies by trial and error.

Researchers indicate that there seem to exist situations where multigrade teaching is adopted by 'choice', having been recognised as an effective pedagogical option (Veenman, 1995; Little, 1995; Mason and Burns, 1997). However, such examples are not widely discussed in the literature. Multigrade schools offer small towns and villages, an alternative to the closure or consolidation of uneconomical single grade schools (Bray, 1987).

Draisey (1985) points out that multigrade teaching should not be visualised as a problem or as a response to a problem but as an opportunity with its own advantages. Thomas and Shaw (1992: 4-5) have put forward arguments in support and also against multigrade teaching. The following arguments are cited in support.

- Efficient means of providing basic education in thinly populated areas, utilizing scarce educational inputs, such as trained teachers, classrooms, and materials
- Multigrade students can attain higher achievement levels, especially in math, language and sciences
- Maintaining a rural school is important in building village identity and cultural life
- Benefit girls by expanding available opportunities for learning
- Students 'learn to learn' and 'learn to teach' through independent inquiry and peer tutoring

- Individual students and teachers develop a strong relationship over time, which helps the teacher to assess the student and adopt appropriate teaching strategies
- Students benefit from the unique multiage and peer socialization patterns in multigrade classes
- The stigma associated with repetition is removed

The following arguments are cited against multigrade teaching:

- Student achievement may show a decline if programmes are not supported by the required resources and teachers not properly trained
- Demands on teachers' time and organizational capabilities are high and
- Students may receive less individual attention and must often work independently

The same authors indicate the as critical elements in supporting multigrade schools.

- Teachers need to adopt more effective teaching practices to make multigrade schools function properly
- To do so, teachers require adequate material and physical inputs
- Local and regional support networks need to be developed among teachers and
- There must be national level support for pilot programs, including both financial support and active involvement of a few key multigrade advocates.

(Thomas and Shaw, 1992: iii)

In some countries schools with multigrade teaching have gained official recognition. Among these countries Colombia holds a prominent place. Colombian 'Escuela Nueva' or the 'New School' is an officially recognized model programme of multigrade teaching. It has survived for more than two decades to date and it is the most well-known multigrade programme in the world. The special significance of the innovation is its local origin, since then it became a national policy and subsequently was adopted by other countries in the region. The success of the innovation has been shown by its survival and proliferation (Colbert et al, 1993). Another emerging example of a recognized multigrade innovation is the UNICEF assisted multigrade teaching programme in Vietnam (Aikman and Pridmore, 2001). These examples offer lessons for other countries on the importance of recognising multigrade

teaching as a means by which to improve the quality of primary education. Studies have shown that students benefit from multigrade programmes when they are properly implemented (Pratt, 1986; Miller, 1991; Thomas and Shaw, 1992; Veenman, 1995 and Mason and Burns, 1997).

1.2 Background to the problem

This section presents the background to the problem. It gives a policy context which explains the status of recognition for multigrade teaching in Sri Lanka. It shows the nature of its prevalence and argues in favour of multigrade teaching in Sri Lanka.

1.2.1 Estimating the prevalence

The school census database of the Ministry of Education does not include statistics on the prevalence of multigrade teaching in the country and there are no criteria defined for the identification of multigrade schools. There is no evidence to show the exact degree of prevalence of multigrade teaching. Hence, it is not possible to identify the number of schools implementing multigrade teaching in Sri Lanka.

Several educationists have reported the existence of multigrade teaching in Sri Lanka. Ekanayake (1982) reported the incidence of 'multigrade schools' as 33% of the total number of schools in Sri Lanka. Baker (1988) who did a study on a disadvantaged district in Sri Lanka reported the existence of a considerable amount of 'multiple class teaching' in small schools. Abhayadeva's (1989) estimate in the late 'eighties indicates that 24% are schools with multigrade teaching. Little (1995) has reported that one-teacher schools accounted for 2% of the country's schools and that two-teacher schools accounted for 5 % of all schools in 1991. Sibli (1999) based on 1997 school census data indicates that 12% of schools have three or less teachers, quoting 1252 out of 10120 schools.

Further evidence shows the existence of multigrade teaching in Sri Lanka. Some of these conclusions that multigrade teaching schools are in evidence, however, are inferred from given terms such as 'disadvantaged rural schools' and 'one-, two- or three-teacher schools'. The following citations bear evidence for this.

A UNICEF report (1980) indicates:

A major area of inequalities in Sri Lanka today is the existence of a group of disadvantaged schools categorised as 'small schools'. These are found in rural and often remote areas, in urban slums and in plantations. They have enrolments ranging from less than a hundred students to approximately two hundred students, an inadequate supply of teachers and minimal facilities, reflecting thereby both economic and educational deprivation.

Ratnaike (1987 quoted in Abhayadeva, 1989: 2) a committed policy maker who was concerned about education in Sri Lanka commented:

.....such schools generally cater to disadvantaged populations in rural areas whose earnings are low and unstable. In addition to paucity of teachers, such schools have inadequate physical facilities, equipment, and books and are neglected by the education system in regard to maintenance, repair and supervision. They remain in a state of suspended animation. They are charged with providing education to over a quarter of million children. Since there are only one or two teachers per school of five grades, no teaching occurs for many children over large portions of the year.

Jayaweera (1991: 3), has emphasised the need for finding suitable alternatives in order to yield the fullest benefit of extension of educational opportunities, and achieve the targets of 'Education for All'. It is stated as follows:

As high abilities and talents are not confined to a socio-economic elite, it is not possible to provide opportunities for the fullest development of human potential in the total population without ensuring equity. Like the gems that lie embedded and unseen in the soil, undeveloped abilities that have potential for excellence could be unrecognised and wasted. On the other hand without promoting excellence, equity can lead to aridity. Neither individuals nor the nation can benefit optimally from the extension of educational opportunity if dull uniformity and rigidity distort aptitudes and depress standards and levels of achievement.

From the above citations it could be assumed that although the actual term ‘multigrade teaching’ had not itself been mentioned frequently, it is emphasised that conditions in rural school contexts where teacher shortages contribute to malfunctioning and low quality in student outcomes, have to be improved, and this in turn would have an impact on multigrade teaching.

An attempt was made to estimate the prevalence of multigrade teaching schools, using the most recent school census data available at the time. The ideal strategy would be to make an estimate of schools with less number of teachers than the number of functioning grades in the primary tier. However, such a calculation could not be done because in some schools teachers work in both the primary and secondary tiers of the same school and also because it was not possible to establish the total number of schools having four or less teachers in the primary tier. The schools fulfilling this criterion among the ones having both primary and secondary grade spans were unavailable in the school census database. Therefore, the most straight forward estimate was to consider the schools with four or less teachers, because five teachers is the least number to fulfil monograde teaching in all primary classes of a school, which would be the minimum estimate. In reality the number of schools undertaking multigrade teaching, and therefore which must have these needs met would be more.

Table 1.1 shows the number of schools with four or less teachers in Sri Lanka by province and by district, based on the 1998 school census. Based on this criterion, the estimate was 18% (1851 schools). It shows that all provinces and districts of the country have schools that needed to adopt multigrade teaching. The percentages range from 7.57% to 30.78% in Southern and Northern provinces respectively.

Table 1.1 Schools with four or less teachers in Sri Lanka, 1998

<i>District/Province</i>	<i>Schools with 4 or less teachers</i>	<i>(%)</i>	<i>Rank</i>
Colombo	22	4.98%	8
Gampaha	44	7.62%	
Kalutara	74	16.19%	
Western	140	9.49%	
Kandy	79	11.47%	5
Matale	66	20.63%	
Nuwara Eliya	141	44.06%	
Central	286	18.69%	
Galle	63	12.80%	9
Matara	10	2.54%	
Hambantota	19	5.74%	
Southern	92	7.57%	
Jaffna	135	32.92%	1
Kilinochchi	32	38.09%	
Mannar	49	56.32%	
Vavunia	103	58.86%	
Mullatiyu	42	45.65%	
Northern	361	30.78%	
Batticaloa	123	41.74%	2
Ampara	89	22.42%	
Trincomalee	47	19.50%	
Eastern	259	28.83%	
Kurunegala	122	12.88%	7
Puttalam	38	10.73%	
North Western	160	12.29%	
Anuradhapura	100	27.54%	4
Polonnaruwa	49	22.79%	
North Central	149	19.15%	
Badulla	101	17.57%	6
Monaragala	46	17.69%	
Uva	147	17.60%	
Ratnapura	117	19.63%	3
Kegalle	140	23.60%	
Sabaragamuwa	257	21.61%	
Total	1851		

The provinces are ranked as ‘very high’, ‘high’ and ‘low’ based on the prevalence of schools with four or less teachers out of the total number of schools in the province. 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. Further analysis indicates that about 90% of these schools are exclusively primary schools.

1.2.2 Reasons for non-availability of ‘a teacher per grade’

When considering the reasons for non-availability of a teacher for a certain grade, the existing norms for teacher deployment have to be examined. Teacher deployment is carried out on the basis of a fixed Teacher-Pupil Ratio (TPR). In 1998, the TPR for the entire general education was 1:24. For Grades 1 to 5 it was 1:32 and was expected to improve to 1:27 (MEHE, Sri Lanka, 2000c). Teacher requirements are also calculated on the basis of the TPR. The norms for teacher deployment at the time of the commencement of the study are given in the circular 1997/04 issued on 8th April 1997 (MEHE, Sri Lanka, 1997). This is the tool developed to calculate the staff entitlement for each school. Table 1.2 provides an extract from it showing the student population ranges required for a teacher entitlement of five or less teachers:

Table 1.2 An extract of the circular on teacher cadre entitlement

<i>Primary student numbers</i>	<i>Primary teacher entitlement</i>	<i>English teacher entitlement</i>
25-44	1	1
45-74	2	1
74-114	3	1
115-164	5	1

According to the extract shown in Table 1.2, all schools with less than 114 students would be entitled to four teachers only, irrespective of the number of grades in the school.

An amendment to the circular 1997/04 provides criteria for the appointment of principals. It states that, in schools with Grades 1-5 or 1-8 and having 114 or less students, one of the teachers should act as the principal as such schools would not be entitled to have a separate principal. The guidelines given by the amendment 3/PPR/PP/134 issued on 1997.07.25 indicate that the principal should teach a minimum of 10 hours in addition to undertaking their administrative duties.

Another reason why the need for multigrade teaching arises is that of teacher absenteeism. The rate of teacher absenteeism is 11.4%. (MEHE, Sri Lanka, 2000b). Multigrade teaching is likely to arise in most schools due to teacher absenteeism if supplementary arrangements cannot be arranged to cover the work.

1.2.3 A need to recognise multigrade teaching for the future

In future, it will be important to acknowledge that multigrade teaching is important. Rupasinghe (2001) shows a 'polarization effect' in the school system in Sri Lanka, where small schools continue to get smaller while larger schools expand (Table 1.3).

Table 1.3 shows the changes in the number of schools of different sizes in 1981, 1991 and 2000. It also shows a gradual increase in the percentages of schools with less than 50 students, as well as schools with more than 2000 students, during the past two decades. Percentages of small schools with less than 50 students are on the increase with 6.8% in 1981, 8.9% in 1991 and 12.9% in 2000. Similarly, percentages of schools with 2000 or more students are 0.8% in 1981, 1.7% in 1991 and 2.9 in 2000. This phenomenon is caused by urban migration of populations, improvement in transport facilities leading

to an increased demand for urban schools, and parental preference to send children to schools which are bigger and popular.

Table 1.3 Distribution of schools by size in 1981, 1991 and 2000

<i>Student No.</i>	<i>No. of schools in 1981</i>	<i>%</i>	<i>No. of schools in 1991</i>	<i>%</i>	<i>No. of schools in 2000</i>	<i>%</i>
1 - 50	653	6.8	899	8.9	1294	12.9
51 - 100	1596	16.8	1291	12.9	1351	13.6
101 - 200	2066	21.7	1986	19.9	2005	20.1
201 - 500	3122	32.8	3120	31.3	2830	28.4
501 - 1000	1519	15.9	1753	17.6	1480	14.8
1001 - 1500	384	4.0	582	5.8	529	5.3
1501 - 2000	110	1.2	198	1.9	198	2.0
2001 or more	81	0.8	169	1.7	285	2.9
Total number of schools	9531	100.0	9998	100.0	9972	100.0

Source: Rupasinghe (2001)

In addition to this apparent polarization of school size, in general the number of students and teachers in the system are predicted to decline. The enrolment trends of the primary school age students, when examined, show a decrease over the last two decades. From 1990 to 1998 the enrolment has declined by 10% (UNESCO, 2000). This reduction in the size of the school age cohort is explained as a result of declining birth rates. The annual rate of population growth in Sri Lanka in 1998 was 1.2% (Central Bank, Sri Lanka, 1998). With this trend of declining student enrolment, the demand for teachers too, is predicted to decline over the next decade. With fewer teacher in the system, teacher deployment for rural areas would prove to be difficult (Aturupane and Abeygunewardena, 2000). Another aspect one cannot disregard is the population displacement and teacher shortages faced in the Northern and the Eastern provinces of the country where there has been unrest for more than two decades. There will be a heavy demand for multigrade teaching in providing education for situations such as these.

Although there have been attempts to give recognition to multigrade teaching, the impact of such attempts did not get broadened to make a significant change in the educational policy. The teachers who are trained through initial

teacher education courses are compulsorily required to serve in schools which are mostly small schools in rural areas. Hence, it is a felt need to make the prospective teachers who are following courses at National Colleges of Education and Faculties of Education, skilful in multigrade teaching. It will improve the employability of the new teachers. In such a context this study makes an effort to bring into limelight the issues concerning multigrade teaching and evolve a research-based intervention for the improvement of multigrade practice.

1.3 Origin of the study

This study originated in late 1999 as a fundamental part of the multi-site international research project on multigrade teaching initiated by a team of researchers at the Institute of Education, University of London, and this was funded by the Department for International Development (DFID), United Kingdom. The sites of the international project were Peru, Sri Lanka and Vietnam (Little, 2001: 567-568). The project objectives were as follows:

- Describe the extent of multigrade practice and associated problems in Peru, Sri Lanka and Vietnam.
- Describe in detail how teachers currently organise teaching in multigrade primary schools.
- Conduct an intervention study in classrooms with teachers on the organisation and management of the multigrade classrooms.
- Make recommendations on multigrade teaching policy and practice.

An important component of the project was to conduct three research studies at post-graduate level by local researchers in Peru, Sri Lanka and Vietnam. The project awarded a scholarship to each of the researchers to design and carry out a study in each country. The researchers from each country independently designed a study on multigrade teaching. The researchers benefited from reciprocal visits to schools with multigrade teaching in all three

countries involved in the project. The visits focused in the widening of perceptions of multigrade teaching and sharing experiences in conducting research.

I was selected to participate in the project, while engaging in teaching at the Faculty of Education of the University of Colombo as a junior Lecturer. My interest in the study was due to the exposure that I had on the problems of the education system in Sri Lanka during my career. I started my career in education as a researcher at the Department of Educational Research, National Institute of Education (NIE). During the ten years I spent at the NIE, I developed insights into the education system of the country and gained experience through participating in a number of research studies. With this background I embarked on this study in the hope of making a contribution towards the quality improvement in primary education, with special reference to multigrade teaching in rural Sri Lanka.

As I had not worked as a multigrade teacher, it was thought that some professional experience in multigrade teaching would be helpful. To address this need, I engaged in multigrade teaching by serving in a multigrade class in a small school for two weeks. In this preliminary exercise I was supported by the Sri Lankan Senior Research Associate (SRA) of the International Multigrade Project, Mr. M. Sibli and the London Supervisor, Prof. Angela Little. After a six month study period at the Institute of Education, University of London I designed this study on multigrade teaching in Sri Lanka.

1.4 Aim and objectives of the study

The aim of the study is, “to study the status of multigrade teaching and contribute to its improvement”. Through considering the objectives 1, 2, 3 and 4 of the main project, the following were formulated as objectives of the study of multigrade teaching in Sri Lanka. The objectives were to:

1. describe the prevalence of multigrade practice, the nature of multigrade contexts and associated problems,
2. describe how teachers currently organise teaching and learning in multigrade primary schools,
3. conduct an intervention study in classrooms with teachers to make a positive change in the organisation and management of the multigrade classrooms, and
4. synthesise findings and make recommendations on multigrade teaching policy, practice and research.

1.5 Research questions

The purpose of the study is to fulfill the need to raise awareness regarding improving multigrade teaching in policy makers, curriculum developers and teacher educators in Sri Lanka. In order to achieve this, it was necessary to investigate the status of multigrade teaching and then to make a suitable intervention to improve the quality of multigrade teaching. Hence, the study needed to be designed with an action-orientation. Seven research questions were formulated to guide the study.

Firstly, it was necessary to gain an understanding of practice and also the prevailing status of, multigrade teaching, to design the study. Therefore, the first research question is, *“What is the nature of the knowledge on practice of and research on multigrade teaching, that could be synthesised through literature?”*

Secondly, in order to contextualise the study within the primary education system in Sri Lanka the question *“What is the nature of the setting for multigrade teaching within the primary education context in Sri Lanka?”* is asked.

Thirdly, to locate the study in multigrade contexts, and to understand the characteristics and conditions under which multigrade teaching occurs, a third research question is formulated, *“What are the contextual characteristics of multigrade teaching schools in rural Sri Lanka?”*

Fourthly, in order to understand how teachers handle multigrade classes, the fourth research question is formed “*What are the current practices of multigrade teaching and the challenges faced by multigrade teachers in rural Sri Lanka?*”

Arising from research questions 2, 3 and 4, the fifth research question is “*What innovations could be planned to improve multigrade teaching?*”

Attempts to establish interventions to improve multigrade teaching, give rise to the sixth research question, “*What is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?*”

Following on from issues of intervention, the seventh question arises: “*What is the impact of the intervention?*”

The research questions are summarized as follows:

1. What is the nature of the knowledge on the practice of and research on multigrade teaching, that could be synthesised through literature?
2. What is the nature of the setting for multigrade teaching within the primary education context in Sri Lanka?
3. What are the contextual characteristics of multigrade teaching schools in rural Sri Lanka?
4. What are the current practices of multigrade teaching and the challenges faced by multigrade teachers in rural Sri Lanka?
5. What innovations could be planned to improve multigrade teaching?
6. What is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?
7. What is the impact of the intervention?

1.6 The action-oriented conceptual framework

The action-oriented conceptual framework of the study and the structure of the thesis are laid out based on the research questions (Figure 1.1). The framework defines the major action orientations of the study showing the phases and steps. Each chapter is located within this framework illustrating the progressive development of the thesis.

The thesis is presented in ten chapters. Chapter 1 of the thesis presents the introduction and the rationale. It argues for the need to improve multigrade teaching in Sri Lanka with discussions on prevalence and policy recognition.

Chapter 2 is the review of the literature on multigrade teaching that provides the conceptual definitions, the parameters of multigrade teaching and the status of multigrade teaching internationally. Chapter 2 addresses the research question 1 (RQ1).

Chapter 3 locates the study within the primary education context in Sri Lanka. It presents the issues of the primary education system in Sri Lanka which have a bearing on multigrade teaching. Chapter 3 addresses RQ2.

Chapter 4 presents the methodology. This chapter first describes the development of the action research framework, using the classical models of action research. Secondly, it describes the initial assumptions and methods, while arguing for an emergent/flexible design for the field study.

The action research is framed as a three-phase study and is presented in the five chapters, 5, 6, 7, 8 and 9.

Chapters 5 and 6 present Phase 1 of the study, the 'fact-finding' phase. Chapter 5 presents Phase 1: Step 1, the status of rural multigrade school contexts in a selected education zone. Chapter 5 addresses RQ3.

Chapter 6 presents Step 2 of Phase 1. It incorporates three case studies of multigrade classes in three schools (RQ4) selected from Step 1. First, the three case studies are presented according to a format and secondly, a ‘cross case analysis’ identifies the commonalities and differences of practice between multigrade teachers, and makes an attempt to identify the needs and opportunities for improving multigrade teaching. Chapter 6 addresses RQ4.

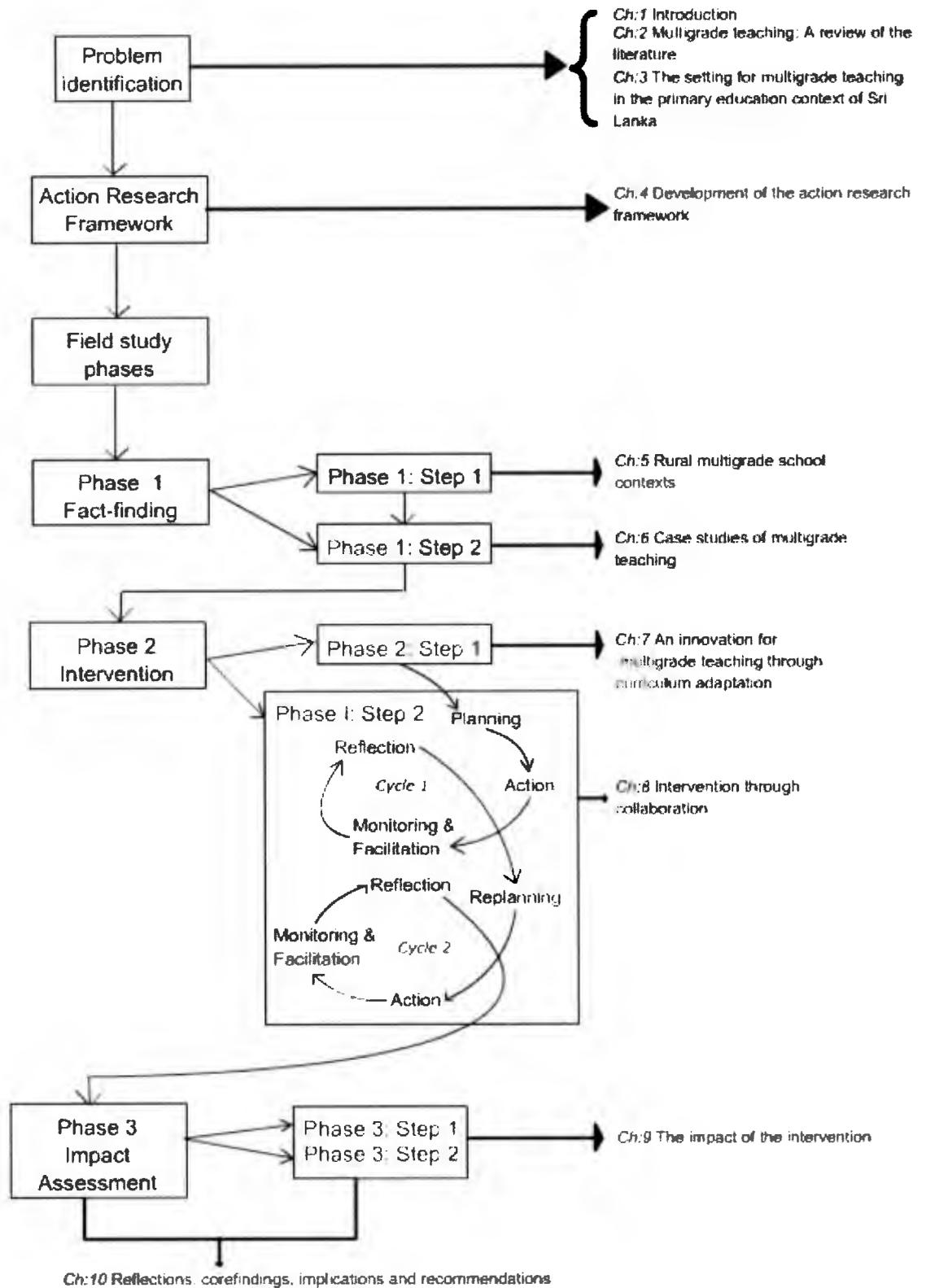
Chapter 7 presents Phase 2: Step 1 of the study. It views the planning phase of innovative methods as crucial in solving problems regarding multigrade teaching. The chapter also indicates the rationale for selecting mathematics as a suitable subject for innovation. Chapter 7 addresses RQ5.

Chapter 8 incorporates Phase 2: Step 2 of the study. It presents the details of the intervention made to improve multigrade teaching in 10 schools with 17 multigrade teachers. Chapter 8 addresses RQ6.

Chapter 9 constitutes Phase 3 of the field study. It presents the methods and analysis of the impact assessment of the intervention through student achievement outcomes and teacher satisfaction. Chapter 9 addresses RQ7.

Chapter 10 presents the reflections of the researcher on the study, the core findings, implications, and makes recommendations.

Figure 1.1 The action-oriented conceptual framework of the thesis



CHAPTER 2

MULTIGRADE TEACHING: A REVIEW OF THE LITERATURE

This chapter is a review of the literature pertaining to multigrade teaching. The objective of reviewing the literature is to address the research question “*What is the nature of knowledge on practice of and research on multigrade teaching, that could be synthesised through literature?*” The major proportion of the literature reviewed here arises from non-Sri Lankan settings, as there is only a small number of research studies on multigrade teaching in Sri Lanka. The expected outcomes of the review were to gain an understanding of multigrade teaching and to develop a framework of variables to consider in examining multigrade teaching in Sri Lanka.

2.1 The concept

This section presents the definitions, terminology and specific features of multigrade teaching.

2.1.1 Definitions and terminology

There are several definitions of multigrade teaching appearing in major works of literature on multigrade teaching. They are as follows:

- A situation where one teacher teaches a number of grades (Ekanayake, 1982:42)
- A set of techniques that allows a teacher to deliver instruction to groups of pupils of various ages and capacities (Thomas and Shaw, 1992: 2).
- The teaching of students of different ages, grades and abilities in the same group (UNESCO, 1995: 44).
- Students from two or more grades are taught by one-teacher in one room at the same time. Students in multigrade classes retain their respective grade-level assignments and their respective grade-specific curricula (Veenman, 1995: 319)

- An organisational structure in which students from two or more adjacent grade levels are placed with one teacher (Mason and Burns,1997:2)
- Instruction across two or more curriculum grades within a timetabled period (Little, 2001: 482).

According to the above definitions, multigrade teaching in general is the simultaneous instruction by a single teacher to students of different grades.

Multigrade teaching is referred to in various terms in international literature. Little (1995:1) presents a collection of terms such as ‘multiple class’, ‘composite class’, ‘vertical grouping/class’, ‘family grouping/class’ and ‘combination classes’, which are used synonymously with multigrade teaching in international literature. Mason and Burns (1997:5) use the term ‘combination classes’ instead of ‘multigrade classes’ in their review. They also mention terms such as ‘double-grade’, ‘dual-age’, ‘multiple-grade’ or ‘split-grade’ classes. In certain countries, schools with multigrade classes are called after the number of teachers in a school. In California a school is referred to as a multigrade school if there are four or less teachers, five being the number of grades in the primary tier (Finley and Thompson, 1963:471). In Sri Lanka there are no schools known as multigrade schools, though conditions such as ‘one-teacher schools’, ‘two-teacher schools’ or ‘three-teacher schools’ are recognized (Little, 1995:2).

Schools with multigrade classes are broadly divided into two categories depending on the extent to which multigrade teaching has become a necessity. In ‘fully’ multigrade schools, all grade groups are combined to form one or more multigrade classes with none of the grade groups functioning as a monograde class. In ‘partial’ multigrade schools only some of the grade groups are combined in a multigrade fashion, while others function as monograde classes (Nielson et al, 1993:1).

2.1.2 Multigrade teaching and related approaches

Multigrade, multiage and nongraded are teaching approaches found randomly in literature. The need arises to identify some of the basic differences and commonalities between these approaches.

Firstly, the age and grade of students in the three settings determine differences among the three types of organizations. The age-stratified grade structure of the students is a consideration in multigrade teaching but not in multiage and nongraded settings. In multigrade settings, students of different ages are stratified and instructed together. In nongraded and multiage settings, age is not a grouping criterion. In nongraded settings, children of different ages are flexibly grouped according to performance levels and allowed to learn at their own rates (Gutierrez and Slavin, 1992). In multiage grouping, children belonging to two or three age groups are deliberately mixed to obtain the benefits of cross age tutoring. In multigrade classes the focus is to instruct the grade levels with the specific grade level curricula (Pratt, 1986; Veenman, 1995).

Secondly, when reasons for adopting the different approaches are considered, it is clear that multiage and nongraded groupings are formed deliberately to enhance certain educational benefits, such as team teaching, individualized instruction and continuous progress of the curriculum. In contrast, multigrade settings are generally formed out of 'necessity' with the absence of a teacher per grade mainly due to imbalance and inadequate enrolments.

It could be inferred that, although multigrade teaching shares some selected characteristics of non-graded, multiage groupings and instructions, the emphasis that multigrade teaching has on the grade level curricula makes it more suitable to be adopted within a system where graded national curricula are prescribed and implemented.

Another concept that is related to multigrade teaching which has emerged from Sri Lankan literature is 'multilevel' teaching. Multilevel teaching is conceived as an approach to strengthen monograde as well as multigrade teaching. Abhayadeva (1989:2) points out from a study conducted in Sri Lanka that "a single grade with multi-levels could be conceived as operating in a multigrade framework". It is the general belief that the range of the differences between students would be wider in multigrade classes than in multi-level situations (Collingwood, 1991).

The definitions, terminology and relationship to other approaches reveal that multigrade teaching has almost the same meaning in different contexts while also having distinct characteristics.

2.2 Prevalence and location

Knowledge of the prevalence and location of multigrade teaching helps in a study about the nature of the problems involved with multigrade teaching. This section attempts to synthesise its prevalence in the world, demonstrate the conditions under which multigrade teaching becomes a necessity and illuminate the problems of multigrade school contexts in South Asia.

2.2.1 Prevalence

Reviews on multigrade teaching reveal the prevalence of multigrade teaching throughout the world. In most countries it is found in rural areas (Veenman, 1995; Little, 1995, 2001). Finding the prevalence of multigrade teaching has not been a priority in many of the education systems of the world. Nevertheless, this section presents some recent figures from both developed and developing countries to indicate the extent of prevalence of multigrade teaching in the 1990s.

In Vietnam, according to 1999 figures, 1.8% of the primary schools had at least one multigrade class. Most schools were located in remote mountain areas (Chau, 1999). In the Philippines in 1995, 9% of elementary schools (20,000 schools), were multigrade schools located in remote villages (Barsaga

and Lacuesta, 1997). In Peru, according to 1998 figures, there were about 21,500 multigrade schools and 96% of these were located in rural areas (Hargreaves et al 2001). In the United Kingdom, from figures reported in 1999, 6.3 % schools enrolled less than 50 students indicating the presence of multigrade teaching. Of these a greater proportion is scattered in rural areas in Wales, and Scotland (Little, 2001). By 1996, 84% of primary schools in India had three teachers or less, and 95% of these were in rural areas (Little, 2001).

It appears that multigrade teaching is prevalent throughout the world irrespective of the size of the country, size of the population or level of its economic growth. A key feature is that it exists mainly in the rural areas. The limited availability of data relating to its prevalence reflects the insignificant recognition given to multigrade teaching in education systems world wide.

2.2.2 Conditions that make multigrade teaching a necessity

Two main conditions which predispose multigrade teaching are those of 'necessity' or 'pedagogic choice'. The incidence of multigrade teaching occurring through 'necessity' is higher than the incidence of its adoption by 'choice'. The empirical literature does not clearly indicate whether they have arisen through necessity or choice (Little, 2001:482-483).

Factors that contribute in making multigrade teaching a necessity in Asia and the Pacific, have been identified as demographic, geographic and economic. Demographic factors comprise low population densities, migration and displacement. Geographic factors are the difficult terrain and geographical barriers which limit transport facilities. The factors that could be taken as economic are the disadvantaged populations and shortage of classrooms. In these circumstances teacher shortages due to inadequate supply and unwillingness to serve in remote conditions and teacher absenteeism are reported to make multigrade teaching a necessity (UNESCO, 1988; Birch and Lally, 1995; UNESCO, 1995; UNESCO and Royal Ministry of Education Research and Cultural Affairs, Norway, 1996).

An understanding of the specific conditions of necessity is important for the present study in locating and identifying multigrade school contexts. The following is a comprehensive list of conditions that would 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 travelling 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 justifies 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 (2001:482)

Although these conditions are listed separately, in most contexts several factors are reported to occur together. One example is Vietnam, where many ethnic minority groups are scattered in the mountainous villages, have limited education funding, and face large scale teacher shortages (Chau, 1999). In the Philippines, the geographical barriers such as great home-distances, and villages separated by several hills, together with factors such as teacher

shortages or low levels of teacher commitment to their posts combine to make multigrade teaching a necessity (Miguel and Barsaga, 1997).

Researchers who have worked extensively to identify the conditions that make multigrade teaching a 'forced necessity' predict that the necessity will ensure that multigrade teaching will prevail for a long time in most education systems (Little, 1995; Veenman, 1995).

2.2.3 Problems of multigrade school contexts in South and South-east Asia

Multigrade class situations present a range of problems. The following is a summary of problems in India, Sri Lanka, Philippines and Korea, reviewed by UNESCO (1982:2-4), and categorised according to school and community-based problems.

(1) School-based problems are as follows:

- Physical inaccessibility is the cause of two types of problems in multigrade settings. One is the difficulty of access of multigrade schools from urban centres in which education offices and other services are located. The other is the difficulty of access within the community where there are instances of students walking to school for about 1-3 km.
- Financial problems faced by multigrade settings result in sub-standard facilities and a lack of suitable teaching-learning materials.
- Curriculum-related problems include lack of relevance of urban-based curriculum material, problems of using material oriented for monograde teaching, inability to cover the curricular content and lack of any self-instructional and self-evaluation materials.
- The preparation of teachers is observed as a problem in all the countries mentioned previously. Both pre-and in-service training is organised on the assumption that the teachers are responsible for one grade at a time only. Both instructional skills and the need to develop positive attitudes are seen as essential components of training.

(ii) Community-based problems are as follows:

- Multigrade teaching occurs abundantly in disadvantaged areas, where poor quality living conditions lead to malnutrition and ill-health, resulting in absence from schools.
- In these areas the home environments may be educationally impoverished because of the inability to supply the essential resources for students.

Jayawardena (1995) in a survey of problems related to multigrade schools in one district in Sri Lanka confirms the fact that majority of the above mentioned problems were in existence even in the 1990s.

2.3 Multigrade practices

The study needs to review of multigrade practices in order to understand multigrade teaching in Sri Lanka. The issues addressed in relation to multigrade teaching approaches are strategies of curriculum adaptation, timetabling practices, materials used for teaching-learning and teacher preparation.

2.3.1 Curriculum organisation and timetabling approaches

In a multigrade context, curriculum organisation and devising a realistic timetable for instruction are important concerns. Monograde teaching and national curricula are the most common features in most of countries. Problems are encountered when attempts are made to implement monograde-oriented curricula in multigrade settings. The following strategies for reorganisation of curricula for multigrade teaching are suggested:

1. Improving curriculum content to ensure relevance
2. Preparing instructional plans for teachers in which various activities are proposed with an emphasis on problem-solving and aspiring skills for character and community development.
3. Preparing supportive instructional materials that support plan of instruction

4. Analysing minimum competency requirements so as to identify skills which should be taught directly and those that may evolve from self-instruction.
5. Involving parents, teachers and community leaders in the reorganisation of the curriculum

UNESCO (1995:21-22)

There is a range of strategies reported by a number of authors. Thomas and Shaw (1992:14). present several timetabling approaches in adapting subject-based curricula. They are as follows:

- (i) *Subject stagger*. The subjects that require more teacher-pupil interaction are grouped with the subjects requiring less. In adopting this option different subjects are assigned to different grades at a time. For example, the teacher works intensively with one grade on mathematics, while another grade does creative arts.
- (ii) *Subject grouping*. Subjects which easily lend themselves to vertical integration are presented by the teacher to all grades at the same time, for example, music, art, drama, social studies, environmental studies, religious education, and physical education.
- (iii) *Common timetable*. The same subject is presented to all grades in a given timetabled period, according to the prescribed grade level and the work programme designed by the teacher. Length and difficulty of work assigned are dependent on the age and grade level of the students. Older students may be assigned relatively more independent work allowing the teacher to spend more time teaching younger students when a new concept is being introduced.

Mason and Burns (1996:36-43) identify three approaches. The first is the 'two-group approach' where teaching of all subjects is done separately for the different grades. This approach involves less curriculum adaptation and less direct teaching, but more independent work, more waiting for teachers and less time-on-task. Usually this approach involves direct teaching to one grade while the other grade completes independent work.

The second is the 'whole class approach', teaching through thematic approaches, problem solving, 'finding common threads in text books' and the teaching of basic concepts to both grades, while proceeding in greater depth with the upper grade students.

The third is the 'mixed approach', where teachers vary their approach between the 'two-group approach' and the 'whole class approach' depending on the subject area addressed. The teachers used the 'two group approach' for reading and mathematics, and the 'whole class approach' for social studies and science.

Studies from nine developed countries, revealed that a 'mixed approach' was commonly followed by teachers through adoption of the 'two group approach' in the teaching of mathematics, phonics, reading and spelling and adoption of the 'whole class approach' in teaching science, physical education, oral English, literature, art, creative writing, drama and health (Mason and Burns, 1997).

An example is presented by Laukkanen and Selventoinen (1978), where an approach based on the spiral curriculum is implemented. In this approach, the same general topic was covered at the same time in four combined year groups, with each group studying the topic as its own appropriate level. The necessity of suitable curriculum material is emphasised for its successful implementation.

Nielsen et al (1993:34), report a 'circular approach' which is prevalent in Belize. In adopting this approach, first, the teacher would assign 'seat work' or group work to one or more grade groups and then directly instruct another. Next, the teacher would assign some work to that group and move to instruct another. At the end of the direct instruction with the last grade group the teacher assigns it seat work and then goes back to the first grade group either to correct their seat work or to introduce a new topic for direct instruction. Another approach reported by the same authors is where all grade groups are kept occupied with assignments put on blackboard or worksheets and teacher checks progress while helping the students individually.

A study by King and Young (1996) points out two foci in approaching multigrade teaching, the 'teacher-centred' focus and the 'student-centred'

focus. In the teacher- centred approach, the routine and the structure are emphasised, whereas in the student -centred approach, the teacher is expected to negotiate with the students over the structure of the lesson. Both approaches encourage group work which includes interaction and co-operation between all grade levels. In both situations the teachers agrees on the fact that planning is crucial for multigrade teaching.

2.3.2 Grouping strategies

Grouping is important in multigrade instruction. Grouping could be differentiated by grade, ability and age (Barsaga and Lacuesta, 1997). In multigrade instruction, individualised instruction, small-group, mixed-ability, same-age, same social group and same ability are some of the grouping strategies recommended (Collingwood, 1991).

2.3.3 Strategies for student engagement in learning

Time for teacher guided learning for each grade is less in multigrade classes than in monograde classes. Therefore, tools recommended to be adopted by multigrade teachers to engage students in learning activities without teacher's direct instruction are several (Thomas and Shaw, 1992:15-16).

The first is 'self-directed learning', a strategy where students are made to work on their own using a range of material so that it allows the teacher to work with another group of students. Developing self-directed learning allows for a high level of independence. The second is 'peer-tutoring', another strategy where students are made to work like teachers across grade groups. Peer-tutoring is said be successful when it is implemented in a structured way within an instructional programme or when it is appropriately brief or when a lower level of skill is being taught. The advantages of peer-tutoring are for both learners and tutors to obtain a deep understanding about subject matter. Peer-tutoring allows for a high level of interdependence. Careful scheduling is necessary to develop a productive routine so that students know what to expect and how to engage in planned activities through peer-tutoring. The third

strategy to promote student learning is 'frequent assessment and feedback'. It is an essential tool in multigrade situations to prevent students getting isolated especially in large multigrade classes. These strategies could be strengthened by using learning corners, instructional aids prepared by teachers and resources from Teacher Resource Centres at district level. The emphasis is made on the need to plan the activities (Nielsen et al, 1993).

It is said that in classes originally designed for monograde teaching it is difficult for the teacher to function as a facilitator and respond to the different needs of all students. If effective student 'learning independence' and 'interdependence' is to be facilitated, teachers need to be adequately trained (Barsaga and Lacuesta, 1997). The review of skills needed by the multigrade teachers indicates the need for preparation of teachers.

2.4 Teacher preparation

Ideally, teachers should be prepared to face the realities of multigrade teaching through pre-service education. In the majority of worldwide systems of education, multigrade teaching needs are conveniently hidden within the single graded school structure. Nevertheless, the teachers who are appointed to remote multigrade schools often face difficulties because in many countries, they will generally begin their careers in the rural schools. Little (1995:7) depicts the nature of the problem:

It is essentially a problem faced by teachers and students in peripheral rural areas unsupported and unrecognised by mainstream and centralized education systems.

The new teachers once they are deployed in isolated rural schools, have very little contact with other teachers and Master Teachers (Bell and Sigsworth, 1987; Birch and Lally, 1995).

However, there have been attempts to prepare teachers for multigrade teaching in some countries through in-service training. One of the most significant is the 'Escuela Nueva' in-service teacher training strategy. Colbert (1999) one of

the founder members of this innovation indicates that it exposes the teachers to active pedagogical methods, similar to those used with the students during training. They are encouraged to reflect on their teaching practices, learn and collaborate with each other. The local teachers' learning circles facilitate this training component. The training process incorporated in the programme is a participatory one with observations from, and interactions with other teachers in the demonstration schools. Another characteristic is that the workshops are planned to enable teachers to practise what was learned in between the workshops. The teacher learning circles are self-managed by teachers, with periodic sessions to jointly reflect on their own pedagogical practice, which supports the principle of collaboration among teachers.

Another example is from Vietnam, where the Ministry of Education and Training in collaboration with the UNICEF has developed an eleven-module training programme for in-service teacher training (Chau, 1999). Although the policy-makers in Vietnam recognise multigrade teaching, the training of teachers in multigrade schools in remote contexts is considered as difficult (Birch and Lally, 1995). In such contextual difficulties, regional support mechanisms for training, the development of resource centres where multigrade teachers can meet, interact and share their experiences on pedagogical and administrative support and to develop materials needed for effective multigrade teaching have been shown as important (Thomas and Shaw, 1992).

In Nepal, in-service teacher training includes a component on multigrade teaching. However, according to Suzuki (2002) the national training policy does not reach the local level as intended through the 'cascade' system. In Australia, the research-based teacher preparation activities planned by higher education institutions include effective planning and learning activities, grouping techniques and opportunities to observe, interact and participate in the multigrade settings (King and Young, 1996).

According to Muthayan (1999) Canadian teachers are given a training which is flexible, and which could be adapted to multigrade teaching. The study

implies that if a teacher-training programme could provide skills and values, which could be applicable to any situation; it would be adequate to teach successfully in a multigrade situation. It is stressed that if multigrade teaching is perceived as a 'problem' it would encourage the teachers to develop negative attitudes even before they enter the profession. The National Multigrade Teaching Programme in the Philippines in the period 1993 to 1997, in collaboration with UNICEF, mainly focused on teacher preparation (Miguel and Barsaga, 1997). In Sri Lanka an introductory module on multigrade teaching is incorporated in the Distance Teacher Training course which is a popular initial teacher training course (NIE, Sri Lanka, 1991).

Bharadwaj and Boda (1998) recommend brief training and orientation for teachers, inclusive of competency-based measurement. A change in the design of school buildings to suit multigrade teaching where the teacher could be in a suitable place to manage all the classes is also recommended. Harrison and Busher (1995) have identified the need to include coping strategies for teacher isolation in teacher preparation programmes. King and Young (1996) recommend practical experience in rural schools in order to familiarise the teachers to rural settings.

The cost involved in training multigrade teachers is an important factor, for developing countries. The experience of Colombia's 'Escuela Nueva' raises the point that the cost involved in teacher training for multigrade teaching at the earlier stages exceeded that of traditional teacher training (Psacharopoulos et al, 1993).

The literature illustrates that teacher preparation for multigrade teaching has not been a priority although a few attempts could be located from a few countries.

2.5 Recognised innovations

The review of innovations to accommodate multigrade teaching is necessary, as there is a need to learn lessons from them. The 'Escuela Nueva' model, is the most significant of these. This started with a pilot phase of 500 schools in 1975-78. By 1985 the number of schools was 8,000. At the beginning of the 1990s, out of the 27,000 primary schools, 20,000 schools adopted the model. The major factor that influenced the expansion was the degree of support from the Ministry of Education in Colombia and other international organisations (Rugh and Bossert, 1998). 'Escuela Nueva' integrates the curriculum, community, administrative and teacher training strategies. The curriculum designed in the Colombian 'Escuela Nueva' promotes active learning through which children are taught how to think, analyse, investigate, create and apply knowledge. It also stresses co-operation, responsibility and democratic attitudes. The teacher spends most of his/her time teaching the younger children basic skills while managing resources for other children. Older children or parent volunteers assist students with learning difficulties (Colbert, 1999).

In Zambia, multigrade schools were introduced to provide full primary education opportunities in sparsely populated areas. Problems of implementation are experienced because of factors such as remoteness, impoverished conditions, problems of supervision, poor distribution of materials and limitations in community support (Lungwangwa, 1989).

The production of support material for multigrade teaching is another important innovation. Firstly, handbooks have been produced as a teacher support material by UNESCO (1988); Collingwood, (1991), Commonwealth Secretariat (1997) and UNESCO (2001). These handbooks provide guidelines on classroom arrangements, activities, grouping and preparation of aids. Most strategies recommended are useful for active learning. Secondly, readily available lesson plans enable the teachers to have more time to plan for varied activities for the pupils. Thirdly, student materials have been developed which improve students' time on task, while also facilitating teaching (Barsaga and

Lacuesta, 1997). Learning materials for use on the basis of ability rather than on grade level have been produced in Malaysia (Education Department, Sabah undated) and in UNICEF assisted Multigrade programme in the Philippines (Barsaga and Lacuesta, 1997). Kamat (1998) attempted an innovation through group assignments. The criteria for grouping were according to the place of sitting, irrespective of achievement levels and the number of students. Group assignments on projects suited the pupils' pace of learning and self-learning assignments were also used in order to raise self-confidence. The outcomes of the study are reported as positive, since students enjoyed learning in small groups and doing project work in collaboration.

The sustainability of educational innovations and expanding appropriately are two issues worthy of consideration. Benveniste and McEwan (2000) distinguish macro and micro variables with regard to the successful implementation of an innovation. The macro variables influencing successful implementation were identified as the capacity of the organization carrying out the reform, the coherence and practicality of the policy message, the political environment facing policy makers, resource constraints, decisions on incentives and the type of planning model utilized. Micro-level variables mentioned were the perceptions, attitudes and incentives of teachers, students and parents and the 'fit' between local culture and educational innovation. Capacity and willingness were also identified as two important variables affecting the sustainability of an innovation.

National-level policy decisions on teacher and administrator training, teacher recruitment, the development of materials and other forms of support to multigrade schools are compulsory factors to be addressed during the expansion of pilot programmes (Thomas and Shaw, 1992: iii). However, not all systems extend support for innovations. Tatto (1999) raises the issue that policy-makers may be too rigid, a feature which discourages context-specific innovations in Mexico.

Small-scale innovations on various aspects of multigrade teaching are in evidence. Several innovations from India are reported. Suitable use of the

home language is found to be helpful in situations where there are differences in home and school languages in multigrade schools (Sharma, 1998). The use of other strategies such as appointing class monitors, class management committees; encouraging the keeping of diaries, learning corners, group teaching and competency based evaluation in multigrade situations may reduce the burden on the teacher (Bharadwaj and Boda, 1999). A model with action points for research based pedagogic and management strategies in a holistic approach is another innovation documented, although field implementation of the model is not reported (Bhattacharjee, 1998).

The discussion reveals that large-scale innovations are reported from countries where multigrade teaching is recognised by the system of education and where there is political commitment, while small-scale innovations for multigrade teaching could be identified from many countries of the world.

2.6 Effect on student achievement

The effects of multigrade teaching on students are studied mainly through cognitive and non-cognitive outcomes in comparison with monograde settings. Cognitive effects are measured mainly through achievement in mathematics and language. Commonly measured non-cognitive effects are socio-civic behaviour, self-esteem and creativity.

In comparing outcomes and their effects, there are several factors to be considered. These include the level at which the evaluation has been carried out, the basis on which students have been assigned to multigrade classes and the focus of interpretation of the outcomes. Outcomes of effects involving student achievement are extensively reviewed by Pratt (1986), Miller (1991), Veenman (1995) and Mason and Burns (1997).

Pratt (1986) has concluded that student achievement in multigrade settings are similar to that of those in monograde settings. Further, it is revealed that non-cognitive effects are more consistently demonstrated than cognitive effects. Miller (1991) out of a review of 21 quantitative studies in the 1960s and 1970s



in developed countries concludes that, being a student in a multigrade classroom does not negatively affect his/her academic performance or social relationships or attitudes. Veenman's (1995) review comprises a range of studies from the USA, Germany, Netherlands, England, Canada, Finland, Sweden, Western Australia, Togo, Colombia, Burkina Faso and Pakistan that compare both cognitive and non-cognitive effects of multigrade and monograde students. Except for the Pakistan-based study (Rowley, 1992 cited in www.ioe.ac.uk/multigrade), where students in monograde classes outperformed the students in multigrade classes, there were no differences between the attainment levels of students in multigrade and monograde classes. Mason and Burns (1997) distinguished between the basis of assignment of students to the multigrade classes as an added dimension for comparison, and it was revealed that purposefully created multigrade classes do not place students at academic risk. However, there is no evidence in terms of student achievement to favour either monograde or multigrade instruction.

A Californian study (Finley and Thompson 1963) on cognitive effects revealed no evidence to prove that monograde teaching is better than multigrade teaching. A study to find the effects of multigrade grouping on achievement in reading and mathematics disclosed that, being in multigrade classes did not negatively influence the reading achievement of high achievers. One of the sampling limitations of this study was the non-inclusion of low achievers or mixed ability students (Rule, 1983). However, this study opens up the need to focus on the effects of multigrade grouping on both low and high achievers. An impact evaluation study by Barsaga and Lacuesta (1997) of Philippine's multigrade programme revealed that the overall performance shown by a sample of pupils in multigrade classes was promising, although there remained opportunities for further improvement.

Evaluation of the effects of the 'Escuela Nueva' programme by Rojas and Castillo (1988) from both cognitive and non-cognitive perspectives, it showed that the national level rural graded school did not surpass the multigrade programme. Hence, the evaluators strongly recommend multigrade teaching as an educational alternative in the rural areas. Tatto (1999) based on a study in

Mexico, also prescribes multigrade teaching especially in rural contexts. The author's view was that it promotes more collaboration and intellectual dialogue between teachers and students as well as among the students themselves. It is predicted that it might be one of the effective ways of increasing personal capital in terms of the education of the rural poor.

A recent study by Berry (2001: 569) in the Turks and Caicos Islands has revealed the following with regard to reading achievement:

- Low achieving students in multigrade schools are significantly more successful than low achieving students in monograde schools.
- High achieving students in monograde schools have a significant advantage as they grow older.
- Low achieving boys have a significant advantage in multigrade schools
- High achieving girls have a significant advantage in monograde schools.

The range of varied outcomes show the need for further studies on both multigrade and monograde practices and their relative advantages and disadvantages. Nevertheless, it is evident from literature from both developed and developing countries, that multigrade teaching has remote chances of producing adverse effects on students' cognitive outcomes. More literature could be located that indicate non-cognitive advantages. However, the quality of outcomes is dependent upon the nature of recognition and support extended to multigrade teaching by the respective education systems in different countries.

2.7 Challenges of multigrade teaching

It is generally understood that multigrade teaching is more challenging than monograde teaching. Several key challenges are reported. First, is the responsibility of "delivering curricula of two or more grades and maintaining grade-level expectations" (Mason and Burns, 1997:7). Within this aspect of curriculum adaptation, ensuring its relevance to local conditions is another challenge (Birch and Lally, 1995). The challenges of effective lesson planning to ensure each grade covers its required syllabus, maximisation of actual time on task, presentation of material in a logical sequence, effective distribution of teacher time between groups and adopting suitable teaching methods are also

identified (Thomas and Shaw, 1992:12). These researchers emphasise careful lesson planning to minimize 'down time' which is also known as 'dead time', thereby ensuring that students will be engaged in various learning activities throughout the day (Steward and Thomas, 1996:130).

Secondly, there are challenges identified with respect to the student composition of multigrade classes. One is the uneven proportions of students in each grade level of multigrade classes, which makes the situation more complex (Mason and Burns, 1997: 23). The wide range of ability is another feature which poses a challenge to the teacher. Bennett et al (1987) attempted to ascertain to what extent teachers were able to cater to the children at the extreme ends of the spread of ability within multigrade classes. They observed that teachers showed a tendency to underestimate the abilities of high achievers and over estimate those of the low achievers.

Thirdly, the differences between home and school languages of students pose difficulties in instruction. There is a wide prevalence of use of different dialects and indigenous languages in many contexts where multigrade teaching is found to be a necessity (Aikman and Pridmore, 2001).

Lack of resources constitutes a fourth challenge, especially in the Asia-Pacific region. The lack of syllabi and other curricular materials suitable for multigrade teaching is frequently mentioned. In countries where single grade teaching is well supported, less support is given teaching in multigrade classes (Birch and Lally, 1995).

A fifth set of factors is associated with the widening responsibilities due to the scarcity of human resources. In small multigrade schools only a few teachers are available to share most of the experiences and responsibilities of their working life (Bell and Sigsworth, 1987). Although imparting multiple curricula is the main task of the multigrade grade teacher, other role dimensions exist, especially in deprived contexts (UNESCO, 1988 and Birch and Lally, 1995). The role dimensions are as follows.

- a facilitator of learning to enhance learning at both group level and on a one-one basis.
- a community resource person
- a social worker or counsellor for both the school and the community
- a materials designer to implement the curriculum
- an action researcher to improve one's own practice
- a surrogate parent to students
- a financial manager
- a mediator for reconciling conflicts

A sixth challenge is the overcoming of professional isolation which is faced by teachers. The sense of isolation from mainstream educational development is especially felt by teachers in rural small schools and this is relatively high. The following citation depicts the implications of teacher isolation.

Teacher isolation is a serious problem because it implies that children may be receiving an education which is less than it should be. Preference to work in privacy, keeping his/her thoughts about one's own practice to oneself, discouraging other adults from entering his/her classroom as she would feel uncomfortable are some of the characteristics identified in an isolated teacher.

(Bell and Sigsworth, 1987:117-118)

The challenges faced by multigrade teachers indicate that they need to be more versatile than monograde teachers. The lack, or meagre nature of, financial incentives, minimum housing provision and problems related to dependents are also factors that adversely affect the output of multigrade teachers (Birch and Lally, 1995).

2.8 Beliefs and attitudes of teachers

Teacher beliefs are important as they determine the quality of teaching. The firmly established single grade teaching approach has created a negative attitude among teachers towards multigrade teaching. Most multigrade teachers perceived their job neither as a teaching challenge nor as an opportunity to be innovative but as a task to be avoided if at all possible (Veenman, 1995). A review of a study on the views of 35 teachers on multigrade teaching revealed that a majority of teachers (77%) did not prefer

to teach in multigrade classes. Only 14% of the teachers preferred to teach in multigrade classes. The multigrade classes in this study referred to a combination of two adjacent grade levels for the entire day (Mason and Burns, 1996). In Belize, the proportion of teachers who felt positively and those who felt negatively towards multigrade teaching was found to be equal (Nielsen et al, 1993). Steward and Thomas (1996:128) have explained with examples three positions of teacher beliefs towards multigrade organisations.

1. Strong positive: multigrade teaching is the best approach to grouping children for both pedagogical and social reasons. It is superior to non-graded grouping.
2. Weak positive: multigrade classes can be organised so as to achieve results which are at least comparable with mono-grade classes, at less cost and with an increase in student access to schooling.
3. Negative: multigrade classes are an unfortunate demographic necessity of lower quality and difficult to teach.

There are studies which indicate some teacher preference for multigrade teaching. Muthayan's (1999) comparison of the perceptions of teachers in Canada and India on the effects of multigrade teaching on students revealed that teachers in both countries believed that multigrade teaching was more beneficial to children because it caters to a diversity of needs amongst children. Rojas and Castillo (1988) reported that 89.3% of teachers who were engaged in multigrade teaching in Colombia preferred 'Escuela Nueva' over traditional rural schools. Findings from a set of case studies in the Philippines reveals that better management of multigrade classes depends more on the personal attributes of the teacher, rather than whether the teacher has received appropriate training or not. The conclusion is that even without special training, a teacher with a more positive attitude towards multigrade teaching was found to produce better outcomes (Barsaga and Lacuesta, 1997). It is important to note that a survey of the literature does not necessarily indicate that multigrade teaching is perceived as negative.

2.9 Discussion and summary

The concept of multigrade teaching seems to be known by a range of terms in various international contexts. Multigrade teaching situations mainly arise out of ‘necessity’ rather than by ‘choice’. A large percentage of multigrade teaching occurs in rural locations in both developed and developing countries. Conditions that make multigrade teaching a necessity are mainly demographical, geographical and economical. The slow growth of literature, together with updated data on prevalence, indicates that it is unrecognised in most mainstream education systems.

The multigrade approach has distinct differences compared with nongraded and multiage approaches. A major difference is seen in its emphasis on different grade level curricular expectations. However, theoretically, while multigrade settings are composed of students of different ages, a well planned structure should result in pedagogical advantages. The concept of multilevel teaching indicates the importance of addressing levels within either in a multigrade or monograde class.

Although multigrade teaching has a world-wide prevalence the relative availability of associated literature is less. The scarcity of literature could be mainly due to the non-recognition of multigrade teaching by a majority of education systems. A lack of essential inputs such as teacher training and self learning student materials is commonly cited amongst problems hindering the implementation of multigrade teaching innovations in some countries where multigrade teaching has been addressed by policy initiatives.

Different types of multigrade practices have been documented. The practices adopted in addressing different subjects within subject-based curricula differ, depending on the nature of the subject. However, multigrade teaching seemed to be carried out through two main approaches. These were the ‘whole class’ approach, teaching of the same theme but differentiating between the various grade levels. Secondly, was a ‘two group’ approach, where two grade groups were instructed separately through selecting appropriate subject combinations.

A review of these approaches would be helpful for the present study in observing the multigrade practice of the Sri Lankan teachers.

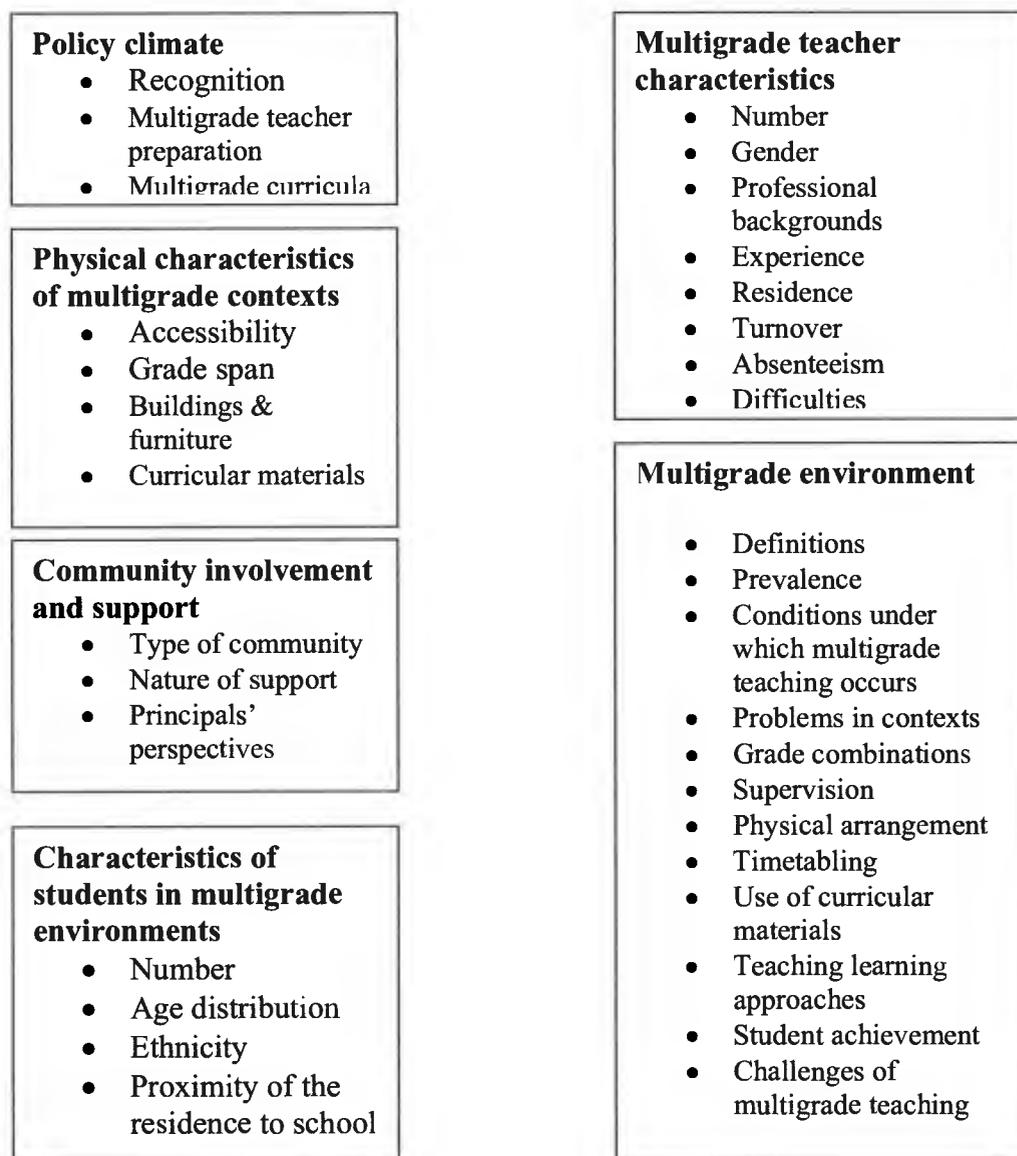
The review considered a range of issues related to multigrade teachers. These included the demands of the role of the multigrade teacher, support provided to multigrade teachers, multigrade teachers' attitudes regarding their approaches to both their teaching and existing training programmes. The literature reveals that the global scenario regarding the multigrade teacher is not satisfactory. This therefore justifies the addition of research on needs of multigrade teachers to the rationale of this study.

Research on multigrade teaching has been mainly focused on its effects on student achievement. Hardly any research evidence exists to suggest that multigrade teaching affects student achievement adversely. Evidence indicates that it has better effects on non-cognitive skills compared with that of monograde instruction. In conclusion, it could be inferred that internationally, multigrade teaching has been viewed as an effective approach to provide education successfully to reach the goals of Education for All.

Despite some scattered efforts to probe into multigrade teaching, none has produced any conclusive evidence of the situation of multigrade teaching in Sri Lanka. This situation proves the need to find the meaning and prevalence of multigrade teaching as well as a suitable innovation for uplifting multigrade teaching in Sri Lanka with the present study.

As an outcome of the review of literature, a framework of variables in multigrade teaching was constructed to aid the construction of instruments for the present study (Figure 2.1).

Figure 2.1 A framework of variables in multigrade teaching



CHAPTER 3

THE SETTING FOR MULTIGRADE TEACHING IN THE PRIMARY EDUCATION CONTEXT OF SRI LANKA

This chapter aims to address the research question, “*What is the nature of the setting for multigrade teaching within the primary education context in Sri Lanka?*” It locates the present study in the context of primary education in Sri Lanka. The analysis of the primary education context is directed to the provision of, and access to educational opportunities, teacher deployment and professional development and curriculum issues.

3.1 A brief country profile

Sri Lanka is an island in the Indian Ocean with a land area of 65,610 sq. km. Geographically the island is divided mainly into two parts, the central hills and the surrounding plains. The population of Sri Lanka was enumerated at 16,864,687 in 2001. The ethnic composition of the population comprised 73.9% of Sinhalese, 12.7% Sri Lankan Tamils, 7.1%, Moors, 5.1% Indian Tamils and others 0.7%. Sri Lanka has been a Buddhist country since the introduction of Buddhism in the 3rd century BC. Buddhists are over three fourths of the population (76.7%), (Department of Census and Statistics, Sri Lanka, 2001). Sinhala and Tamil are the two state languages while English is the second language of the country.

Sri Lanka, previously known as Ceylon, had until the 1980s a predominantly agricultural economy with tea and rubber plantations. By the 1990s, the manufacture of garments became the main source of export income. Another major source of foreign exchange is the earnings from Sri Lankans who are employed predominantly in middle-eastern countries. Sri Lanka is considered to be a middle-income developing country. The per capita income figure of 1999 was approximately US\$843. Nevertheless, the war persisting for more than two decades in the northeastern parts of the country has slowed down the

rate of development in Sri Lanka. The average GDP per capita growth rate is 3.4 for the period of 1990-2002 (UNICEF, 2004).

The country comprises three sectors, urban, rural and estate. The urban and rural sectors are classified according to the status of the local government body. Areas under the government of Municipal and Urban Councils are considered as urban. Areas governed by the Pradeshiya Sabhas are considered to be rural. Estate sectors are defined as having plantations of 20 acres or more. Demographic statistics of the Sri Lankan population distribution show that the majority of the population (80%) live in rural areas. The rural communities are mainly peasant communities scattered in the dry zone. The urban population is 14.6%. The plantation communities comprise 5.3% (Department of Census and Statistics, Sri Lanka, 2001). Plantation labour communities have existed since the 19th century when British colonisers opened tea and rubber plantations scattered in the areas of the central hills.

The incidence of poverty during 1995-96, among the urban, rural and estate is recorded as 13%, 29% and 26% respectively (Department of Census and Statistics, Sri Lanka, 2001). The effect of different levels of poverty among the urban and rural locations and the availability of basic facilities such as transport and communication makes the urban schools less impoverished (Ministry of Education and Higher Education, 2000d)

Sri Lanka has shown considerable improvement in terms of social development. Several indicators demonstrate this. Sri Lanka has an under-five mortality rank of 130, on a rating in descending order where Sweden is ranked as best at 193. The total fertility rate was 2.0 and the annual population growth rate remained at 1.0 for the past decade, which are the most impressive figures among the South-Asian countries. The current adult literacy rate is 92%, with 94% and 89% for males and females, respectively. The life expectancy at birth is 73 years (UNICEF, 2004).

3.2 Responsibilities for education

Responsibility for the education in Sri Lanka is divided amongst several bodies and also is decentralized. The role of making recommendations for educational policy making is entrusted to the National Education Commission (NEC), appointed by the government in 1991. Responsibilities for educational administration have been decentralized since 1997, under the 13th Amendment to the Constitution of the country. At present the administrative structure has five tiers, the Line Ministry, provincial ministries, provincial departments, zonal education offices (ZEO) and divisional education offices (DEO).

The Line Ministry is responsible for the monitoring and review of the development of general education implemented by the provincial authorities. There are eight provincial ministries, 92 ZEOs and 302 DEOs in the country. Responsibilities that are vested with the Line Ministry include planning the teacher supply in relation to the number of students, pre-service teacher education, curriculum development, supply of textbooks, preparing student assessment schemes, providing school uniforms for the students, distribution of teaching materials to schools through the provincial authorities, training of trainers for provincial level in-service training, conducting examinations and the annual school census. There are several other bodies linked to the Line Ministry. They are the National Institute of Education (NIE), the Department of Examinations, the Department of Educational Publications and National Colleges of Education (NCOE) and Teacher Training Colleges (MEHE, Sri Lanka, 2000a: 3).

The provincial ministries are responsible for planning and issuing guidelines for education programmes. The provincial departments are responsible for the planning, implementation, management and direction of all education programmes in the provinces. Decisions and guidelines cascade down to the schools through the ZEOs and DEOs. The DEO is the closest link to the schools.

Government schools are categorized as either, national or provincial. All schools other than the 238 national schools are governed by the provincial education authorities, while the national schools are administered by the line ministry.

3.3 Financing primary education

The central government is the main source of education funding. According to 1999 statistics, the government spent an average of 10% of the national budget on education, accounting for 3% of the GDP. The major proportion of the recurrent expenditure on education is spent on teacher salaries. The next highest share is spent on school textbooks, followed by school uniforms distributed free to all students (MEHE, Sri Lanka, 2000c).

Data on public expenditure on education at different tiers of education, such as primary and secondary is absent. Little (2000) points out that the absence of a clear institutional identity for primary schools has resulted in the absence of an administrative status to allocate and monitor financial and other resources for primary education. The estimates reveal that public expenditure on primary education has decreased between 1991 and 1995, although public expenditure on education has gradually increased as a percentage of the GNP (Aturupane and Abeygunewardena 2000). However, arrangements are being made to separate budgetary provision for the different levels of education (MEHE, Sri Lanka, 2000c).

3.4 Opportunities for primary education

Children who are over the age of five by 31st of January of that year are entitled to enter a school for primary education, which extends for five years. According to UNDP statistical tables the gross enrolment rate of ages 5-9 is 107 and 104 for males and females respectively, while the net enrolment rate of the same age group is 97 for both sexes. The retention rate of primary students had reached 97% by 2002. (UNICEF, 2004).

The Constitution of Sri Lanka affirms the need for complete eradication of illiteracy and assures the right to universal and equal access to education for all citizens. Achievements made in terms of human development in Sri Lanka may be attributed mainly to the provision of free education since 1945. Progressive policies under the Free Education Act have facilitated access to education for all citizens for over 50 years. One example of the impact this has had is seen in Sri Lanka's achievements in reaching gender parity in primary education. A major achievement in improving access to education is the provision of schools near children's homes, namely a primary school within a distance of 2 km and a secondary school at least within 4 km. Education imparted through the mother tongue is another factor that contributed to the high rates of literacy. The Compulsory Education Act of 1998 enforces compulsory education for children aged 5-14 years.

The total number of schools in Sri Lanka is 9826. The medium of instruction in schools is done mainly in Sinhala or Tamil. The school system has 70.0% Sinhala medium schools, 28.8% Tamil medium schools and 0.01% of bi-media schools (Ministry of Human Resource Development, Education and Cultural Affairs, Sri Lanka, 2002). Schools impart a curriculum organized into thirteen years corresponding to single year grades. The grades are organized into three levels.

- (1) primary level from Grades 1 to 5
- (2) secondary level from Grades 6-11 leading to GCE-Ordinary Level at Grade 11
- (3) collegiate level for Grades 12-13, leading to GCE-Advanced Level at Grade 13

There are four types of schools with different combinations of grade spans:

- Type 1AB: Schools with a GCE A-Level Science stream. The grade spans of these schools could be either Grade 1 to 13 or Grade 6-13

- Type 1C: Schools with GCE A-Level Arts and Commerce streams. The Grade spans of these schools are Grade 1-13
- Type 2: Schools with GCE O-Level classes. The grade span could be either Grade 1-11.or Grade 6-11
- Type 3: Schools with either Grade 1-5 or Grade 1-8 span

Table 3.1 shows the number of schools providing primary education in different grade spans.

Table 3.1 Government schools providing primary education by grade span, 2002

<i>Grade span</i>	<i>No. of schools</i>	<i>% of total schools</i>
1-5	2585	27.2
1-8	649	6.8
1-11	4216	44.5
1-13	2029	21.4
Total	9479	99.9

Source: Ministry of Human Resource Development Education and Cultural Affairs, Sri Lanka, 2002

Table 3.1 shows that primary education was imparted through 9479 schools in 2002. This figure comprised 97% of the total schools. The different grade spans of the schools were 1-5, 1-8, 1-11 and 1-13. Of these schools 27.2% were exclusively primary schools having a grade span of 1-5 only.

3.4.1 Issues of access to primary education in rural locations

The inequalities between the urban and rural locations in Sri Lanka have been repeatedly emphasised (Jayasuriya, 1969; Jayaweera, 1980; Ekanayake, 1982 ; Nystrom, 1985 and National Education Commission, 2003). The retention rate was highest in the Western, while the lowest was reported from Eastern, Uva, Sabaragamuwa, Northwestern and Central provinces of the country (MEHE, Sri Lanka, 2000d). It is noteworthy that in provinces with low retention rates,

the incidence of rural small schools is high. The distribution of schools by urban and rural location is given in Table 3.2.

Table 3.2 Government schools by location, 1998

<i>Province</i>	<i>Urban</i>	<i>Rural</i>	<i>Total</i>
Western	352	1113	1465
Central	109	1416	1525
Southern	76	1126	1202
Northern	75	780	855
Eastern	71	878	949
North-western	35	1258	1293
North-central	15	762	777
Uva	25	813	838
Sabaragamuwa	39	1140	1179
Total	797 (7.9 %)	9286 (92.1%)	10083

Source: MEHE, Sri Lanka, 1998

The distribution in Table 3.2 shows that the majority of the schools (92.1%) are located in rural areas.

The distribution pattern of schools according to school type indicate a concentration of National schools, Type 1AB and 1C schools in urban areas, while Type 3 schools are more abundant in rural areas (MEHE, Sri Lanka, 2000c). Rupasinghe (1990) shows the existence of a hierarchy of school types each type being distinguished by the socio-economic background of its clientele and the demands it exerts on the community. The researcher shows that a few urban and rural 1AB are the most prestigious and cater to elitist groups in the country, while the remaining types of schools cater to other social classes in descending order. When considering all these facts it is reasonable to conclude that rural Type 3 schools are the most impoverished of the schools. Most of these schools are small and cater to families engaged in low status jobs.

3.4.2 Background to ‘small schools’

A small-school is defined as “a school with less than 100 pupils on roll” or a ‘single teacher school’ (MOE, Sri Lanka/UNICEF, 1977). A later definition

incorporated schools with secondary classes having students numbering 200 or less (UNICEF, 1980). The term ‘small schools’ has been commonly used synonymously with ‘disadvantaged schools’ because almost all small schools face deprivations. Most of these are without sufficient facilities, and are attended by a small number of pupils from the poorest families of landless labourers, small-scale cultivators in rural sectors, fishing communities in the coastal areas, and plantation workers (Jayaweera, 1980). The majority of small schools are situated in isolated rural villages and plantation communities. If calculated according to the Schools Census 2000, there are 2285 primary schools with less than 100 students and 1411 schools with secondary classes but with less than 200 students. Most of these schools were rural and plantation schools.

Plantation schools are distributed in the areas having plantations in the Central, Uva and Sabaragamuwa provinces. Schools situated within tea and rubber plantations are located in the central hills of the country, which “act as a geographical barrier for the development of those schools” (Little, 1999: 267). The Estate School Ordinance has stipulated that plantations must establish estate schools to provide a minimum education to the children of their workers as the future potential workers of these plantations. When citizenship was given to the estate workers, the Ministry of Education agreed to take over the estate schools, integrating them into the national system of education (Peiris, Kandasamy and Kanagararatnam 1981). Between the 1970s and the 1990s, almost all estate schools were taken over by the government (Little, 1999). A large majority of plantation (estate) schools are Type 3 schools with only a very few being upgraded as Type 2 schools, having post-primary grades up to 8 or 11. However, there has been a trend of increasing enrolment in these schools (Little, 1999).

The argument for keeping a small village school open is an issue to be considered in terms of its high cost set against the benefits rendered to the isolated community (Little, 2000). A majority of the small schools serve as the only avenue of educational opportunity for children in small remote

communities. The quality of education in these schools has been a major problem in the system of education in Sri Lanka for a long time.

3.4.3 Interventions to support small schools

The Ministry's concern for small schools can be traced back to the mid-'seventies when the 'Small Schools Development Unit' was established in 1976 together with the appointment of a 'small schools development officer' (MOE, Sri Lanka, 1977). Small schools became the focus of foreign donation and assistance in the late 1970s, mainly with the support extended by UNICEF and the Swedish International Development Cooperation Agency (SIDA).

Initial development work in small schools was carried out with UNICEF assistance in the late 1970s. This included attempts at curriculum integration and the training of teachers to implement multigrade teaching, as well as the improvement of physical facilities. It is reported that this intervention was not effectively sustained (MOE, Sri Lanka/UNICEF, 1980).

Another intervention effected as a pilot scheme by the NIE under the auspices of the UNICEF was to link multigrade teaching with mixed-ability teaching or multilevel teaching. The underlying idea was to emphasise the different levels within a class, in spite of its monograde or multigrade structure. One of the long-term objectives of this pilot project was to explore the possibility of adapting multigrade teaching techniques to multilevel teaching in monograde classrooms (Abhayadeva, 1989). However, any follow-up of the pilot study appears to be unrecorded.

In the late 1980s, under the auspices of SIDA, a group of disadvantaged schools was developed through two projects, the Primary School Development Programme (PSDP) and the Plantation School Education Development Programme (PSEDP). The majority of these schools had less than 100 students and not more than one or two teachers. The schools were selected from rural and plantation localities respectively. Among the numerous aims of the

project, improvement of pedagogical skills was attempted through development of self-study materials for students (Little, 1995).

None of the attempted interventions into teaching in small schools seems to have been sustained. Disparities between small schools in terms of the quality of education are widely discussed. Therefore more systematic research-based intervention will be critical.

3.4.4 Closure of small schools

The NEC proposed that the school system should be rationalised and reorganised to reduce the number of school types to two. These would be the junior schools (Grades 1 to 9) and the senior schools (Grades 10 to 13). The schools would be subjected to a process of rationalization according to a set of criteria (MEHE, 1999a). This circular recommended the closure of the small schools functioning as 'uneconomical units'. Clause 5.1 of the circular indicates:

5.1 Category 1 :In a school presently conducting classes in Grades 1-5 where the average student number (registered) per class is 10 or below and if there is another school with Grades 1-5 within 2 km from it such a school to be consolidated.

However, six criteria attached to the circular as notes outlines the conditions for such consolidation, as follows:

Note c: In case you want to decide in consideration of factors such as geographical, ethnic, social or transport difficulties that a certain school should continue you may state the relevant reasons and it will be suitable to allow such a school to keep functioning further, although it comes within the ambit of the functions in para 5.1 to 5.6.

However, a recent survey has revealed that 351 small schools had been closed down, being considered as uneconomical units because of the poor quality of education which they offered. However, it was only with regard to two-thirds of these schools that another school was situated within a distance of 2 km.

These changes were carried out in seven provinces including the Northern and Eastern provinces (NEC, 2003).

It seems that the education system has not paid due attention to small schools. Multigrade teaching has not been considered as an important intervention into the development of small schools.

3.5 Disparities in achievement in primary education

The estimated literacy rate for the 5-9 age group for 1996/97 was 91.8%, with 94.3% for males and 91.8% for females respectively. However, it has been pointed out that there is a disparity between the literacy rates as claimed and actual literacy rates. National statistics effectively conceal the true picture of small local areas and the pockets of illiteracy in socially and economically disadvantaged groups of the population. In considering achievement in primary education, currently attention has begun to focus on achievements beyond literacy (MEHE, Sri Lanka, 2000c: 1).

A national study on learning achievement, which was conducted using a student sample of 4000 from 204 schools in 25 education districts, showed average levels of performance in the areas of language, mathematics and life-skills (Wijesuriya, 1994). The study indicated better performance in literacy (a mean score of 61.8), a lower performance in numeracy (45.1) and a disproportionately low (26.1) performance in life-skills. None of the districts has reached the desired mastery levels in these areas of study. The performance of pupils varied widely among school types. The students of Type 2 and 3 schools did not perform equally with students of Type 1AB and 1C schools. The rural students' performance levels were lower than those of their urban counterparts. Eight districts reached near mastery levels in literacy only. Most specifically Ratnapura, Kegalle and Moneragala were found to be in the lowest group in performance in all three areas. Although not implied in the said study, one major reason for the poor performance could have been the low quality of education provided by schools with multigrade teaching needs.

Ekanayake and Sedere (1989) in a study of 21 disadvantaged schools from five districts showed significant regional disparity between the achievement of language skills and mathematical concepts in deprived rural schools. The total number of students included in the study was 2,357. All schools had a student population less than 400 and were not in demand at Grade 1 enrolment and served only the less affluent. The schools lacked physical facilities, suffered from a shortage of human resources, and multiple class teaching was the general practice,

Jayawardena (1995) revealed through a study of multigrade schools that the mean achievement levels for Mathematics and Sinhala of Grade 5 students were 20.32% and 19.79% respectively.

With regard to the repetition rates as calculated in 2000, the Western province had the lowest for all grades. The Northern province showed a very high repetition rate, the highest of all provinces, probably as a result of the war. Other provinces with high repetition rates were Uva, Central and Sabaragamuwa (MEHE, Sri Lanka, 2000c). It is noteworthy that these provinces have a percentage of multigrade teaching needs according to the estimate done (see Chapter 1, Table 1.1, p.22).

At the end of the primary grade span primary students have to face the Grade 5 scholarship examination, which has two objectives. The students displaying the highest levels of mastery in competencies/aptitudes at this examination are entitled to select a popular school according to the standard of their scores. If the annual income of the parents of these students is lower than Rs.6000 per annum they are eligible for a bursary award until completion of their tertiary education (NEC, 2003). However, it is doubtful whether students in deprived situations such as multigrade contexts are able to benefit from the scholarship examination and enter the prestigious schools.

3.6 Primary teacher resource: the mismatch between needs and provision

The setting for multigrade teacher provision within the Sri Lankan education system is presented in the next sections. The issues associated with teacher supply, deployment and training are discussed.

3.6.1 Supply and deployment

The national percentages of male and female primary teachers in 1998 were 14.9% and 85.1% respectively (MEHE, Sri Lanka, 1998). It was estimated in 2000 that 29.9% of the teachers teach only in primary grades and 9.5% teach in primary as well as in secondary classes (MEHE, Sri Lanka, 2000c: 13).

The availability of trained teachers is reported as satisfactory in urban areas while poor in rural areas (MEHE, Sri Lanka, 2000c). Teacher shortages are mainly felt by the Tamil medium schools (Little, 1999). In 1998, teacher pupil ratio (TPR) in Sinhala medium was 1:28 and in Tamil medium schools it was 1:41. Teacher deployment programmes are targeted to reach a TPR of 1:27. It is estimated that in order to attain this target another 3435 Sinhala medium teachers and 2731 Tamil medium teachers are necessary (MEHE, Sri Lanka, 2000c: 32). Though TPR is a widely considered indicator to assess teacher deployment and teacher availability, it has little meaning in explaining the disparities in teacher deployment as it does not consider student distribution by grades and teacher availability. These issues on teacher supply and deployment are likely to have major implications for teaching and learning. When teachers are deployed to rural schools they are faced with multigrade needs in some of the schools. It is less clear how individual schools resolve issues arising out of such implications.

In teacher supply and deployment to difficult schools, incentives offered by the system are important. The allowance given as an incentive to attract

teachers to difficult areas was suspended in 1995. After a lapse, the Ministry issued a new circular indicating such incentives as loan priority, priority for scholarships, and training opportunities and a bonus year for teachers with three years experience in a difficult area. Such teachers were not to have had more than 25% of their annual leave (MEHE, Sri Lanka, 1999b).

3.6.2 Setting for multigrade training provision within the teacher education system

In Sri Lanka, teacher education is categorized broadly as ‘Initial’ and ‘Continuing’. Training is provided at both national and provincial levels. The institutions that provide teacher education are the National Colleges of Education (NCOE), the Teacher Training Colleges, the Faculties/Departments of Education of Universities, the National Institute of Education (NIE), the Teacher Centres (TC), the Provincial Ministries and the Zonal Education offices. Brief descriptions of the different courses conducted by the various institutions are presented below.

3.6.2.1 Initial training for prospective teachers by the national colleges of education

The first mode of teacher training is offered by the NCOE. This is an initial teacher education program leading to the Diploma in Teaching for those who comply with the necessary GCE A-Level entry requirement. Primary education was offered in 10 out of 14 of the NCOEs (Herath, 2000). Out of the three years of training, two are conducted institutionally and the third year is an internship in a school. The curriculum development teams for this training course include lecturers of the NCOE, and academics from universities and NIE.

Frequently, the first appointments of the newly trained teachers are given to a school in a difficult, remote area. They face multigrade teaching situations during this initial period of service, but no special measures are yet taken to equip the NCOE trainees in multigrade teaching.

3.6.2.2 Initial in-service training for teachers given by teacher training colleges

A second mode of teacher training is the one offered by the teacher training colleges for teachers who do not possess the GCE A-Level requirement for entry to NCOE. Teacher training colleges offer a two-year in-service initial teacher education programme. Some of the teachers who undergo this training teach in schools where multigrade teaching is a necessity. However, there is no training component on multigrade teaching included in the course.

3.6.2.3 Distance mode initial teacher training programmes by the NIE

A third mode of training is the Distance Teacher Training provided by the NIE for in-service teachers. The intake for distance training comprises mostly teachers serving in the peripheral regions of the country, many of whom would be facing multigrade teaching situations. This Distance Teacher Education course includes a module for multigrade teaching. A small handbook is available in the training materials package. The handbook gives a comprehensive outline of basic strategies to organize multigrade classes. However, no follow-up study to investigate the usefulness the module has been carried out. The programme trained 50,000 persons recruited as teachers in 1989 and it would be interesting to study how these teachers manage in multigrade situations.

3.6.2.4 Degree courses by the Universities and NIE

A fourth mode of teacher training is the B.Ed Degree programme conducted by the universities and the NIE. The B.Ed. course offered by the university is a pre-service programme while the B.Ed course implemented by the NIE is an in-service programme. While primary education is a major component of both programmes no emphasis has been placed on multigrade teaching.

3.6.2.5 Post-graduate Diploma in Education by universities and NIE

A fifth mode of teacher training is the Post-graduate Diploma in Education (PGDE) offered to graduate teachers by the faculties and departments of education of the universities and the NIE. These also have no emphasis on multigrade teaching except as a passing reference.

3.6.2.6 Short-term in-service education courses provided by Provincial and Zonal Education authorities

A sixth mode is the short-term in-service education programme, which is the main type of continuing teacher education. The NIE, the MEHE and the provincial and zonal education authorities provide short-term in-service courses through a cascade model, where NIE curriculum developers train In-service Advisors (ISA) from all provinces. Subsequently, the trained ISAs are expected to conduct short-term courses for teachers in their various regions. These training programmes are mostly reform-specific as new reforms necessitate a major programme of in-service training. However, teachers have expressed dissatisfaction with the training given on practical aspects of teaching in relation to the reform-specific in-service training for Key Stage 1 in 1998 to 2000 (Perera and Dharmawardena, 2000; Gunawardena et al, 2002).

3.6.2.7 Teacher Centres

A seventh mode of teacher education is in the planning stages where over one hundred teacher centres are being established all over the country. At least one teacher centre per education zone is provided as a centre for continuing teacher education. Considering the overall training provision, although a whole range of teacher education courses is adopted by the education system of Sri Lanka, the emphasis given to multigrade teaching is minimal or absent.

3.6.3 Supervision and pedagogical support

Two major functions of the ZEOs are the monitoring of the implementation of the curriculum at school level and provision of feedback to teachers. However,

these two functions are mostly neglected by the ZEOs due to the lack of staff (Mallawarachchi and Sivagnanam 2000). Schools with multigrade classes are likely to be the most neglected, as the majority of them are in remote locations in the country. This neglect at zonal level could be one of the major factors that have contributed to the ‘invisibility’ of the multigrade phenomenon at the policy-making level.

3.7 Primary education framework

In Sri Lanka, efforts have been made to maintain equity in education through the adoption of a common national curriculum in all state and private schools during the compulsory education span. The primary curriculum is designed in an age-graded framework. The curricula comprises a graded package of syllabi, teacher guides, teacher training and student curricular materials.

The latest curriculum reform commenced in 1997 with the aim of improving the quality of education under the recommendations made by the NEC. The Presidential Task Force, a special committee appointed by the President of Sri Lanka was entrusted to set up action plans for the recommended educational reform. The functions of the reformed curriculum as given in the curriculum guidelines are to:

- Identify the special skills and potential of the child and plan the learning-teaching process accordingly.
- Create learning opportunities through effective use of the environment, instead of confining the child to the classroom.
- Utilize the child’s instinctive inquisitiveness to provide opportunities to learn through curiosity by encouraging him or her to think, question, find solutions, explore, express, create and appreciate.
- Sharpen the senses and provide training in recollection and memory.
- Provide opportunities for the acquisition of social skills necessary to observe accepted norms and to appreciate culture.
- Respect the culture and points of view of others and learn to live in harmony as patriotic citizens of Sri Lanka.
- Develop an environment-friendly attitude and participate actively in conservation activities.
- Be able to accept and adapt to change.
- Develop the skills necessary to face challenges with self-confidence.
- Promote the balanced and overall development of the child.

(MEHE, Sri Lanka, 2000a)

In the new structure the five grades are clustered into three key stages (KS) incorporating grades 1 and 2, grades 3 and 4 and grade 5, to form KS 1, 2 and 3 respectively, for the purpose of assigning each KS to a single teacher. The new curriculum has been designed to serve as an appropriate foundation for the development of competencies related to five areas, i.e. communication, environment, ethics and religion, play and leisure and learning to learn. The new curriculum includes a language area and three other subjects. The language area includes mother tongue (Sinhala and Tamil) and English. The other subjects are mathematics, religion and environment-related activities (ERA). The specified competencies for each KS form the outline for the selection of content for all the subjects. The framework of the primary education span is given in Appendix 1, p.330.

The Primary Education Department of the NIE designed, developed and revised the curricula. The curriculum specialists with the assistance of teachers revised the curriculum during the reform. Draft versions of the new curricula were trialled in schools. The curricula were reviewed with teachers, teacher educators and curriculum specialists. After several committees made further recommendations and revisions the curricula were submitted to the Academic Affairs Board and the Council of the NIE to obtain approval for implementation. This centralized curriculum development process ensures uniformity of standards of the intended curriculum across the whole country.

The curriculum for each grade was revised one after the other during consecutive years through the following stages:

1. The first year was considered as the design phase.
2. The second year was devoted to piloting the curriculum in one particular education zone and to make suitable revisions.
3. In the third year the piloted curriculum was implemented nationally

Following this process, in 1998 Grade 1 new curriculum was piloted in one district. In 1999 it was implemented across the whole island. The reforms on

the primary curriculum were introduced through a cascade system of reform specific in-service teacher training.

In reviewing the process of curriculum development, it could be seen that while curriculum reform received significant attention, none of it was aimed at the specific needs of multigrade teaching. The framework of the primary curriculum illustrates the underlying assumption that all teachers would be engaged in monograde teaching. No guidelines for addressing the demands of multigrade teaching situations are included.

3.8 Summary

This chapter has presented the setting of multigrade teaching within the primary education context in Sri Lanka. Primary education has received remarkable attention with the introduction of the free education scheme, expansion of the school system and provision of resources, resulting in a significantly increased participation rate. It has also contributed to raising the educational achievement levels. However, disparities that continue to exist relate mainly to the provision of urban and rural education and to small schools. Multigrade teaching is significant in rural contexts. None of the several existing modes of teacher training gives any explicit planned emphasis to multigrade teaching. Neither are issues relating to multigrade teaching considered in the primary curriculum.

CHAPTER 4

DEVELOPMENT OF THE ACTION RESEARCH FRAMEWORK

This chapter describes the process of development of the framework of the field study in relation to the relevant research questions, and the appropriate methods of sampling, data collection and analysis. This chapter while giving an outline of the methods selected, presents the reasons for the selection of appropriate methods. The detailed procedures followed within the action research are described in greater detail in the future chapters.

4.1 Research questions to be addressed through the field study

Out of the seven RQs, 1 and 2 were addressed by the literature and were presented in chapters 2 and 3. The two chapters laid the context to the study and contained important underlying features on which the field study would be developed.

The research questions (RQ3 to RQ7) to be addressed through the field study were as follows.

RQ3 What are the contextual characteristics of multigrade teaching schools in rural Sri Lanka ?

RQ3 was framed to gain a broad perspective on a range of multigrade contexts before focusing on a study of multigrade practice.

RQ4 What are the current practices of multigrade teaching and the challenges faced by multigrade teachers in rural Sri Lanka?

RQ4 was framed to find out how teachers currently organize multigrade teaching and to understand the challenges faced by them in order to plan innovative strategies to support their teaching.

RQ5 What innovations could be planned to improve multigrade teaching?

RQ5 was framed in order to plan an effective teaching strategy, which would address the challenges revealed through RQ3 and RQ4.

RQ6. What is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?

RQ6 was framed to address the need to make an intervention to improve practice in multigrade teaching, contribute further to knowledge about such practice and benefit from lessons gained through the process.

RQ7 What is the impact of the intervention?

RQ7 was framed to investigate the effectiveness of the intervention made in multigrade practice.

4.2 Methodological considerations for the choice of action research design

This section discusses the methodological considerations of selecting a suitable research design in order to achieve the study's objectives by reviewing the characteristics of action research. The research questions indicate a need for an action-oriented study on educational practice. Action research approach was considered as a suitable approach for the study and hence a review of literature was carried out to understand its characteristics.

4.2.1 Definitions of educational action research

Action research is gaining popularity for its potential for educational and staff development processes. It is an approach to improving education by changing it and learning from the consequences of changes.

A popular definition of action research is “the study of a social situation with a view to improve action within it” (Elliott, 1991:69). The definition by Bassey (1998:93) also gives a similar meaning:

Action research is an inquiry that is carried out in order to understand, to evaluate and then to change in order to improve some educational practice.

Kemmis and McTaggart (1982 in McNiff et al, 1996:9) state, “the linking of the terms action and research highlights the essential feature of the method. Trying out ideas in practice is considered as a means of improvement and as a means of increasing knowledge”. They describe ‘action’ as deliberate, controlled and a critically informed variation of practice.

McNiff et al (1996:8) state, that in action research ‘praxis’ is more important than ‘practice’. According to the author praxis is informed, committed action that gives rise to knowledge rather than just successful action, and action research is an approach for improving practice through planned and committed action, which may be called an ‘intervention’.

An intervention incorporates a set of action strategies or experimental solutions to the problem under investigation (Altrichter et al, 1993:159). The definition of action research by Cohen and Manion (1994: 186) indicates the place of intervention in action research. They define action research as ‘a small-scale intervention in the functioning of the world and a close examination of the effects of such intervention’. Therefore, ‘intervention’ could be considered as an integral part of action research.

Cohen and Manion (1994:188-189) indicate the purposes of action research as,

1. a means of remedying problems diagnosed in specific situations, or of improving in some way a given set of circumstances.
2. a means of in-service training, thereby equipping teachers with new skills and methods, sharpening their analytical powers and heightening their self-awareness.
3. a means of injecting additional or innovatory approaches to teaching and learning into an ongoing system which normally inhibits innovation and change.

4. a means of improving the normally poor communication between the practising teachers and the academic researcher and of remedying the failure of traditional research to give clear perspective.
5. a means of providing a preferable alternative to the more subjective, impressionistic approach to problem solving in the classroom.

These definitions and discussions on the use of action research have a direct bearing on the present study as it is directed at diagnosing the problems of existing practice and evolving strategies for improvement.

4.2.2 Action research as a collaborative endeavour

Action research is a 'better endeavour' when it is carried out as a collaborative activity (Kemmis and McTaggart, 1988:5-6). The definition of collaborative action research is given as, "a form of collective self-reflective inquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as understanding of these practices and the situations in which they are carried out". In viewing action research as a collaborative endeavour, the roles of researchers and participants are said to become blurred and participants become more than informants of the research. Kemmis and McTaggart describe three ways in which collaboration may take place:

- A group of teachers working as a team
- A single teacher reflecting on his/her own practice with the help of a 'critical friend'
- A facilitator provides resources, challenge and support to the practitioners

Out of these, the approach of teachers researching their own practice is the most discussed approach to action research in the developed countries. The 'teacher-as-researcher' movement originated in the United Kingdom in the 1960s when Lawrence Stenhouse and John Elliott introduced action research to curriculum reform in schools (Elliott, 1991). This movement effected a change in the centralised model of curriculum development and in the role of

the curriculum developers. With this movement teachers were encouraged to become researchers in the classroom. McTaggart (1991) also states that the current need for action research is in the area of the development of curriculum and educational practice. Thus, the distinction between curriculum development and curriculum evaluation has become narrow. The curriculum researcher was seen as “someone who helped the teachers to improve their practice through reflecting on their own capacities” (Hammersely 1993: 212). This movement led to an expansion in the role of the ‘teacher-as-researcher’ and reduced the role of the ‘non-teaching educational researcher’ to a secondary one. This argument raised issues relating to the insider vs the outsider in conducting research in a particular context.

Methodological arguments put forward by Hammersely (1993) point out that the teachers are in an advantageous position in terms of having access to their own intentions, feelings and understanding of their behaviour through long-term experience in the setting. In contrast, the outsider would need a long time in the field to build up such relationships and understanding. The teachers, being the key actors in the settings studied, are in a position to test theoretical ideas in a way that an observer can never do.

The countervailing disadvantages for insider involvement are also given:

1. For those who are closely involved, it may be impossible to see the wider context in order to get a proper understanding.
2. The information that practitioners have about situations in which they operate could be limited, superficial or distorted. An outside researcher may be able to tap a wider range of sources of information than an insider and will be able to process them more explicitly allowing for checking by others.
3. The relationships available to practitioners may not include what is necessary for research purposes.
4. What is required to test theoretical ideas may well be in conflict with what is needed for good practice. Therefore, the practitioner may face a dilemma and, as a result, may not be able to test his or her ideas.

(Hammersely, 1993:218)

Carr and Kemmis (1986:136) based on the relationship between outside facilitators and practitioners put forward a typology of action research. The first type is described as the 'technical action research' model where practitioners test the applicability of findings generated elsewhere, while the researchers provide practitioners with ideas and strategies for improvement and further study of the situation. In this model the practitioners depend highly on the researcher as a facilitator.

The second type is described as the 'practical action research' model, where the facilitator acts as a 'process consultant', and helps the practitioners to articulate their values and concerns, to plan and monitor action and to evaluate action and its effects. This type of a relationship resembles the 'teachers-as-researchers' model by Stenhouse and Elliott, where outside researchers from higher education acted as facilitators to schoolteachers in school-based curriculum development (Elliott, 1991). This kind of interdependence between university academics and teachers contributed to the change in nomenclature from collaborative action research to 'participatory action research' (Kemmis and McTaggart, 2000:567).

The third type is known as 'emancipatory action research' where action research is carried out by a self-leading group, aimed at developing new practice, with a minimal contribution from a facilitator.

Out of the models discussed, the 'technical action research' model was the one which seemed most feasible since the researcher has more responsibility over the process through initiation and leadership. However, it was considered important that this model should work in conjunction and in consultation with the literature on collaborative action research in the developing world, in order to facilitate action research with multigrade teachers for this study in the best possible way.

4.2.3 Lessons from collaborative action research studies in developing countries

Three action research studies on classroom intervention in developing countries characterised by the outsider–insider combination were reviewed to obtain an insight for developing the framework of the present study.

The first is by Stuart (1991) in Lesotho conducted with five teachers, aiming at improving the teaching of Development Studies at post-primary level. The project duration was one year. The intervention included meetings with teachers and working with each of them in their classrooms over a year, on issues which have been selected. Stuart claims that the action research model in the study was spiral with phases of action, observation, evaluation and reflection, each phase starting with diagnosis and planning. Stuart considered the researcher's role as a 'process-helper', while the teachers made decisions regarding the pace and direction of the project, having identified changes needed, and having chosen the innovations to be tried out. The framework of the study included the comparison of a set of baseline schools with experimental schools, which were subjected to intervention. In conclusion, the study has recommended collaborative action research as an appropriate strategy for developing countries to use in order to encourage the effective professional development of teachers.

The second is the study by Walker (1993). It was contextualised in South Africa to address the question "What conditions make action research possible?" In this study two levels of action research are distinguished. One is the researcher's own and the other is that of the teachers who were involved in the study. The researcher has adopted a spiral model to address the issues identified by the teachers. The researcher's role was that of 'facilitator' having organised workshops, introduced innovative methods for teaching and supported lesson planning. The importance of a facilitator for teacher action research is emphasised in the study. The researcher considers action research to be both relevant and appropriate for teacher development in South Africa.

The third is Stuart and Kunje's (1998) study in six resource-constrained schools in Malawi. They reported how staff responded to an intervention over a six-month period. The study had two stages comprising a preliminary survey followed by an intervention. The intervention aimed at introducing action research at four levels among the staff with the objective of enabling them to co-operate with each other. The authors interpreted the findings from two opposite points of view, one from an optimistic angle and the other from a pessimistic one. Considering outcomes of the study, on the one hand they experienced that participants worked hard which led to some valuable findings; while on the other hand, it was revealed that many problems persisted and that every one who participated did not benefit.

These three studies convey the positive impact made through action research in improving classroom situations. The studies stressed the high level of support needed by a facilitator, in order for the teachers to engage in action research.

4.2.4 My awareness, experience and beliefs about action research at the stage of designing the study

My experience in research goes back to the mid-eighties when I was engaged in laboratory-based scientific research in zoology. A few years later I embarked on education research at the NIE to start my career as a professional researcher. When I acquired wider knowledge and skills on the various methodologies of educational research I began to be critical about my professional work.

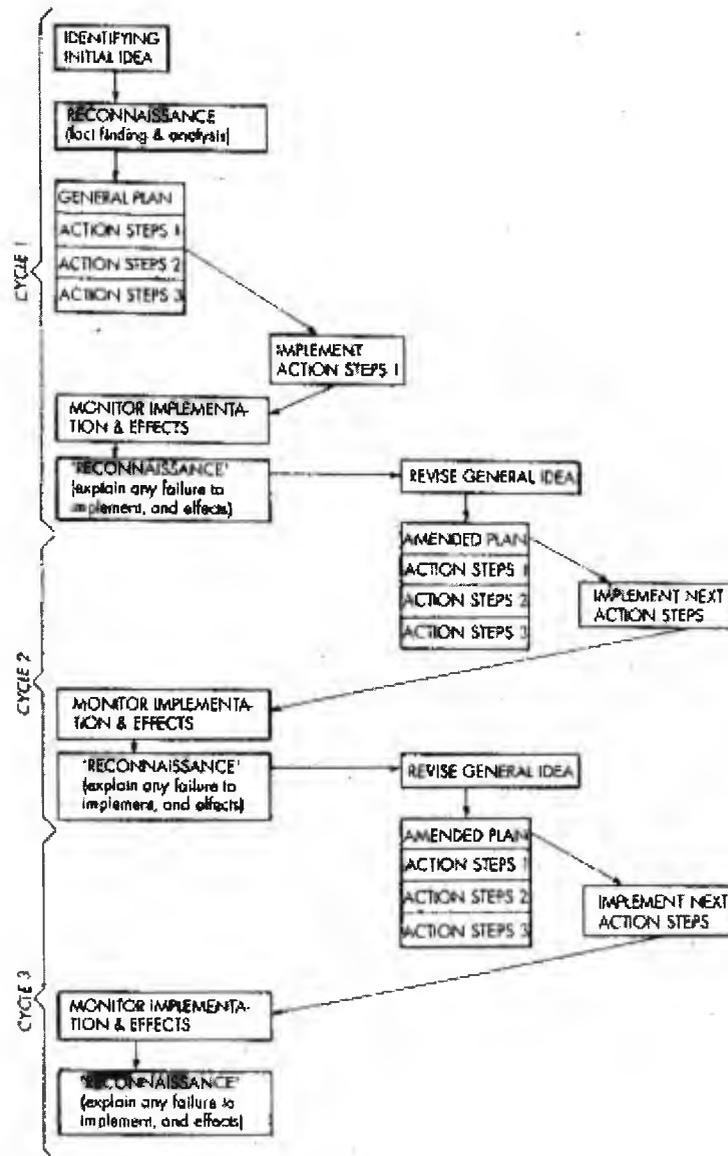
During my professional career as an educational researcher, I witnessed the limited impact that research was making on policy formulations related to improvement in classroom practice. The research studies during the 1990s were designed as both large-scale surveys and case studies. However, we were neither successful in giving a 'voice' to the teachers' work to influence curriculum policy, nor were we able to exert considerable influence on the policy makers.

A significant turning point in our work was made in the mid-nineties with the initiation of collaborative studies with teachers on classroom practice adopting the approach named ‘guided practice’ (Karunaratne et al, 1999). During guided practice, the researcher worked closely with a teacher in supporting classroom practice. The small-scale collaborative studies with primary school teachers yielded positive results in improving our (teachers’ and researchers’) professional practice. However, the teachers were very dependent on the researcher during the process and, hence, it was not possible for a researcher to work with more than one teacher at a time. Nevertheless, the experience gained through participation in those studies was invaluable for me in designing a framework for the present study.

4.3 The development of the action research framework

In developing a framework for the study several models of action research from literature were consulted. These included McKernan, (1991), Elliott (1991), Atweh et al, 1(998) and Whitehead (1989, cited by McNiff, 2001: 72). Basically all the models comprised the idea of four stages: planning, action, reflection and re-planning in action research. In developing a basic framework, Elliott’s model (Fig.4.1) was more explicitly helpful.

Figure 4.1 A revised version of Lewin's model of action research by John Elliott (1991)



The major factor in the adoption of this model was the fact that it permitted significant scope to change the general idea subjected to the study. This seemed appropriate since I found myself in the same circumstances while analyzing the problem in context through addressing RQ1 and RQ2 of the study. According to the model a second major factor was the stage of

‘reconnaissance’, which was elaborated as ‘fact-finding and analysis’. This stage was considered to be relevant, as it pointed out the need to obtain an insight regarding multigrade practices. This stage matched with the RQ3 and RQ4 of the present study. The third was the importance of the idea of preparing a general plan of action. This seemed a logical way to proceed with planning the intervention for improving the status of multigrade teaching. It matched with the RQ5 of the present study. The fourth was intervention to improve the existing situation and it was directly applicable to the RQ6 of the present study. The fifth was the stage that aimed at evaluating impact of the intervention. It was also considered to be a necessary component for the present study having indicated by the RQ7. Lastly, the Elliot action research cycle aimed at reflecting on the experiences of planning and action. In the present study too, a final stage needed to incorporate such activities to review the overall study. However, revising the plan to initiate another cycle as given by Elliott was considered to be beyond this study due to the constraints of time. Hence, the present study ends with making recommendations that could be considered for the next cycle of action in another study. With consolidation of early ideas on the above lines, the initial plan for action research evolved, and the following sequence summarises the framework of the action research with the aim of improving multigrade teaching:

1. Fact-finding within multigrade contexts and practice (RQ3 and RQ4).
2. Planning an innovative strategy to improve multigrade teaching (RQ5).
3. Intervening in collaboration with teachers in implementing the planned innovative strategy (RQ6).
4. Assessing the impact of the intervention (RQ7).
5. Reflections, summarising core findings and recommending further action based on implications.

After making the action research plan the next step was to design a suitable fieldwork plan.

4.4 Fieldwork phases and the design

Action research is essentially a field-based approach needing to be conducted within the context in which the phenomenon under study takes place. Thus, a field study design was developed. The study was designed in three phases which took account of the framework described earlier.

Phase 1, fact-finding on multigrade contexts and teaching. This was divided into two steps:

- (1) Step 1, understanding the characteristics of multigrade teaching school contexts and multigrade teachers (addressing RQ3)
- (2) Step 2, understanding the status of multigrade practice and the challenges involved (addressing RQ4).

Phase 2, the intervention on multigrade teaching based on Phase 1 findings. This was divided into two steps:

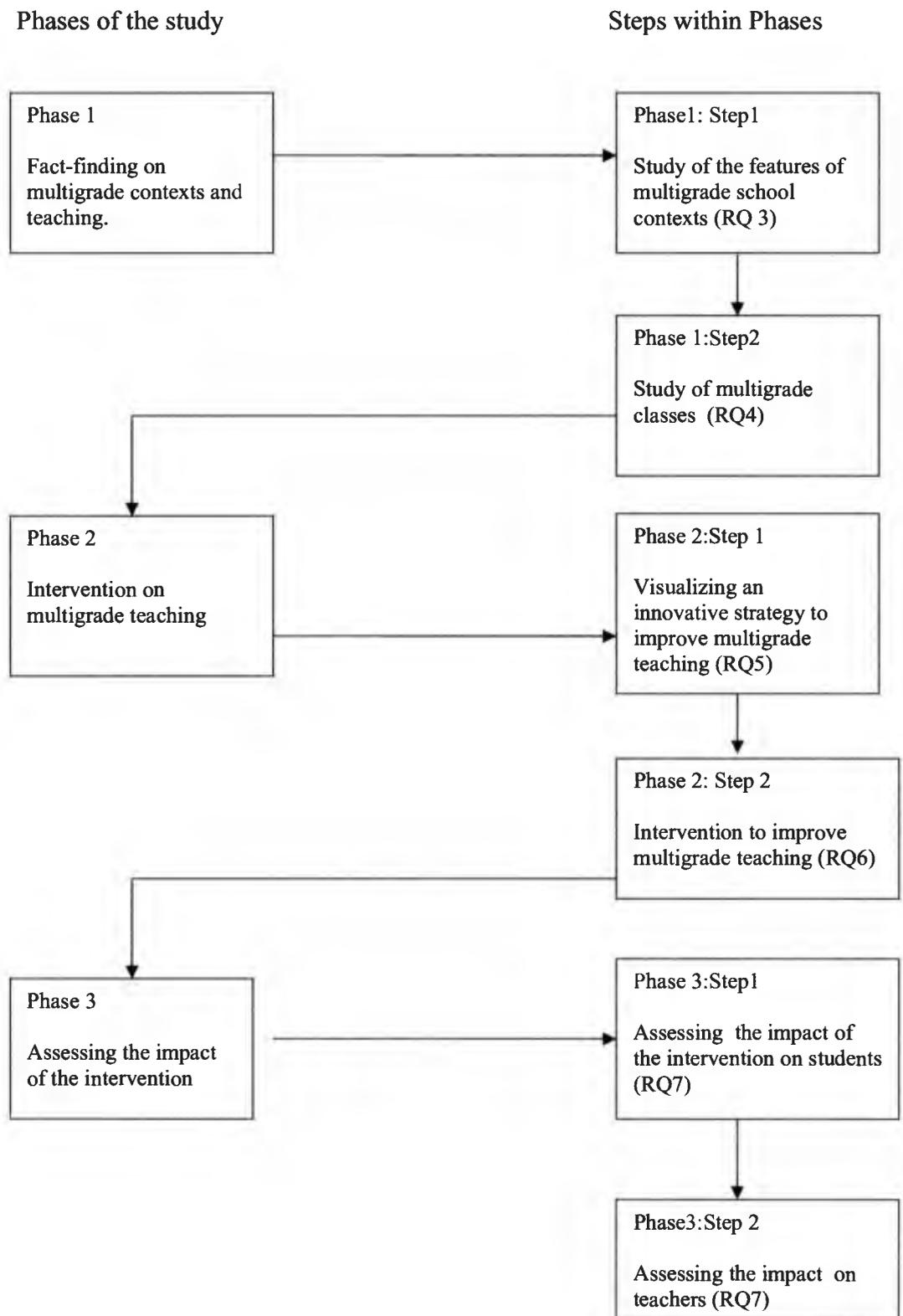
- (1) Step 1 visualised an innovation for multigrade teaching (addressing RQ5)
- (2) Step 2 comprised intervention, in collaboration with teachers (addressing RQ6)

Phase 3, assessing the intervention was planned as two steps (addressing RQ7):

- (1) Step 1 assessed the impact on students
- (2) Step 2 explored teacher satisfaction

Figure 4.2 summarises the Phases and Steps schematically.

Figure 4.2 Phases and Steps of the field study



A 'design' is defined by Lincoln and Guba (1985:259) as "a broad plan relating to certain contingencies that will probably arise". Finalising fieldwork design before entering the field leads to a linear process of research where conceptual, methodological and empirical steps are neatly viewed as sequential steps (Flick, 1998:41). However, the precise nature of these contingencies is unpredictable in a field study. Further, action research is not considered as merely following a strict plan of action (McTaggart, 1996). Thus, the concept of 'emergent' design was adopted in the study.

Schwandt (2001:35) clarifies some of the issues in an emergent design as follows:

The term emergent can suggest that the design itself arises unexpectedly or that the field worker has no design or plan at all at the outset of the study. This kind of complete laissez-faire attitude of seeing 'what happens' is ill-advised. The field worker seeks to understand and portray some problems, even issues and concepts should have given careful thought in advance of understanding the fieldwork. How that understanding can be developed and how claims are made about a social phenomenon can be warranted.

Advantages of emergent designs as given by Merz (2002:150) are that:

An emergent design can encourage the researcher to develop his/her own voice. By developing his or her own voice the researcher can begin to go beyond the limits imposed by another's way of thinking or doing things in order to develop a more in-depth way of understanding and reporting the experience

These ideas indicate that the design will change and be shaped by a large number of interactions unfolding over a period of time. The study with a flexible design made me reflect on the process and make suitable modifications throughout.

4.5 Sample area and formal entry

Since the study was designed as action research, close interaction between the researcher and multigrade teaching schools was essential. Hence, schools within a small geographical area needed to be selected. To fulfil this requirement the study was located in one educational zone. The selection of an

appropriate education zone was done systematically on a step-wise approach on the basis of the highest prevalence of estimated multigrade teaching schools.

The first step was to select a province with the highest prevalence of multigrade schools according to estimates in Table 1.1 (given in Chapter 1, p. 22). According to estimates, the highest percentage of schools with four teachers or less was in the Northern and Eastern provinces. Two reasons prevented me from selecting these provinces as a sample area. One reason was because these two provinces were not accessible for research, being war-torn areas, and the other reason was the fact that the medium of instruction of the majority of the schools in these two provinces was Tamil and therefore the researcher could not undertake research due to the lack of knowledge of Tamil. Hence, the province with the next highest percentage of multigrade schools, the Sabaragamuwa province, was selected. The Sabaragamuwa province lying to the southwest of the central hills of Sri Lanka had 21.61% of schools with four or less teachers. The vast majority of schools in the Sabaragamuwa province are located in rural areas. Sabaragamuwa has the highest percentage (40%) of poor households out of the nine provinces (Department of Census and Statistics, Sri Lanka, 2001).

The second step was to select one of the two districts. Kegalle and Ratnapura are the two districts comprising the province. Using the district-wise percentages of multigrade schools in Table 1.1, Kegalle district was selected as it had a higher percentage of schools with four or less teachers. The location of the province and the district are given in a map of Sri Lanka (Appendix 2, p.331).

The third step was to select an educational zone within the Kegalle district. The Kegalle district has three educational zones. Table 4.1 gives the incidence of schools with four or less teachers in Kegalle district categorised in education zones.

Table 4.1 Schools with four or less teachers in the Kegalle district, by education zone

<i>Education Zones</i>	<i>Schools with four or less teachers</i>
Dehiowita	78
Mawanella	25
Kegalle	37
Total	110

Source: MEHE, 1998

Table 4.1 shows that the Dehiowita education zone has the largest number of schools with four or less teachers. Thus, it was selected as the sample area for Phase 1. The detailed description of contextual characteristics of the Dehiowita education zone with special reference to primary education reviewed through documents is given in Chapter 5.

4.6 Pilot fieldwork

The importance of a pilot fieldwork study before committing to a qualitative component of a study is expected to assist the researcher. It is advised that pre-interviews, a brief period of observation and document review would be beneficial to a researcher who wishes to devote a significant time component in the field (Jansesick, 1994). The researcher is said to benefit through addressing unclear issues, pre-testing interview questions, gaining independence to carry out the study, building up rapport with the participants, establishing communication networks, and shaping up the study with insights gained through reviewing documents.

In the present study a pilot fieldwork was conducted to achieve the following:

1. to obtain an understanding of the general context of the area and become familiar with the physical demands of the data collection
2. to identify the population and develop a sampling strategy

3. to adapt the framework developed through a review of the literature for

Phase 1: Step 1

4. to decide on suitable methods for the study of multigrade contexts

Pilot fieldwork was carried out through school visits in two locations with the London supervisor. In selecting the schools for field visits, attention was paid to the number of teachers in the primary grades and schools with the lack of one teacher per grade were selected.

1. Visits to two schools with multigrade teaching in a suburban area of Colombo.

Firstly, two schools in a suburban area of Colombo were selected on the basis of convenience. These were located with the help of a colleague who is an in-service adviser.

2. Visits to five schools with multigrade classes in the sample area

Secondly, visits to five schools in the sample area were made. The schools were located with the help of a colleague from the Ministry of Education in Sri Lanka who was a former director of education in the selected educational zone.

Gaining formal entry to the sample area was an important aspect in field research, and the following steps were taken:

1. A letter requesting permission to conduct the study was sent to the zonal director of education indicating the purpose of the study and background of the researcher. In addition, arrangements for a meeting with the zonal director were also made to explain the objectives of the study.

2. A letter was handed to school principals requesting permission to collect data regarding school contexts during each school visit. The letter included the fact that the approval was granted for the study by the zonal director of education.

The pilot data collection was done through open observations and interviews conducted as conversations. Field notes were written at the site and completed after the field visits. Pilot field visits revealed the issues to be considered during fieldwork which included the necessity of:

- a field residence for the data collection period, as the distance to sample schools was on average about 150-200 km away from my permanent residence.
- a means for personal transport for field visits as public transport services to remote schools from the main towns of the education division were either absent, irregular or infrequent.
- a vehicle that would withstand the rough conditions of the roads.
- a driver familiar with the hilly and curvy roads, who would assist in finding remote schools.
- taking precautions to avoid personal risk involved in travelling to remote schools in isolated unfamiliar areas.

4.7 Methods

The next task was to make the initial selection of appropriate methods to suit the emergent design of action research comprising the three phases with six steps. At the outset of the study the development of the general overall idea of the methods to be adopted was essential to plan each step of the different phases of the study. The framework of the study demanded adoption of methods from both the quantitative and qualitative paradigms. First, the need to study multigrade teaching in its naturalistic environment required the adoption of mainly qualitative methods. The relationship between the context and qualitative research is iterated as follows:

Qualitative researchers assume that human behaviour is significantly influenced by the setting in which it occurs
(Bogdan and Bicklen, 1992:30)

The following quotation elaborates this aspect:

Qualitative research is multi-method in focus, involving an interpretive naturalistic approach to its subject matter. This means qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them.
(Denzin and Lincoln, 1994:2 cited in Creswell, 1998:15)

Second, the usefulness of quantitative methods for comparison of groups was considered (Creswell, 1998:21). The need to study the impact of intervention on students by making a comparison with a group of students in non-intervention schools required the adoption of mainly qualitative methods.

4.7.1 Field methods for Phase 1: Step 1

The research question addressed in Phase 1: Step 1 is, “What are the contextual characteristics of multigrade teaching schools in rural Sri Lanka?” The data collected during pilot fieldwork enabled decisions to be made regarding Phase 1: Step 1 which is the first step of the fieldwork of the study. Lessons learned through pilot fieldwork indicated the need for the researcher to become the key instrument in data collection (Lincoln and Guba, 1985: 236). The following are the reasons:

- Instrument/s could not be made on a highly structured format as previous knowledge on multigrade contexts was sparse
- Schools hardly had any personnel who would enthusiastically complete postal questionnaires.
- Postal services were not easily accessible to the schools.

4.7.1.1 Condensed fieldwork

The ‘condensed fieldwork’ approach reviewed by Crossley and Vulliamy (1997), was selected for data collection from school contexts. Condensed fieldwork permits an approach, which considers some characteristics of

ethnography accompanied by aspects of population validity. The authors appreciated its usefulness for policy-oriented research. The following are the characteristics and strengths of the approach:

- it could cover a large number of sites during a short period of time for the purpose of broadening the sample to enhance population validity
- it was appropriate to obtain in-depth information and understanding on a limited number of themes
- the comparison of a large number of sites at a certain depth has a special significance for policy research rather than a single in-depth case study

Crossley and Vulliamy (1997:17)

The planning and making of arrangements for field data collection was done during the latter half of April in Year 2000, during the school vacation. The following is an extract from the field notebook showing how arrangements for field residence and transport were made and my feelings at the commencement of fieldwork:

Field arrangements were considered with my family as it involved living away from home for several months and doing research in an unfamiliar location. After considering several alternatives, a host family and driver from the sample area were found through one of my sister's friends. I came to Deraniyagala town and resided with the host family, leaving my family in Colombo. I began the field study with some apprehension being aware of the challenges that lay ahead. (April 2000, field notes)

4.7.1.2 Achieving a sample of schools

Sample selection for Phase 1: Step 1 was not a straightforward activity as there were no systematic records about multigrade schools. Several documents from MEHE were collected and studied. These were mainly school census schedules and school lists produced as a result of school restructuring and reorganization. Secondly, documents giving details of school types, number of students, teachers, and grades in the school were collected from MEHE and

ZEO. These were studied to get an overview of the primary education context of the education zone with particular reference to difficult schools. Thirdly, principals of the schools visited were consulted to find any information on other schools having multigrade teaching needs. Hence, due to the lack of information on multigrade school population, steps were taken to ‘achieve’ a sample using ‘theoretical sampling’ or ‘purposive sampling’. The concept of ‘theoretical sampling’ is defined as follows:

Theoretical sampling is the process of data collection for generating theory, whereby the analyst jointly collects, codes and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges. The process of data collection is controlled by the emerging theory.

(Glaser and Strauss, 1967:45).

The characteristics of theoretical sampling in contrast to probabilistic sampling are given by Mertens (1998: 258-265). Table 4.2 summarizes the information.

Table 4. 2 Differences between theoretical and probabilistic sampling

Theoretical sampling	Probabilistic sampling
Goal is not to generalise from sample to population.	Goal is to generalise from sample to Population.
Sample size is not defined in advance. Seeks indices of saturation.	Sample size is defined in advance
Adopt maximum variation in selecting items and look for deviant cases to enrich the emergent model.	Items are selected by a predetermined probability.
Repeated drawing of sampling elements with criteria to be defined again in each	One-shot drawing of a sample following a plan defined in advance
Strategies include deviant cases, intensity, maximum variation, homogeneous, typical case, stratified-purposeful, critical case, snowball, criterion and theory-based.	Strategies include probability based, simple random, systematic, stratified, cluster and multistage.

The framework on theoretical sampling in contrast to stratified sampling was considered as suitable to be adopted for sampling of schools as the size and the features of multigrade teaching school population were unknown. The details of the process are discussed in Chapter 5.

4.7.1.3 The ‘Field guide’

Fieldwork in Phase 1: Step 1 had to focus on semi-structured data collection strategies, as the study was more exploratory and less guided by literature or theory. The pilot fieldwork indicated that the contextual variability between schools and the scarcity of the human resources within multigrade contexts favoured the use of a single semi-structured instrument that would act as a guide for data collection.

A ‘field guide’ addressing issues arising from both the literature and pilot fieldwork was prepared (Appendix 3, pp.332-337). It comprised items for which data had to be collected through ‘interviews as conversations’ (Burgess, 1984: 218), semi-structured observations and collection of documents. The source of each data item was also documented.

In recording the data first, notes generated from interviews, observations and documents with the use of the field guide were written down in a notebook. Initially, brief notes were taken down in situ. Secondly, after each day’s school visits, an attempt was made to review the field notes and to complete them in detail where necessary. Thirdly, during the short breaks in the fieldwork, the notes were enhanced and word-processed.

4.7.1.4 Analysis of field notes

Data analysis in Phase 1: Step 1 was carried out as an ongoing activity during and after data collection. First, preliminary analysis was made by adding reflective comments while reading the field notes in order to enhance them. Secondly, the field notes of Phase 1: Step 1 were analysed through ‘a priori theme analysis’ based on the framework made for the data collection field

guide. Thirdly, attempts were made to focus gradually on emerging categories (Huberman and Miles, 1994: 431). The ideas developed through the ongoing data analysis were helpful in designing the subsequent steps of the study.

4.7.2 Field methods for Phase 1: Step 2

Phase 1: Step 2 addressed the research question, “What are the current practices in multigrade teaching and the challenges faced by multigrade teachers in rural Sri Lanka?” The main objective of this step was to study the instructional practices of teachers in addressing multigrade classes.

4.7.2.1 Multiple case studies

A case study is a “study of a singularity conducted in depth in natural settings” (Bassey, 1999: 47). Similarly, it is defined as “one of the traditions of qualitative inquiry in exploring a bounded system, a system bounded by space, time and place, while the case could be a programme, event, an activity or individuals” (Creswell, 1998:61). In summary, the essential feature of case study is that sufficient data are collected for researchers to be able to explore significant features of the case and to put forward interpretations of what is observed (Bassey, 1999:47).

Since the objective was to study an educational practice in depth, the method adopted for this step was ‘educational case study’ which is designed to enhance the understanding of educational action (Husen and Postlewaite, 1994: 642).

Multiple case studies include two or more cases within the same study (Yin, 1993:5). The terms multiple and multi-site seemed to be synonymous in the research methodology literature. It is considered to be a method of equivalent value for survey research. Husen and Postlethwaite (1994:643) describe the suitability of multi-site methods especially for policy research where generalisation is an important issue. The possibility of an educational case study being incorporated into multi-site methods is also indicated.

One basic feature of multi-site case studies is that the researcher usually spends less time in each site when compared with a researcher who makes an in-depth inquiry of one case such as in an ethnographic case study.

The ‘multiple case study’ approach was adopted to study multigrade practice. Three parallel case studies were conducted. The rationale for the selection of the three specific multigrade contexts for case study is given in Chapter 6.

4.7.2.2 Observer-as-participant

The role assumed during Phase 1: Step 2 was ‘observer-as-participant’, where the researcher maintained the role of observer and did not take an established participatory role in the context (Foster, 1996:74). Five days were spent in each school to study multigrade practice. During observation, the objectives were revealed to the teachers. Field notes were gathered on the setting and approaches of multigrade practice. Subsequently, reflective notes and hunches were added.

4.7.2.3 Case analysis

The process of analysis of the three case studies was carried out focusing on the understanding of the multigrade practices adopted by the practitioners. The process involved two main steps, as an analysis of each case and a cross-case analysis. The specific activities of each main step are detailed below.

1. Within-case analysis

- (a) Analysis of themes within a case providing details that support the themes.
- (b) Generating analytical statements and drawing the ‘lessons learned’ from the case.
- (c) Writing of the individual case studies
(Creswell, 1998:63).

2. Cross-case analysis

- (d) Writing a cross-case narrative based on a series of themes.
- (e) Forming assertions or proposing generalisations through interpretations of ‘lessons learned’ from a case on the basis of personal views or theories or constructs in the literature (Stake, 1995 quoted in Bassey, 1999:3; Creswell, 1998, 249).

4.7.3 Fieldwork outline of Phase 2: Step 1

Phase 2: Step 1 was planned to address the research question 5, “What innovations could be planned to improve multigrade teaching?” In this regard attempts were made to complete the planning of an innovation, which would improve multigrade teaching based on the needs of the multigrade teachers, as revealed from the two steps of Phase 1. Hence, no prior decisions could be made on this step and the entire process is described in Chapter 7.

4.7.4 Fieldwork outline of Phase 2: Step 2

Phase 2: Step 2 was planned to address the research question 6, “What is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?” Only a few field decisions could be made initially in this regard. They were as follows:

1. A group of about twelve teachers would be formed.
2. Teachers would be supported in workshops and school-based facilitation
3. Teacher collaboration would be used as much as possible for the process.
4. A period of about nine months would be allocated to the intervention.
5. Data collection would be made in the role of participant observer.

Elliott (1991:75) describes the construction of a general plan to effect a change. He considers that the plan should help practitioners to go beyond present constraints (to some extent at least) and to empower them to act more

appropriately in the situation and more effectively. The plan of intervention is given in Chapter 8.

4.7.5 Initial plans for fieldwork in Phase 3

The effectiveness of the intervention could be found only by generating evidence on the improvements of multigrade practice. Phase 3 addressed the research question, “What is the impact of the intervention?” Two types of data were generated from Step 1 and Step 2 respectively namely, student achievement and teacher satisfaction.

Phase 3: Step 1 attempted to assess the impact of the intervention made on student achievement. This was assessed by adopting a quasi-experimental design. The design and methods are given in Chapter 9.

The impact of the intervention on teacher satisfaction was assessed through eliciting teacher satisfaction data regarding the intervention. The tools for data collection were semi-structured questionnaires, semi-structured interviews, focus group interviews and the collection of such documents as lesson plans and diaries. The construction of questions for the instruments occurred after the intervention.

Data gathered were sorted with the help of the criteria which had evolved through the process of intervention, in order to assess the change or improvement (McNiff, 2001).

4.8 Issues of verification

Verification in a qualitative study is a process which should occur throughout data collection, analysis and report writing (Creswell, 1998:194) in order to make it a reliable and a valid study. In a ‘naturalistic’ inquiry ‘trustworthiness and ‘authenticity’ are the terms used for its reliability and validity (Lincoln and Guba, 1985:300).

In a field study, prolonged engagement and sustained observations are strategies used for the verification of validity and reliability. Prolonged engagement in the field is expected to build up trust between the researcher and the informants, and this helps to address any issues of distortions in the data which may have been introduced by the researcher or informants (Creswell, 1998: 201).

In action research, claims to knowledge should be validated (McNiff, 2001). One way to validate action research claims is to “involve others in making judgements” (McNiff et al 1996:24). Two strategies were used:

1. An observer was invited to participate in the workshops
2. An impact assessment workshop involved the participants in a review of the changes that occurred.

Efforts were made to address the issues of reliability, validity, trustworthiness and authenticity of the data collection and generation, throughout the various steps of the study. Table 4.3 summarises these attempts.

Table 4.3 Summary of efforts towards verification of the study

<i>Phases of the study</i>	<i>Strategies adopted to ensure Trustworthiness/Reliability</i>	<i>Strategies adopted to ensure Authenticity/Validity</i>
Phase 1 :Step 1	<ul style="list-style-type: none"> *Use of the field guide developed based on a pilot study for data collection, *Data collection through direct methods through making field visits to all schools.. 	<ul style="list-style-type: none"> *Field visits to 54 schools in ‘achieving the sample’. *Achieving the sample with saturation and with study of deviant cases. *Collection of data from different sources adopting multiple methods
Phase 1: Step 2	<ul style="list-style-type: none"> *Selection of cases to represent the main different types of multigrade contexts. *Observations based on findings from Phase 1:Step 1 *Completion of field notes immediately after the school visit. 	<ul style="list-style-type: none"> *Prolonged fieldwork *Multiple data sources
Phase 2: Step 1	<ul style="list-style-type: none"> * Analysing the curricula with criteria evolved from accepted curriculum models. 	<ul style="list-style-type: none"> *Discussion with curriculum developers and London Supervisor.
Phase 2: Step 2	<ul style="list-style-type: none"> *Tape recording the proceedings of the workshops . * Observer’s records. 	<ul style="list-style-type: none"> *Collaboration with others for intervention. *Inviting an observer to the workshops.
Phase 3: Step 1	<ul style="list-style-type: none"> *Preparation of instruments from the validated item bank. *Deciding the structure of test papers in collaboration with the curriculum developers. 	<ul style="list-style-type: none"> *Obtaining assistance from other data collectors in student achievement data in terms of the collection and marking of the papers.
Phase 3: Step 2	<ul style="list-style-type: none"> *Obtaining data directly from participants 	<ul style="list-style-type: none"> *Obtaining teacher satisfaction data using multiple methods *Obtaining feedback from teachers in the presence of an observer.

4.9 Ethical considerations

A number of ethical issues arise in action research. The following were modified aspects from Winter (1996) for this study:

- Consultation with relevant personnel and authorities to obtain permission to enter schools.
- All participants collaborated for the study were allowed to express their ideas freely on the study.
- Negotiation with participants in quoting their work and points of view.
- The maintenance of confidentiality using fictitious names for schools and teachers (It should be noted that at the end of the intervention all teachers were keen to get their photographs into the report).

As described above, ethical aspects regarding clearance, consent, acknowledgements and anonymity of persons and institutions were considered.

4.10 Time plan

The broad time plan for the study was prepared (Figure 4.3). Although the activities of fieldwork were completed according to the scheduled timeframe, organising the findings and writing up took longer than expected.

Figure 4.3 Time plan for the research project

Preparation	
Identification of the research area	October-January 1999
Initial reading	November 1999 - February 2000
Preparing the budget	January 2000
Managing field issues	March –April 2000
Fieldwork	
Phase 1:Step 1	May to June 2000
Phase 1:Step 2	July and September 2000
Phase 2:Step 1	October to December 2000
Phase 2:Step 2	January to December 2001
Phase 3:Step 1	January, 2001 and December 2001 (data collection only)
Phase 3:Step 2	December 2001
Organisation of the findings	
Organising Phase 1:Step 1 findings	January – February 2002
Organising the Phase 1:Step 2 findings	March – April 2002
Analysis of data	
Data processing and Analysis Phase 3:Step 1 data	May – June 2002
Analysing Phase 3:Step 2 data	July 2002
Production of the thesis	
Compilation of the complete first draft	December 2002
Revise and produce final draft	March 2003

4.11 Summary

This chapter presented the development of the action research framework and the methods adopted for the field implementation of the study. Detailed background to and development of the action research framework is presented in detail. The chapter claims that the study was developed based on an 'emergent design'. Hence decisions on each step of the study could not be made prior to the study and hence not included within this chapter. The pilot fieldwork and Phase 1 are discussed in some detail, while phases 2 and 3 are briefly outlined. The issues regarding verification, ethics and time frame are presented.

CHAPTER 5

RURAL MULTIGRADE SCHOOL CONTEXTS

This is the first of the five chapters that describes the action research. It presents the findings pertaining to Phase 1: Step 1 of the field study. It addresses the research question, “*What are the characteristics of multigrade school contexts in rural Sri Lanka?*” This research question was sub-divided into the following specific questions focused on a selected set of variables from the framework developed through the literature review (see Chapter 2, Figure 2.1, p.57):

- i. What are the characteristics of the primary education context in the education zone?
- ii. How prevalent is multigrade teaching in the education zone?
- iii. What are the characteristics of the multigrade teaching schools?
- iv. What are the conditions under which multigrade teaching arises?
- v. What are the characteristics of multigrade teachers?
- vi. How are multigrade classes organised?
- vii. What are the challenges presented by the multigrade classes?
- viii. What are the teacher perceptions and beliefs regarding multigrade teaching?

Phase 1: Step 1 was conducted in the Dehiowita education zone during May, June and July in 2000.

5.1 Characteristics of the sample area

The literature on multigrade teaching from the world indicate that conditions that makes multigrade teaching a necessity are related to contextual features (see Chapter 2, Section 2.2.2, pp.37-39). This section provides the findings on general and specific features related to the provision of education in the education zone.

5.1.1 General contextual characteristics

Dehiowita education zone is situated to the south-west of the central hills of Sri Lanka. The area experiences an average annual rainfall of 2750 – 3750 mm. Hills, the river and its tributaries are the main geographical features. The major employment opportunities of the villagers are in the agricultural sector, mainly in the commercial plantations of tea and rubber. However, there were also many tea and rubber smallholders in the community. The population growth of the Kegalle district to which the education zone belongs had a rate of 0.6, which was the lowest in the country (Department of Census and Statistics, 2001).

The Dehiowita education zone comprises of rural and plantation communities. The villages are scattered over the hilly terrain. The plantations of tea and rubber extend for about a quarter of the total area. Lack of communication, marketing facilities, and banking services are major problems faced by the inhabitants in the hilly villages. Public transport facilities reaching the rural areas are poor, mainly due to deteriorated road conditions. The roads to the interior villages are not accessible to motor vehicles. The environment is calm, quiet, full of greenery and cool, fresh air.

5.1.2 Primary education context

This section includes a description of the primary education context of the Dehiowita education zone.

5.1.2.1 Administration

Administration of education of the provincial schools is a responsibility of the Dehiowita ZEO. This zone is divided into five education divisions notably, Dehiowita, Kitulgala, Yatiyantota, Ruwanwella and Deraniyagala. The deputy director of education in each division is the link between the schools and the ZEO.

Primary education is one of the nine subject areas of development in the programme of the ZEO. The primary education co-ordinator who is a deputy education director is entrusted with the task of development of primary education. In addition, directors in-charge for overall planning, supervision and development are also present.

5.1.2.2 Schools

In 2000, the number of government schools in the education zone was 234, of which 230 were rural provincial schools. The other four were national schools managed by the Line Ministry. The target population of schools for the study were the rural provincial schools. This section describes the schools by education division, type, medium of instruction, degree of difficulty of working conditions and possibilities for rationalisation and restructuring. Firstly, the distribution of the schools across the education divisions is given in Table 5.1.

Table 5.1 Provincial schools in the Dehiowita education zone by education divisions, 2000

<i>Education Division</i>	<i>Number of schools</i>
Ruwanwella	48
Yatiantota	41
Dehiowita	63
Deraniyagala	43
Kitulgala	35
Total	230

Source: ZEO database, 2000

According to Table 5.1 the largest number of schools (63) belonged to the Dehiowita education division and the least number (35) belonged to the Kitulgala education division. The other three divisions, Ruwanwella, Yatiantota and Deraniyagala comprised 48, 41 and 43 schools respectively.

Secondly, the distribution of schools according to the school types and medium of instruction is given in Table 5.2.

Table 5.2 Provincial schools in the Dehiowita education zone by school type and medium of instruction, 2000

<i>School type</i>	<i>Medium of instruction</i>			<i>%</i>
	<i>Sinhala</i>	<i>Tamil</i>	<i>Total</i>	
1AB	0	0	0	0
1C	26	5	31	13.5
Type 2	82	7	89	38.7
Type 3	63	47	110	47.8
Total	171	59	230	100.0

Source: Provincial Educational Data-profile, 2000

Table 5.2 indicates that the majority of schools in the education zone were either Type 3 or Type 2. When the medium of instruction was considered the Tamil medium schools comprised of roughly one third of the number of schools, while the Sinhala medium schools comprised about two thirds.

Schools were classified by the ZEO into five categories according to their degree of difficulty of working conditions. The category 'A' schools were described as 'highly conducive' to work as these schools were easily accessible and had the best facilities. In terms of access and facilities, schools in category 'B' were described as having 'conducive' conditions, while schools in category 'C' were seen as having a 'less conducive' environment to work. The schools classified as category 'D' were the 'difficult' schools. The schools classified as category E were the 'very difficult' as these were the most difficult to access and had minimal facilities.

Thirdly, Table 5.3 shows the aggregate prevalence of 'less conducive', 'difficult' and 'very difficult' schools when considered as a proportion of all schools in each education division of the Dehiowita education zone. The percentages indicate that almost all schools in Deraniyagala and Kitulgala divisions were 'less conducive' or 'difficult' or 'very difficult' according to the classification. The lowest percentage was in the Ruwanwella division. Dehiowita and Yatiyantota divisions also incorporated relatively large proportions of schools classified as 'less conducive', 'difficult' and 'very difficult'. The total number was 169, which accounts for 73.4% of the total schools in the Dehiowita education zone.

Table 5.3 The 'less conducive, 'difficult' and 'very difficult' by Education divisions, July 2000

<i>Education Division</i>	<i>Number of 'less conducive', 'difficult' and 'very difficult' schools</i>	<i>As % of total number of schools in the division</i>
Ruwanwella	27	47.9
Yatiantota	26	63.4
Dehiowita	44	69.8
Deraniyagala	40	93.0
Kitulgala	32	91.4
Total	169	

Source: ZEO database, 2000

When 'difficult' and 'very difficult' categories were considered, Deraniyagala and Kitulgala had highest percentages with 37.2% and 34.3% respectively. Dehiowita had 20%. Yatiantota division had only 9.7% and Ruwanwella had none.

Fourthly, when the details of the schools within the programme of rationalisation and restructure were considered, it was found that sixty schools in the zone were subjected to the programme. The recommendations regarding these schools were as follows:

- Five primary schools should be consolidated,
- Six schools which had grades up to eight were to be downgraded becoming primary schools only,
- Seven schools catering for grades from 1-11 were to be downgraded to Grades 1-9. only,
- Eleven schools were to be upgraded,
- Two schools with grades up to 1-13 were to be down graded, and
- Twenty-nine schools were to come under two sectional heads.

Further, another 73 schools that were conformed to the criteria were found to have been excluded from the programme (Dehiowita zonal education data base, 2000). This was to prevent their possible consolidation or closure,

having been considered essential to the specific communities of the small villages.

Basic details of schools revealed Dehiowita education zone comprises schools of small size and relatively difficult working conditions. These could be taken as indirect indications of prevalence of schools with multigrade teaching needs.

5.1.2.3 Primary students

This section describes the composition of the primary student population in the education zone by enrolment, medium of learning, gender and achievement outcomes. The primary student population of the Dehiowita education zone in the year 2000 was 23,746.

Table 5.4 Primary student population of the Dehiowita education zone by gender and medium of learning, 2000

<i>Gender</i>	<i>Ethnicity</i>			
	<i>Sinhala</i>	<i>%</i>	<i>Tamil</i>	<i>%</i>
Male	7786	43.2	3080	53.7
Female	10225	56.8	2655	46.3
Total	18011	100.0	5735	100.0

Source: Provincial Education Data profile, 2000

Table 5.4 shows the distribution of the primary student population by gender and medium of learning. According to Table 5.4 the majority of the students learned in Sinhala. The gender distribution within two groups shows that more Sinhala females were enrolled while a greater number of males were enrolled within the Tamil group. The proportions of male and female students in the Sinhala medium were 43.2% and 56.8% respectively. The proportions of male and female students in the Tamil medium were 53.7% and 46.3% respectively. No details of the ethnicity among the students learning in the two media could be drawn. However, most commonly the medium of learning corresponds to their ethnicity.

Enrolment rates were available only at the provincial level. In 1997, Sabaragamuwa province showed provincial Gross Enrolment Rates of 98.5% and 97.3% for Sinhala and Tamil media respectively. The Net Enrolment Rates were 91.4% and 91.5% for Sinhala and Tamil media respectively. These figures indicate that a considerable number of children of both ethnic groups do not enter school at the stipulated age (MEHE, Sri Lanka, 2000c).

Student achievement data was available only at the district level. The national study of learning achievement in literacy, numeracy and life-skills revealed the Kegalle district to be one of the three districts in which the lowest performance was recorded. Of the three, two belonged to Sabaragamuwa province (Navaratne, 1995).

5.1.2.4 Primary teachers

Teachers appointed as primary teachers in the Dehiowita education zone in 2000 numbered 1009. When classified according to ethnicity, 802 were Sinhala and 207 were Tamil. According to these figures there was an excess of 117 Sinhala medium teachers and a deficit of 41 Tamil medium teachers. (Planning and Data Processing Unit, ZEO, Dehiowita, 2000).

5.1.2.5 Primary In-service Advisers (ISAs) and Teacher Centres

Seven ISAs were in-charge of primary education for the Dehiowita education zone during 2000. The Deraniyagala and Yatiyanthota education divisions each had two primary ISAs, while the remaining three divisions each had one.

The Deniowita education zone had two Teacher Centres whereas most other zones have one. The two centres were situated in Dehiowita and Deraniyagala education divisions. However, the teacher centre programmes were at the planning stage only. In addition a resource centre established in the 1980s was also being used as a training centre.

5.2 The sample of schools

Sampling for Phase 1: Step 1 was initially discussed in Chapter 4 (see section 4.7.1.2, p.96). This section describes the field procedure adopted in ‘achieving’ the school sample and the basic characteristics of the sample.

5.2.1 Field procedure in achieving the school sample

The total number of schools surveyed through ‘condensed fieldwork’ was 47. The nature of the need for multigrade teaching in the schools visited was classified into four categories by probing into the conditions of the school through interviews with principals and other staff members (Table 5.5).

Table 5.5 Types of multigrade teaching needs

<i>Multigrade teaching need</i>	<i>No. of schools</i>	<i>%</i>
Permanent	38	80.9
Arising from time to time with teacher turn-over disparities (but no multigrade teaching needs at the time of data collection)	3	6.4
Arising due to teacher absenteeism	4	8.5
No multigrade teaching needs at present as the school has excess teachers due to disparities in deployment. However, the schools are eligible for four or less teachers only.	2	4.2
Total	47	100.00

Table 5.5 shows that the first category was the schools with a fixed or permanent need for multigrade teaching. Of the 47 schools visited, over 80% (38 schools) had fixed or permanent multigrade teaching needs. The second category comprised schools with a fluctuating need for multigrade teaching

due to frequent teacher turn-over. From the sample 6.4% schools (3 schools) belonged to this category. However, these schools were without multigrade teaching needs at the time of visiting the school. The third category of schools facing multigrade teaching needs comprised 8.5% of the schools (4 schools) as a result of frequent teacher absenteeism. The fourth category included schools that did not need multigrade teaching at the time of the field visit, although having eligibility for four or less teachers. Out of the sample, 4.2% (2 schools) belonged to this category. Overstaffing was due to disparities in teacher deployment. The two schools in question were overstaffed because they were comparatively less difficult than the other schools classified as 'difficult' in the respective education division. Teachers who needed to fulfil their service requirement in a 'difficult' school opted for transfers to these comparatively less difficult schools through political influence, despite the fact that these schools were eligible for a smaller number of teachers.

The 38 schools with permanent multigrade needs were considered as the 'achieved sample' of multigrade schools for the analysis of Phase 1: Step 1. The sources through which the sample of schools was located is given in Table 5.6.

Table 5.6 Sample schools by sources of location

<i>Source/s location</i>	<i>No.</i>	<i>%</i>
(1) Schools with 4 or less teachers-from School Census	5	13.2
(2) Schools excluded from rationalization'	5	13.2
(3) Listed under (1) and (2)	15	39.4
(4) Not listed under (1) or (2)	13	34.2
Total	38	100.0

Table 5.6 shows that out of the sample, 13.2% of the sample (5 schools) was schools with four or less teachers. Another 13.2% (5 schools) were found to be listed among the schools excluded from the restructure and rationalisation programme. Although 39.4% (15 schools), appeared in both lists, another 34.2% (13 schools) were not included in either of the two lists. These were

located with the help of information received from other schools in the area. Of these, 11 schools had both primary and secondary sections.

The sample schools with fixed multigrade needs were analysed according to the degree of multigrade teaching needs (Table 5.7). The analysis revealed two categories. Fully multigrade schools had all the classes functioning as multigrade classes. Partially multigrade schools had only some classes functioning as multigrade classes. Table 5.7 reveals that the proportion of ‘partially’ multigrade schools was larger (60.5%) than the proportion of ‘fully’ multigrade schools (39.5%).

Table 5.7 Degree of multigrade teaching in sample schools

<i>Fully multigrade schools</i>	<i>Partially multigrade schools</i>	<i>Total</i>
15 (39.5%)	23 (60.5 %)	38

The number of schools to be included in the sample was determined through ‘saturation’ of categories of different types of multigrade contexts. The number of schools to be located using the above mentioned criteria from each division was influenced by the following factors within particular education division:

1. The number of ‘difficult’ schools present
2. The teacher deficit figures that featured
3. General information from and opinion of the community in regard to the existence of schools with four or less teachers.

The distribution of the sample schools included across the five education divisions are given in Table 5.8.

Table 5.8 The ‘achieved’ sample of schools by education division

<i>Education Division</i>	<i>‘Achieved’ sample of schools with fixed multigrade teaching needs</i>
Ruwanwella	3
Yatiantota	3
Dehiowita	8
Deraniyagala	19
Kitulgala	5
Total	38

Table 5.8 shows that the largest number of schools visited was from the Deraniyagala education division. Hence, the largest number of schools included in the sample was those from the Deraniyagala education division.

The sample classification according to the level of difficulty of working conditions of schools is given (Table 5.9).

Table 5.9 Sample schools classified by level of ‘difficulty’

<i>School category</i>	<i>Number of schools</i>	<i>%</i>
Category A – highly conducive	1	2.6
Category B – conducive	0	0.0
Category C – less conducive	21	55.3
Category D – difficult	14	36.8
Category E – very difficult	2	5.3
Total	38	100.0

Table 5.9 shows that only one school fell under the category ‘highly conducive’. The other 36 belonged to either the ‘less conducive’ category or one of the categories indicating the different degrees of ‘difficulty’. Of the sample, 55.3% (21 schools) were ‘less conducive’, 36.8% (14 schools) were ‘difficult’ and 5.3% (2 schools) were ‘very difficult’ schools.

Table 5.10 gives the distribution of the sample schools by type given by the school census classification (see Chapter 3, section 3.4, pp. 61-63).

Table 5.10 Sample schools by type

<i>School type</i>			
<i>Type 1C</i>	<i>Type 2</i>	<i>Type 3</i>	<i>Total</i>
1 (2.6%)	11 (28.9%)	26 (68.4%)	38

Table 5.10 shows that the majority of schools with multigrade needs were Type 3 (68.4%). The proportion of Type 2 schools was also somewhat high (28.9%). However, it seemed that Type 1C schools have less need for multigrade teaching than the Type 2 and 3 schools (2.6%).

The classification of sample schools according to the medium of instruction is given in Table 5.11.

Table 5.11 Sample schools by the medium of instruction

<i>Sinhala medium Schools</i>	<i>Tamil medium Schools</i>	<i>Total</i>
30	8	38

The number of Sinhala medium and Tamil medium schools was 30 and 8 respectively. However, the purposeful emphasis of visiting a majority of Sinhala medium schools needs to be noted here.

The distribution of sample schools across a range of variables revealed the basic nature of the schools having multigrade teaching needs.

5.3 Physical accessibility

Physical accessibility to the sample schools was estimated using two indicators, distance from the closest town centre and accessibility by different modes of travel.

5.3.1 Distance from closest urban centre

The distance between each sample school and its closest urban centre is categorised in Table 5.12, below.

Table 5.12 Distance to closest town centre

<i>Distance from the closest urban centre</i>	<i>No. of schools</i>	<i>%</i>
Less than 5 km	8	21.0
6 – 10 km	6	15.7
11 – 15 km	13	34.3
16 - 20 km	7	18.5
20 – 25 km	4	10.5
Total	38	100.0

Table 5.12 shows that schools having multigrade teaching needs in the Dehiowita educational zone were found to be scattered within a radius of 25 km from the main town of each education division. Of the sample 21.0% were located within a radius of 5 km, while the rest were located beyond 5 km from the respective main towns.

5.3.2 Access by motor vehicle

Accessibility of sample schools from the closest town centre by a motor vehicle was another indicator used to assess the accessibility of a school. This accessibility indicator was important because it revealed the accessibility of the schools to teachers who travelled from other neighbouring villages or from the main town and to outsiders who would visit the school occasionally for supervision or research purposes.

When accessibility by a motor vehicle was considered, two types of examples were identified. Firstly, the use of private transport was considered. The data on this aspect was based on my own experience in accessing the schools for this research, using a private motor vehicle. The school sample could be

divided into three categories depending on the degree of accessibility with the use of a private motor vehicle.

Table 5.13 Accessibility by private motor vehicle

<i>Degree of accessibility of the school by private motor vehicle</i>	<i>No. of schools</i>	<i>%</i>
1. Accessible	10	26.3
2. Access is very difficult due to bad condition of the road	20	52.6
3. Involves walking for 1-3 km along very rough hilly foot paths after driving in a vehicle	8	21.1
Total	38	100.0

Table 5.13 shows that 26.3% of schools could be accessed by a private motor vehicle. However, 52.6% of the schools could be accessed by a private motor vehicle with difficulty. The other 21.1% could not even be accessed by a motor vehicle.

The following extracts from field notes illustrate the difficulties the researcher faced in accessing three of the sample schools.

Example 1

The journey uphill became difficult as the road made driving almost impossible. The vehicle was driven very slowly over the rocky road. The surroundings looked isolated with a thick growth of big trees. A feeling of isolation gripped my mind. The distance I had travelled had been only 3km although I felt it was very much more (field notes, 8/5/2000).

Example 2

The driver and I started walking along the rough and narrow footpath. I was incapable of estimating the time to reach the school covering a 3km distance through the difficult footpath. Rain clouds were gathering and the surroundings became dark. The thicket was dense and no houses were in sight. I felt inclined to turn back and abandon the school visit. But I was not

ready to give up. We did not meet anyone even to ask for the directions. We continued. (field notes, 9/6/2000)

Example 3

We (the driver and I) had already walked for about one hour when we saw a board indicating that there was only 500m more to the school. The footpath turned to a thicket and led to a stream. With the night's rain the water level was high and running fast. There was no bridge to cross the river! We started to cross. The water level was almost up to my hip. I knew it was not very safe to cross the river as neither of us was familiar with the place. Even the stones and the rocks were slippery. My sari added to the problems. With the greatest difficulty I crawled from one slippery rock to the other. When we crossed, there was another dark thicket . . . (field notes, 22/6/2000).

The second mode of access was by public transport. Observations and information provided by staff members of the schools indicated that only 50% of the schools could be accessed by public transport (Table 5.14). The main reason for the limited provision of public transport was the bad condition of the roads.

Table 5.14 Accessibility by public transport

<i>Accessibility by public transport</i>	<i>No. of schools</i>	<i>%</i>
Accessible by public transport	19	50
Not accessible by public transport	19	50
Total	38	100

With regard to using public transport, 'travel time' is a criterion that could be considered as important to assess the level of accessibility of a location. The travel time to a school included waiting time for public transport, time spent on travelling in the bus, and time spent on walking after disembarkation. It was not possible to get a composite of figures for all the schools. However, information regarding the regularity of the bus service was obtained from school staff and the members of the community. The criterion devised for analysing the frequency of the public transport service was as follows: if transport services were available about five times or more per day on a regular

basis it was considered to be 'fairly reasonable'. If it was less and was infrequent it was considered 'unreliable'. Table 5.15 shows that except in the case of three schools, the public bus service to the other schools was found to be unreliable.

Table 5.15 Availability of public transport services

<i>Frequency of bus service</i>	<i>No. of schools</i>	<i>%</i>
Reasonable	3	15.8
Unreliable	16	84.2
Total	19	100.0

Two examples are given to illustrate the inconvenience faced by multigrade teachers in reaching the schools using poor transport facilities.

Example 1

A principal of a school situated 10km from town, arrives 45 minutes late in spite of travelling on the first bus of the day. In the afternoon the bus would pass the school 45 minutes earlier than the school closing time. If he missed that bus, he had to either walk 3km to the next junction or wait for two more hours for the next bus to pass the school. Frequently he would leave the school earlier than the closure time. He travels to this school from another direction in the town for which he has had to take another bus.

Example 2

A principal of an isolated school was compelled to walk 4km up hill to reach the school as a result of frequent lapses in the bus service. Climbing the hilly terrain was very tiresome. He was absent from school frequently.

The discussions and examples indicate the high degree of difficulty in accessing the sample schools from the main towns.

5.3.3 Access on foot

One of the main reasons for students to attend the sample schools was convenience of access. Most of the students lived within reasonable walking distance. Hence, they accessed the school on foot. A few, who lived further away, travelled by public transport. However, almost all the students lived within a distance of about 3 km from the current school they attended.

Not only those who travelled by public transport, but also those who had to walk some distance encountered difficulties. My personal experience of walking to some of the schools during data collection after disembarking from the vehicle, made me realise some of the difficulties involved in walking to the schools. Walking and climbing the hills through the tea and rubber plantations under the hot sun or in heavy rains was difficult. In addition, feelings of anxiety while walking across isolated forest areas and across suspension bridges over the river could not be disregarded. Teachers who walked to the schools faced the same difficulties. The fatigue suffered especially by the middle-aged teachers with physical ailments added to their difficulties.

In spite of the fact that students were familiar with the topographical features of their village, they too indicated the difficulties faced especially in the heavy rainy season. I was able to observe during data collection, how the stream and streamlets overflowed and bridges became submerged in the water. With the rains, the rocks became slippery, crossing the wire bridges became very risky, leeches sucked blood, clinging to feet or body, making school visits very difficult. There was high absenteeism during rainy days. The primary students were highly affected by the difficulties of access. They were unable to access the schools by themselves passing through the difficult terrain, and therefore, their parents had to accompany them to school or to entrust them to an older child or a teacher.

5.4 Physical environment

The school buildings, availability of furniture and staff residential quarters were also considered, in order to obtain an understanding of the nature of the physical atmosphere in schools with multigrade teaching needs.

5.4.1 Classroom space and furniture

All sample schools except one had permanent school buildings. However, the supply of facilities such as toilets and water was not adequate. All buildings were single-storey. The interior structure of the buildings varied between the open hall type, separate classrooms and a mixture of these two types. With the majority of the multigrade schools being small primary schools, the most common type of building was the open hall type where all the classes were housed. In such schools, a small room in one corner of the building was demarcated as the school office. In terms of availability of space, most schools had more space than they needed, while a few others faced problems due to lack of space. Two examples are given which illustrate these two conditions:

Example 1

A school which was becoming less popular had large unused spaces. Although the school had both primary and secondary grades, the number of students in the secondary grades was declining rapidly.

Example 2

A school that had more than three hundred students faced problems of classroom space, as the school buildings constructed were subject to threats of earth slips. The buildings had to be abandoned. Some of the classes functioned in a temporary shed which was not a suitable place for learning, especially during the rainy seasons.

Basic school furniture for all schools, such as a desk and a chair for each child, a table and a chair for each teacher, and a black board for each class, was available. Almost all schools had at least one cupboard. Most schools had

excess student chairs and desks due to the gradual decline of student enrolment.

5.4.2 Staff residential quarters

The number of schools with staff residential quarters was 26 out of the 38 schools. Staff residential quarters were usually built within the school compound and sometimes as a part of the school building. When occupancy is considered, only 10 out of the 26 schools used the space for residential purposes. Seven teachers and three teaching principals occupied the staff quarters. Lack of space, electricity and water supply made them difficult places in which to reside. Each set of quarters was occupied by a staff member, either a principal or a teacher with their families. The teachers' quarters, although available, were unoccupied in 16 schools. In two or three schools the residential quarters were used as classrooms or as staff common rooms. A series of problems regarding occupancy of the available teachers' quarters for residential purposes were stated by the staff members:

- Isolated location
- Deterioration of the premises
- Lack of water
- Lack of electricity
- Inadequate space

The following examples illustrate the above issues.

Example 1

A lady teacher who decided to reside with a family in the village since she was reluctant to reside in the staff quarters due to isolation.

Example 2

The staff quarters in an isolated two-teacher school were abandoned as the roof of the premises was dilapidated. The former principal had no interest in the premises, and the lack of maintenance has caused deterioration. As the premises were situated in an isolated location no staff member would be interested in living there. The present principal preferred to travel daily, even with difficulty, from his residence in the town.

Example 3

A principal who lived in the staff quarters with his wife and infant encountered a number of difficulties due to the lack of electricity and water supply. He was planning to get a transfer and move into his family home, situated about 50km away from this school.

Example 4

The principal and teacher couple occupied the quarters of a 'very difficult' school in an isolated location. It had very limited space. Another teacher who needed residential facilities had no other option than to reside in one of the classrooms in the school as the residential facility was too small for all three of them to share. To compensate for the inconvenience, the principal provided the meals for the teacher.

Example 5

Two teachers of a Tamil medium plantation school with a severe shortage of teachers indicated that the limited space available for teacher residential quarters was the main reason for the lack of teachers in the school. The principal and the family occupied the staff quarters. The other member of the staff, who was a male teacher from a distant town, was residing in paid accommodation in the village.

5.5 School size

The school size is an important criterion determining instructional arrangements. The general understanding is that multigrade teaching takes place in small schools. The data on school size is presented below, based on the functioning grade span and number of students.

5.5.1 Functioning grade spans

The grade span is an indicator of the size of the school. The officially assigned grade spans included, 1- 5, 1-8, 1-11, 1-13 and 6-13. Table 5.16 presents the functioning grade spans of the sample schools.

Table 5.16 Grade spans of the sample schools

<i>Functioning Grade span</i>	<i>Number of schools</i>
1 to 5	21
1 to 6	1
1 to 7	2
1 to 8	1
1 to 9	1
1 to 10	1
1 to 11	9
1 to 13	1
1 and 4 only	1
Total	38

Out of the sample schools, 21 were primary schools with a 1 to 5 grade span, 9 had a 1 to 11 grade span and one school each taught grades 1 to 13 and 1 to 8. These 32 schools had their functioning grade spans with the official grade spans. In the remaining six schools the functioning grade spans did not match with any of the official grade spans. The deviant grade spans were 1 to 6, 1 to 7, 1 to 9 and 1 to 10 with one school having grades 1 and 4 only, Functioning grade spans differed from those originally assigned mainly because of the changes taking place as a result of school rationalization and restructure. At the time of Phase 1: Step 1, the official grade spans of certain selected schools were in a transition state. The school with classes up to Grade 10 was subjected to ‘downgrading’ from being a school having had grades up to 11. Furthermore, the school with up to Grade 9 had been subjected to ‘upgrading’ from being a school with grades up to 8.

Table 5.16 shows that one school had only two grades for the school, grades 1 and 4. This was due to the differential enrolment of students by the Principal. The Principal, being the only teacher of the school, had been reluctant to enrol students annually due to the shortage of teachers in the school. The teacher said that he could not cope with teaching several grades simultaneously, although the number of students was small. He further stated that the school would not get any more teachers due to the number of students being small. The school was situated in a remote village on the other side of the river bank.

The school had to be reached crossing a suspension bridge. This school was the closest for the primary students of that specific village.

The findings on the functioning grade spans of the sample schools indicate that the majority of the schools with multigrade needs were primary schools. Some of the sample schools deviated from assigned grade spans due to changes of restructure taking place and also due to demographic reasons.

5.5.2 Student numbers

Student numbers constitute an important variable in multigrade teaching contexts. The student numbers in the sample schools ranged from 10 to 340. Table 5.17 illustrates the incidence of schools and school types according to the different ranges of student numbers.

Table 5.17 Student numbers of sample schools

<i>Number of students in the school</i>	<i>Number of Schools</i>	<i>IC</i>	<i>Type 2</i>	<i>Type 3</i>	<i>%</i>
Less than 50	19	-	-	19	50.0
50-100	7	-	5	2	18.5
101-200	9	-	5	4	23.7
200-300	1	-	-	1	2.6
300+	2	1	1	-	5.2
Total	38	1	11	26	100.0

Table 5.17 indicates that 50% of the sample schools had less than 50 students and nearly 18.5 % had between 50 and 100 students while, 23.7% had 100 to 200 students, 2.6% had 200-300 students and 5.2% had more than 300 students. Student numbers in the sample schools indicate that the majority of multigrade teaching schools are ‘small’ schools. When school type is considered along with the student number, the size of the schools having multigrade teaching needs becomes visible.

According to Table 5.17 the school types and size of the schools which necessitates multigrade teaching were.

- Type 3 schools having less than 100 students.
- Type 3 schools having 100-300 students.
- Type 2 schools having less than 200 students.
- Type 1C schools having less than 300 students.

A special note about the type 3 schools having 100-300 students is that a majority of these are Tamil medium instruction schools. The number of students in the primary grade span of the sample schools is given in Table 5.18.

Table 5.18 Students in the primary grade span

<i>Students number of primary grade span</i>	<i>No. of schools</i>	<i>%</i>
< 25	7	18.4
25-44	12	31.6
45-74	8	21.0
75-114	5	13.2
115-164	5	13.2
165-199	1	2.6
	38	100.0

Table 5.18 indicates that multigrade teaching needs ranged from schools having less than 25 primary students to schools with nearly 200 primary students.

5.5.3 Student drop-out

“Dropping out” was mentioned by the principals of some multigrade teaching schools. However, no precise data could be obtained from the schools, as such information was not systematically compiled or not easily accessible. According to the principals, the students left these schools because of

continuous teacher shortages in schools resulting in low quality of education provided. Some principals indicated that they deliberately encouraged students to leave their schools and gain entry into another school as their own schools could not provide a good quality education for students in all grades.

5.6 Multigrade teacher characteristics

The characteristics of teachers who were assigned with responsibility for more than one grade at a time were analysed according to gender, professional qualifications, length of experience and proximity of residence to the school.

The 38 sample schools comprised 46 government appointed teachers who were responsible for more than one grade at a given time. In addition to them there were seven community members who volunteered to assist in teaching in four of the sample schools. They, too, were entrusted with multigrade classes by the principals. They are referred to as ‘volunteers’.

5.6.1 Gender distribution

Out of the 46 multigrade teachers, 12 (26%) were male and 34 (74%) were female. Out of the volunteers two were female and five were male.

5.6.2 Professional qualifications

From the teacher sample, professional qualifications of the government appointed teachers only are presented since the volunteers were not subjected to training. The teacher sample could be categorized as trained, undergoing training and untrained. Table 5.19 gives the status of training and nature of certification within the teacher sample.

Table 5.19 Professional background of multigrade teachers

<i>Professional status and nature of certification</i>	<i>No. of teachers</i>	<i>%</i>
Total trained	40	87.0
(a)Teaching Diploma through distance mode	29	
(b)Teaching Diploma from teacher training colleges	7	
(c)Teaching Diploma from national colleges of education	2	
(d)Post Graduate Diploma in Education from universities or NIE	2	
Undergoing training (through distance mode)	2	4.3
Untrained (graduates 3, non-graduates 1)	4	8.7
Total	46	100.0

Contrary to the general belief that teachers in multigrade school contexts are untrained, Table 5.19 indicates that 87.0% of teachers addressing multigrade teaching were trained teachers. The percentage of untrained teachers was 8.7%. The remaining 4.3% were undergoing training at the time of the study. Out of the trained teachers, the majority had undergone training through distance mode by NIE. Others were trained in training colleges, NCOEs and universities.

When questioned on the availability of any training on multigrade teaching, no teachers were able to recall such training in the various training courses they followed. Three teachers vaguely remembered brief training in multigrade teaching by the SIDA project implemented for the development of the estate schools, about a decade ago.

5.6.3 Teaching experience

Experience is an important variable which influences the quality of a teacher. Table 5.20 shows the distribution of the teachers' experience. However, their experiences in multigrade teaching could not be identified within their total number of teaching years because the teachers could not remember the specific duration of monograde and multigrade teaching phases during their career.

Table 5.20 Total teaching experience

<i>Teaching experience (years)</i>	<i>No. of teachers</i>
Less than 5	8 (17.4%)
5 to 10	15 (32.6%)
11 to 15	14 (30.4 %)
16 to 20	2 (4.3%)
21 to 25	6 (13.0%)
Over 25	1 (2.1%)
Total	46

According to Table 5.20, 17.4% had less than five years teaching experience. The majority had more than five years of teaching experience. The ranges with high percentages were 5-10 years and 11-15 years, with 32.6% and 30.4% respectively. The proportion of teachers with 16-20 years, 21-25 years and over 25 years of experience were 4.3%, 13.0% and 2.1% respectively.

5.6.4 Proximity of residence

The proximity of teachers' residence to their respective schools is an important factor as the majority of the sample schools were difficult to access

from town. Table 5.21 shows the proximity of the residence of multigrade teachers' to their various schools. Five categories emerged:

1. Permanent resident of the same village or a neighbouring village
2. Residing within 10 km
3. Residing within a distance of 10-20 km
4. Temporary resident of the same village
5. Residing in teachers' quarters

Table 5.21 Proximity of multigrade teachers' current residence to the school

<i>Proximity of teachers' residence to school</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
Resident in the village/nearby village	5	13	18 (39.1%)
Within 10 km	5	11	16 (34.8 %)
Within 10 – 20 km	1	4	5 (10.8 %)
Temporary resident in the village	1	3	4 (8.7 %)
Teacher/principal quarters	1	2	3 (6.5 %)
Total	13	33	46

According to Table 5.21 the majority (39.1%) of the teachers were permanent residents of the area in which the school was located. Almost a similar percentage (34.8%) of teachers resided within a distance of 10 km from the school, and they commuted daily to the school. The percentage of teachers who resided within a distance of about 20 km from the school and travelled daily to and fro to school was 10.8%. The proportion of teachers who resided temporarily in the village either in private boarding facilities or occupying the teacher quarters, were 8.7% and 6.5% respectively.

The important aspect here is that when considering the proximity of the residence from the school, the majority (nearly 75%) of the multigrade teachers were either permanent residents of the same village or permanently

residing within a distance of less than 10km. The proportion of teachers who lived temporarily in the village or resided in official quarters was about 15%. However, about 10% of the sample experienced difficulties of daily travel for more than 20 km.

5.6.5 Transfers

Teacher transfer was an issue subject to heavy criticism during the time of data collection by the teachers and principals. On the one hand, the principals and teachers expressed that frequent teacher transfers disrupted the activities of the schools, because they were carried out in an irregular way; on the other hand, the officers of the ZEO indicated that transfers were carried out according to a set of guidelines. The dynamics of teacher turnover was too complex to be investigated within this study. However, based on interviews and observations at school level certain trends could be identified. At extreme levels of teacher turnover were teachers who spent very short periods of time (sometimes even less than a day) in a particular school, while there were some teachers who served the same school for over five or ten years, either willingly or not. However, Table 5.22 presents the number of years the teachers of the sample have spent in the present school:

Table 5.22 Period of teaching in the present school

<i>No. of years in the present school</i>	<i>No. of teachers</i>
Less than 1	13 (28.3%)
1 to 5	13 (28.3%)
5 to 10	10 (21.7 %)
Over 10	10 (21.7%)
	46

Table 5.22 indicates out of the 46 teachers, 28.3% had spent less than a year in the present school. The teachers who had spent between one and five years was also 28.3%. Of the teachers 21.7% had served the present school for five to ten years. Another 21.7% had been serving the present school for over ten years.

More than 50% of the teachers on their own clearly expressed their unwillingness to serve in their present school for reasons such as difficulties of daily commuting due to transport problems, fatigue and isolation, as well as personal problems such as delay of marriage and problems pertaining to their own children's schooling, lack of opportunities for professional development and problems of teaching due to teacher shortages in particular grades.

Examples follow of two single male teachers whose personal lives were adversely affected by having to spend over 10 years in two very remote schools. Although they had both applied for transfers, these had not been granted. The reason indicated by the zonal authorities had apparently been that of the difficulty of finding replacements.

Example 1

A single male teacher faced much inconvenience as a result of his appointment to his school. His permanent residence was 100 km away. He had no place to reside as staff quarters were already occupied by the principal. His marriage was being postponed as the bride's parents wished him to get a transfer before the marriage. He was in the process of collecting evidence with which to take legal action against this injustice that has happened to him, and he was following an external course in the field of 'law' during the weekends with the hope of resigning from the teaching profession.

Example 2

A teacher who was a single male in an isolated 'one-teacher school' for over ten years, faced the problem of finding a suitable partner for marriage, as his life for the past ten years had been committed to the school. Although he was keen on upgrading his professional development the problem of leaving the school was an obstacle. When he wanted to leave the school even for an official matter the school had to be closed.

Three kinds of teachers were identified in regard to teacher turnover. The first were those who served the current school willingly, the second were those who desired a transfer as they had served the current school for a number of years, and the third were those who were transferred to the current school unwillingly.

5.6.6 Absenteeism

Absenteeism was found to be one of the issues that created the need for multigrade teaching. Out of the 38 schools with permanent multigrade teaching needs, 26 schools were faced with teacher absenteeism on the day of the visit. Two extreme examples follow:

Example 1

A 'one-teacher school' was closed because the only teacher had to attend a principals' meeting.

Example 2

Six schools were found to be functioning as single-teacher schools on the day of the visit due to absenteeism of other teachers.

The size of the multigrade class taught by one particular teacher, due to teacher absenteeism on the day of the school visit, had increased from 10 to about 125. Multigrade situations arising from teacher absenteeism does not get reflected in any form in a database.

5.6.9 Perceptions and readiness to develop multigrade teaching skills

During pilot visits and the first few visits of Phase 1: Step 1, I understood multigrade teaching was a concept of which teachers have heard before but were not willing to adopt. The mere suggestion that I was doing a study on multigrade teaching did not make the staff of these remote schools happy.

They felt threatened with the feeling of being entrusted to work with several grades simultaneously. Although they were functioning in a similar context, they never considered it as a formal arrangement. Hence, I decided not to mention the concept of multigrade teaching at the beginning, but ask about it as the penultimate question only. I clarified my objective of the school visit as a study on 'teaching methodologies in schools which lack a teacher per grade'.

All principals and teachers in the sample perceived monograde teaching to be the ideal, and the prevailing attitude towards multigrade teaching was clearly negative. All except three teachers viewed multigrade teaching as an inferior type of teaching.

The most common beliefs were expressed as follows:

“ . . . cannot work systematically due to the heavy work load involved in teaching more than one grade”

“ . . . doing a little bit here and a little bit there is not good enough”

“It is not a good teaching strategy”

“Teaching more than one grade is not successful. Although I ask the children not to listen to what is taught to the other class they always listen”

“Adequate number of teachers for monograde teaching would be supplied in the near future and, hence, having to be responsible with more than a single grade is temporary”.

However, there were three teachers who expressed positive views on multigrade teaching as follows:

“Although it is not an easy task, if the commitment is there you can do it and then get used to it”

“Multigrade teaching is most important for strengthening the literacy skills of the students in remote schools so that they could acquire any subject knowledge, at least, at a later stage”

“It is not possible to teach only one class while others are idling. Children are all the same. I want to teach every one because I cannot bear to see them idling”

The last question to the teachers and principals was posed to find out their willingness to receive training on multigrade teaching. Despite the fact that the majority of the teachers readily expressed their negative attitudes on multigrade teaching, all the teachers were willing to get training on multigrade teaching, if provided.

The following sentiments were some of those expressed by teachers:

“If we can do it in a systematic way, multigrade teaching might be a good strategy”.

“We want to know some method to teach our poor students better than we do now”.

“In order to adopt multigrade teaching, we must get a proper training”.

“ For all teachers serving in the rural areas, it is an absolute necessity”.

However the following statement by one teacher was a genuine plea for an intervention on multigrade teaching in Sri Lanka:

“I sometimes recall about what I did in school that day. I feel dissatisfied and my conscience is not clear because I have a feeling that I could not do my job properly. I feel sorry for the children. I am aware that these innocent children would suffer someday. But I don't know what to do. I tried to do some systematic work by looking at all three teacher guides as I have to teach three grades, but I could not continue it”.

The above responses indicate the readiness of teachers to develop their skills in multigrade teaching. Although the majority of the teachers had negative attitudes regarding multigrade teaching, when the question of prospective training was posed all 46 teachers expressed their willingness to receive training on multigrade teaching.

5.7 Community involvement and support

The nature and extent of community support was probed with the principals and staff members. The principals and staff members of a majority of schools indicated that community support was obtained for clearing up the school premises and for organising activities for religious and New Year festivals. Out of the 38 schools, four obtained voluntary support from the community in classroom teaching. The number of volunteers engaged in teaching was six. They had passed the G.C.E.(O/L) with a minimum number of passes. All the volunteers except one who was a Catholic nun, were keen to find jobs. A small stipend, either by a collection from the parents and the principal or from a non-governmental organisation affiliated to the Catholic Church was given to the volunteers. The youth who participated in voluntary teaching had anticipated a career in the teaching profession

The common perspective of the staff in regard to the community was unsatisfactory. The principals of the majority of schools said that the communities should be made more aware of their role in participating in school activities and supporting the school. However, my experience was different. There were indications that community members were concerned about their children's education. The following incidents quoted from my field experiences illustrate this:

Example 1

During three school visits, a few community members asked whether I was visiting the schools to decide about consolidation of schools because of the low enrolment. When I said "no" they urged me not to allow that to happen.

Example 2

Principals of four schools informed me that the community members joined with them for a meeting with the zonal director to appeal for a greater supply of teachers.

Example 3

Principals of two schools indicated that parents were concerned about the physical punishments given to students.

Example 4

On three or four occasions community members mistook me for a new teacher in their village school. When I said that I was not, they were disappointed and requested me to persuade the office to supply more teachers

5.8 Multigrade teaching

The Sri Lankan education policy offers no guidelines on the organisation of multigrade classes. The sample schools were found to make one or more attempts from the following strategies in organising grade groups when there was no teacher per grade available before assigning more than one grade group to a teacher:

1. Seeking voluntary help from the community to reduce the need for multigrade teaching.
2. Assigning the available teachers to monograde teaching, and letting the other grades be without teachers
3. Instead of assigning a teacher per grade, carrying out the strategy of subject-wise teaching, so that students are addressed by different teachers who are available.

This evidence indicates that efforts were made to avoid organising multigrade teaching situations.

5.8.1 Grouping students for instruction

There was no special consideration made in student assignment to grade groups from monograde teaching situations. The students were assigned to grades according to their ages.

5.8.2 Assignment of teachers with grade groups

The principals of the sample schools expressed difficulties encountered in assigning teachers across the grade groups as the number of teachers was less than the number of grades in a school. They expressed their displeasure about the circular on teacher requirement for its teacher deployment criteria based on the number of students.

The following points include some of the underlying reasons considered by the principals in determining the grade group assignments among the teachers:

- teachers' preferences for and experience of teaching specific grades
- the maintenance of monograde teaching in Grade 5 where the students would sit for the scholarship examination.
- the need to assign the Grades 1 and 2 to the two teachers who were trained for implementation of curricular reforms.
- availability of infrastructure facilities for the combination of grade groups.
- the principals' capacity to take teaching responsibilities
- the availability of volunteers

5.8.3 Grade combinations

The composition of multigrade classes in sample schools is shown in Figure 5.1. Figure 5.1 illustrates the grade combinations of the multigrade classes. The most common combinations are, 1+2 and 3+4+5. The other combinations that were somewhat common are 4+5 and 3+4.

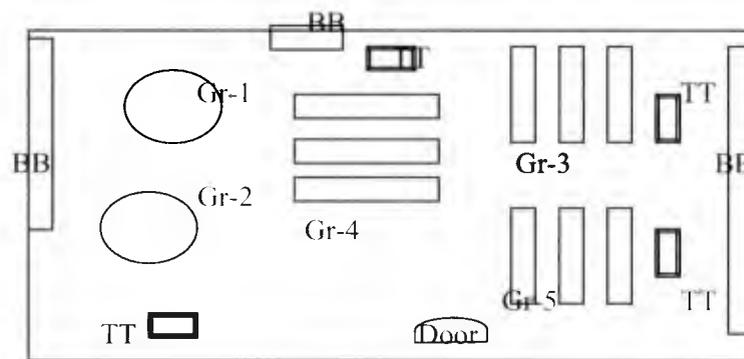
Figure 5.1 Grade combinations of multigrade classes

<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	X
4		X	X	X	X		X			X		
5		X	X		X				X		X	X
Frequency of combinations	13	9	7	5	2	1	1	1	1	1	1	1

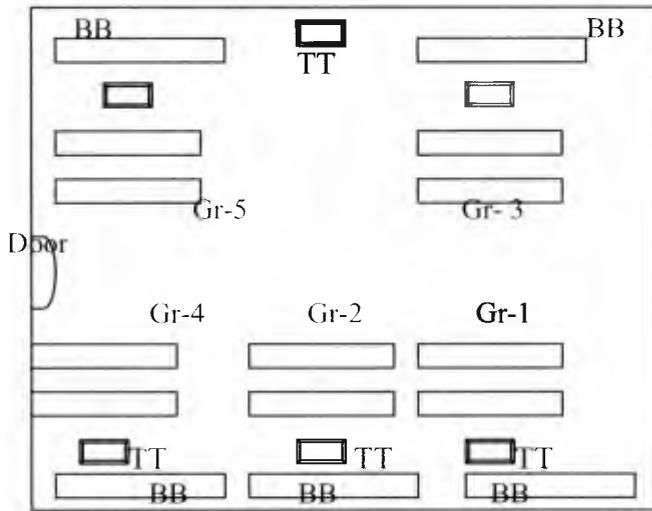
5.8.4 Physical arrangements

The physical arrangement of the grade groups of a multigrade class is an important aspects of multigrade teaching. The nature of the school building was found to be important in determining of the physical layout of multigrade classes. The different types of physical layout patterns observed are presented in this section (Figures 5.2, 5.3, 5.4 and 5.5).

Figure 5.2 Physical arrangement multigrade classes in hall type buildings



Type A

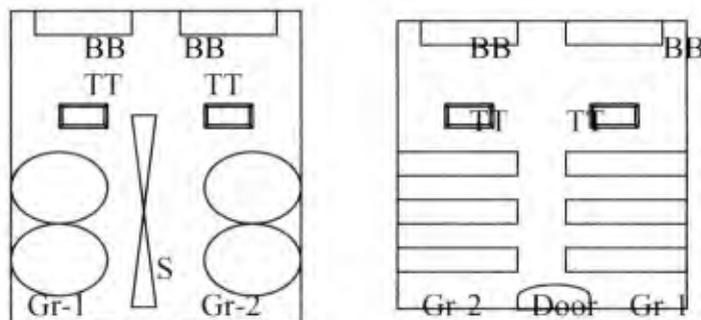


Type B

BB- Blackboard, Gr – Grade, TT- Teacher’s Table

In the arrangement Type A which comprised the majority (in 21 sample schools) the multigrade classes were arranged in the un-partitioned buildings. Types A and B illustrate variations observed within this arrangement. In Type A, the students of grades 1 and 3 are in two circles, while in B, they were arranged in rows. In both types the grades 3, 4, and 5 were arranged separately in rows facing separate blackboards. Depending on the availability the grade groups were separated by screens or cupboards.

Figure 5.3 Grade groups in the same classroom facing their own blackboards



Type C

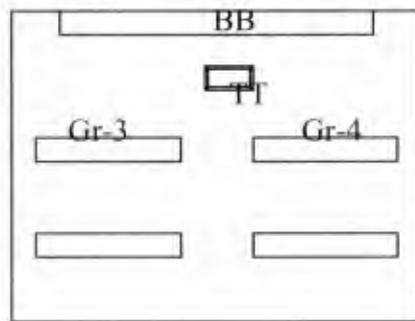
Type D

BB- Blackboard, Gr – Grade, TT- Teacher’s Table S- Screen

Figure 5.3 depicts the arrangements where two grade groups were arranged separately in a single classroom facing two different blackboards. This arrangement was observed when the student numbers of each grade was small enough to be accommodated in the same classroom or when there was a problem of total space in the school. The variations of this type were given by Type C and D. In Type C the two grade groups were separated by a screen or cupboard, while in Type D the grade groups were separated by a space.

Another type was (Type E) where two grade groups were arranged separately in the same classroom facing a common black board and a single teacher's table (Figure 5.4).

Figure 5.4 Grade groups in the same classroom facing a single blackboard

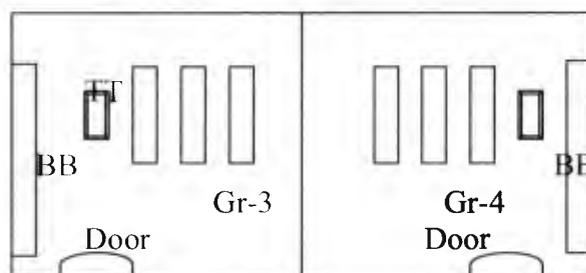


Type E

BB- Blackboard, Gr – Grade, TT- Teacher's Table

Figure 5.5 shows a situation where the grades were arranged in separate classrooms.

Figure 5.5 Grade groups in separate classrooms



Type F

BB- Blackboard, Gr – Grade, TT- Teacher's Table

When studying the physical organisation of classes in multigrade situations, the salient observation was that there was not a single arrangement with mixed grade groups. Even when the two grade groups were in the same classroom, the grade groups were distinctly separated.

5.8.5 Timetabling

The preparation of timetables is compulsory at the beginning of the year. In five sample schools, neatly written timetables were pasted on the walls of the school offices. Almost all other school principals indicated that they had copies filed after submission for approval of the ZEO. All the principals said that they produced timetables prepared for each grade separately where one teacher does not address more than one grade at a given time.

The principals of all sample schools indicated that there was no possibility of adhering to the timetables, although they prepared them. The timetables were prepared for each grade separately, assuming the presence of adequate teachers for monograde teaching. Therefore, implementation of these was problematic. No instructions were provided for the principals for the preparation of timetables in terms of considering the multigrade teaching situations.

5.8.6 Teaching strategies

When teachers were interviewed on the subject of teaching strategies, the most common given was to address one grade after the other. The teacher first addressed one of the grade groups for direct teaching and then assigned them some work, before moving to the next grade group. This process was said to continue across the number of grades for which the teacher holds responsibility. During the process the most heavily used curricular material were the mathematics and mother tongue textbooks.

Another less frequently mentioned strategy was, the 'whole class' approach, addressing more than one grade group without differentiating instruction by

grade level. The number of teachers who indicated using this strategy was less than five.

Teachers had different ideas about the use of the two strategies. Two typical expressions follow:

“Physical education, religion and environmental studies could be taught together, and mathematics and language should be taught separately because the content levels of the two grades are vastly different”.

“Environmental studies and aesthetics are subjects that could be taught together, and mathematics is very difficult to be taught that way”.

One of the teachers indicated that sometimes he would attempt to do a common lesson for the two grades, adding more content for the upper grade.

Another phenomenon which emerged was that some teachers, although instructing more than one grade assumed responsibility for one grade only. They considered the other grades as additional ones to be taken care of until more teachers were transferred into the school.

5.8.7 Use of curricular materials

The curriculum material that was observed to be frequently in use were the graded textbooks of mathematics and mother tongue. Only two teachers indicated that they use teacher guides. Some were unaware of the availability of the material. The majority of the teachers did not show much concern about the lack of syllabi. All principals said that they had to personally visit the ZEO to bring these materials finding a mode of transport for which meagre transport expenses are granted. The teachers expressed the need for workbooks for all the students to engage them in self-assignments.

5.9 Difficulties expressed by multigrade teachers

Both principals and teachers readily expressed the difficulties in serving the sample schools. The responses were categorised as follows.

1. Using syllabi and teacher guides

All teachers in the sample indicated that it was an impossible task to consider teaching according to the syllabi when handling two or three grades together. Although they instructed each grade separately they indicated that they could not work according to graded syllabi.

The majority of the teachers indicated that they did not implement the syllabi. It was even less than five teachers who used syllabi cum teacher guides to obtain a general idea on the content to be covered for each grade. The availability of syllabi and teacher guides was also not clear as the books could not be located or were misplaced or lost or undelivered. However, teachers did not complain about the lack of teacher guides.

The following were typical problems articulated by teachers:

“It is not possible to cover more than one grade syllabus within a year”

“ . . .difficult to plan lessons when teaching for more than a single grade”

“ . . .cannot teach all the subjects when teaching more than one grade due to the heavy work load”

“ . . .difficult to assess students in a systematic way as given in the education reforms when bearing responsibility for two or more different grades.”

2. Addressing a wide ability range of students who belong to different grades

Teachers indicated that it was difficult to teach students of different grades together as their abilities varied. They also indicated that students with

different abilities need teachers' guidance in different degrees, and time is not sufficient to cater for the needs of all students.

3. Physical fatigue

Teachers said they could not cope with teaching one grade after another. When students of one grade are being instructed, the other grade group would come to get their assignments corrected. Teachers found it exhausting causing a lot of fatigue. Doing this on a daily basis was problematic.

4. Student and parental displeasure towards unsystematic teaching resulting in student drop-out

Principals and teachers in most of the sample schools indicated a general trend of student numbers declining over the years. According to them, one of the reasons for this was the low quality of educational activities that are conducted in these schools due to teacher shortage.

A typical explanation was:

“ . . .students gradually drop out from the schools because no systematic teaching could be done without a teacher for each grade”

5. The physical structure of the school building

Out of the two main types of physical arrangements of classes, the partitioned and non-partitioned, the sample teachers preferred the latter. Three examples follow giving the experiences of teachers who were faced with separation of classrooms:

Example 1

In a two-teacher school a new classroom for Grade 1 was nearing completion. The teachers were wondering how they would organise classes to divide the teaching responsibilities with Grade 1 students in a separate room and the other four grades in one hall. They anticipated major problems in the case of even one teacher becoming absent. .

Example 2

The principal of a two-teacher school, having more than a hundred students in an open hall type building, has rejected the plan for partitioning the existing open hall for the Grade 1 new classroom.

Example 3

A principal who initiated steps to partition a classroom in adherence with instructions in accordance with the to latest education reforms, regretted his action because it reduced space for other grades. The separated classroom was also very small and looked very crowded and dark.

Teachers explained that the arrangement of grade groups in non-partitioned hall type buildings helped them to be responsible for several grade groups during their normal teaching as well as during the absence of a teacher.

6. Lack of support and isolation

According to principals and teachers of the sample schools, support and supervision by the ZEOs was minimal or absent. The typical expression was “no one visits our schools”. About ten schools reported that no officer from the education office had visited the school for the past three years at least. It was difficult to find out the frequency of the in-service advisers’ school visits in most of the schools, either because there was no access to such records or they were not present. Many principals expressed their reluctance to keep records as they did not see any meaning in record keeping since they felt neglected and that no one would see the records anyway. Teachers and principals indicated that education officers were reluctant to visit the schools due to problems of access, and an unwillingness to face the realities of the problems faced by the teachers in these schools.

The following examples reveal the lack of supervision and guidance for teaching and learning:

Example 1

A teacher from a two-teacher school with more than 125 students expressed his anger because no officer ever visited their school. He wished to express his anger to the education officers.

Example 2

A teacher in a 'one teacher school' in a remote village said that he felt depressed being in a school with few students for over a decade, For a considerable number of years, he had been the only teacher. He could not remember when an officer visited the school for supervision and support.

The primary education co-ordinator and the zonal planning officer, admitted that they too, had not paid visits to most of the remote schools due to their heavy load of work. The ISAs, having been assigned too many schools for supervision, were unable to visit all assigned schools regularly. Difficulties in finding transport facilities and difficult terrain prevented ISAs visiting remote schools.

7. Lack of opportunity for professional development

Serving in rural and remote multigrade contexts for long periods of time has affected teachers' participation in professional development courses. Several problems existed:

- An inability to participate in professional development programmes consistently was due to a lack of personnel to support functioning the school.
- Lack of confidence to face entrance tests to gain entry to professional courses.
- Study leave is not granted as no other teacher would assume duties in the school to replace the present teacher.

8. Multiple roles

The teachers in the sample schools indicated that their role is complex because they have to play various roles as the number of teachers in the schools were few. First, out of the multigrade teacher sample, 18 teachers were functioning as principals. The role of principal meant they had to attend to the

administrative work of the school, leave the school premises to go to the education office for numerous activities such as monthly principals' meetings, to collect curricular material, to report or discuss any issues arising in the schools, and for various other reasons including the submission of examination applications. They indicated that it was impossible to make alternative arrangements to cover for the loss of instruction time. Secondly, the teachers said that since the education levels of the majority of the parents were low, teachers had to undertake the responsibility of motivating the students, and to look into their personal health and general development.

5.10 Synthesis of findings

The synthesis of the Phase 1: Step 1 was carried out according to issues raised through specific sub-research questions.

5.10.1 Prevalence of multigrade teaching

The visits to schools revealed that the need for multigrade teaching was prevalent. However, the extent of practice of multigrade teaching was not very clear. None of the stakeholders made reference to any school as a multigrade school. The staff members did not acknowledge the existence of multigrade classes in their schools. They indicated that there was a 'teacher deficit' in their schools and expected it to be rectified. The staff members of schools that faced the condition of a lack of a teacher per grade for more than five years indicated that the authorities had neglected schools without supplying teachers.

Phase 1: Step 1 was based on 38 schools that had a permanent need for multigrade teaching. Their school types were, 1C, Type 2 and Type 3. The majority belonged to Type 3 of both Sinhala and Tamil medium schools. Except for one, all sample schools came under the category of 'difficult' schools. The sample schools had both 'full' as well as 'partial' multigrade needs.

The nature of the characteristics of the sample schools revealed that the minimum prevalence of multigrade teaching needed to be re-estimated. The earlier estimate was based on schools with four or less teachers. The fieldwork revealed that schools with secondary grades having multigrade needs are highly 'invisible'. By unveiling the characteristics of such schools included in the sample it was found reasonable to infer that not only the Type 3 schools with 100 or less students, but also any schools with secondary and primary grades and with 200 or less students would definitely have multigrade needs. In addition, Type 1C schools with 300 or less students would be more or less likely to have multigrade needs. With these predictions a fresh estimate of the country's need for multigrade teaching could be prepared using the School Census data 2002. This would be as follows:

Number of Type 3 schools with 100 or less students	=2161
Number of Type 2 schools with less 200 or less students	=1657
Number of Type 1C schools with 300 or less students	= 137
	=
Total number of schools estimated to have multigrade classes	=3955
	=
% of schools having multigrade classes	= 40.0

The new estimate (40%) indicates that the prevalence of multigrade teaching schools would be more than the estimate of 18% computed at the beginning of the study.

Table 5.23 illustrates the degree of multigrade teaching needs in the primary grade groups by number of teachers assigned to the primary in the sample schools (primary and schools having secondary grades).

Table 5.23 Multigrade teaching needs denoted by teacher availability in the primary grades

<i>No. of teachers available for primary grades</i>	<i>No. of schools with Grades 1 to 5 only</i>	<i>No. of schools with primary and secondary grades</i>	<i>Total</i>	<i>%</i>
One	4	1	5	13.2
Two	9	4	13	34.2
Three	3	8	11	29.0
Four	3	4	7	18.4
Five	2	-	2	5.2
Total	21	17	38	100.0

According to Table 5.23, there are 21 schools with grades up to five having multigrade classes. With the exception of two schools, all schools functioned with teaching principals. There were four, one-teacher schools, nine, two-teacher schools, three, three-teacher schools, three, four-teacher schools and two, five-teacher schools. In the two, five-teacher schools, the principal was a non-teaching principal and one of the teachers functioned as a multigrade teacher.

Seventeen schools had both primary and secondary tiers in the same school with multigrade needs in the primary tier. In these schools two were ‘one-teacher situations’, three were ‘two-teacher situations’, eight were ‘three-teacher situations’ and two were ‘four-teacher situations’.

The prevalence of two-teacher schools was higher within the primary schools, while, three-teacher situations were of a higher prevalence within the schools with both tiers. When considering the overall situation, two- and three-teacher situations were more prevalent (34.2% and 29.0% respectively) than one-, four- or five-teacher situations (13.2% , 18.4% and 5.2% respectively).

The majority of schools with multigrade teaching needs had 50 or less students. However, the number of students in schools with multigrade teaching needs ranged from 10 to 340.

Table 5.24 is a comprehensive analysis of the multigrade situations in terms of teacher entitlement according to the circular on teacher requirement, and the actual number of teachers in each school in the primary grade span.

Table 5.24 Teacher entitlement and actual number of teachers for primary grades by student number

<i>Student numbers</i>	<i>Teacher entitlement (Primary, English, Principal)</i>	<i>No. of schools by actual number of teachers for primary</i>						
		<i>One</i>	<i>Two</i>	<i>Three</i>	<i>Four</i>	<i>Five</i>	<i>No.</i>	<i>Cum. tot</i>
< 25		3	3	-	1	-	7	7
25-44	2	1*	5	3	1	2	12	19
45-74	3	-	2*	3	2	1	8	27
75-114	4	1*	-	3*	1	-	5	32
115-164	7	-	2*	2*	1*	-	5	37
165-199	8	-	1*	-	-	-	1	38
		5	13	11	6	3	38	38

* Schools with teacher shortages when compared with the teacher entitlement

A comparison of actual teacher number and teacher entitlement mainly shows the following trends:

- In the majority of schools with less than 75 students, the actual number of teachers was more than the entitlement.
- In the majority of schools with more than 75 students, the actual number of teachers was less than the entitlement.

Table 5.24 also illustrates the following:

- two- and three-teacher conditions are the most prevalent
- multigrade situations occur even if there are five teachers for the primary grade span
- existence of schools with less than 25 students

5.10.2 The school context: physical characteristics

Accessibility is one of the main aspects regarding school context factors. On the one hand, these schools were difficult to access from outside the village, due to poor transport, deteriorated road conditions or/and distance from the main town of the education zone. On the other hand these schools were the most accessible for the students of the various village communities.

The physical structure available as classroom space of the majority of the schools was reasonably adequate but poorly maintained. However, major shortcomings regarding teacher residential facilities were noted.

5.10.3 Conditions under which multigrade teaching becomes a necessity

The reasons that make multigrade teaching a necessity, could be classified into four broad categories:

- non-entitlement for teachers for implementing monograde teaching due to smallness of student enrolment
- teacher deployment disparities due to teacher deficits and ad hoc transfers
- teacher absenteeism due to personal problems, lack of residential facilities, transport failures, rain and/or teachers taking long-term leave for maternity, study leave and medical leave

In synthesising the conditions that prevailed in the sample schools, the following conditions were found to promote the need for multigrade teaching:

1. Schools with persisting low enrolment mainly located in villages with sparse populations and thus entitled to four or less teachers only.

Most of these schools were without suitable teacher residential facilities and were difficult to access from town. These schools survived with the services of teachers who were residing within local communities, and/or

temporarily residing within the community to fulfil the mandatory service requirements of serving in difficult schools for four years. These schools were mostly Sinhala medium primary schools.

2. Schools facing shortages of teachers due to a deficient supply of teachers are compelled to form multigrade teaching classes, despite their entitlement for monograde teaching.

These schools are mostly Tamil medium schools and are situated within commercial plantations.

3. Schools which continue to lose popularity due to reasons such as downgrading as a result of the rationalisation process and/or teacher shortages. This results in a decrease of student numbers in the secondary grades, and is later reflected also in the primary grades. This in turn causes such schools to lose their entitlement for teachers for monograde teaching in both the primary and secondary grades.
4. Schools located within growing communities, having decided to expand the grade range for the small number of students in the upper grades face situations of non-entitlement to teachers for monograde teaching.

These schools are mostly Tamil medium plantation schools.

5. Schools which barely have teacher entitlement for monograde teaching face multigrade needs when subject to teacher absenteeism.

Absenteeism could be due to taking long leave as maternity or sick leave, and/or frequent intermittent days of leave for problems related to residential facilities and commuting to school.

This condition arises in schools of both media and all school types.

5.10.4 Characteristics of multigrade teachers

It is generally understood that the majority of multigrade teachers are untrained and not local residents of the area. Trained teachers numbered 42

out of the 46, and they had qualified mainly by the distance mode of the NIE teacher training course. The teachers' experiences in multigrade classes could not be compiled, as teachers did not possess any records on this issue. However, a considerable proportion of the sample teachers had served in multigrade classrooms for over five years. The majority of the multigrade teachers were females. Teacher transfer was a major problem faced by the teachers. Transfers affected the teachers both favourably and unfavourably at times, depending on their needs.

5.10.5 Organising multigrade classes

Multigrade classes were organised when teachers were entrusted to address more than one grade group at a given time. Although a majority of the schools (29 out of the 38) entrusted the responsibilities of more than one grade to a single teacher due to necessity, some of the schools adopted other strategies such as obtaining the services of volunteers to avoid the formation of multigrade classes or to reduce the need. Further, some schools left one or more grade groups without a teacher, and teachers were assigned the responsibilities of teaching a single grade. This happened mainly for two reasons. The first was to highlight the need for more teachers. The second was to assign the teachers who were trained for Grades 1 and 2 with the two separate grade groups. The distribution of grade combinations assigned to teachers in the 38 sample schools are given as a summary in Table 5.25.

Three salient points could be discerned from Table 5.25. The first is the relatively higher prevalence of 'consecutive' grade combinations, compared with 'discrete' combinations among both two- and three-grade combinations. The second is the higher prevalence (in 24 schools out of the 38) of two-grade combinations when compared with other grade combinations. The more common combinations were 1+2, 3+4 and 4+5. The third is the low occurrence of four and five grade combinations. The grade combinations of multigrade classes were highly flexible due to frequent teacher absenteeism. Teacher transfers also affected the formation of multigrade classes in most schools. No special timetables were prepared to address multigrade classes.

Table 5.25 Grade combinations by their grade compositions

<i>No. of Grades combined</i>	<i>Grade Combinations</i>	<i>No. of classes</i>	<i>%</i>
Two grades	Consecutive combinations of 1+2, 3+4 and 4+5	25	58.1
	Discrete combinations of 3+6, 1+5, 2+4 and 1+4	5	11.5
Three grades	Consecutive combinations of 1+2+3 and 3+4+5	10	23.5
	Discrete combination of 2+3+5	1	2.3
Four grades	Consecutive combination of 1+2+3+4	1	2.3
All five grades combined	Consecutive combination of 1+2+3+4+5	1	2.3
Total		43	100.0

When only two teachers were available, the most frequently encountered combinations were 1+2 and 2+3+5. When there were three teachers available, the Grade 5 class was normally organised as a monograde class because of the emphasis given to the preparation for the Grade 5 scholarship examination resulting in combinations of 1+2 and 3+4. However, the different grade groups within a combination were arranged physically separated from one another. Apart from combining the grade groups no other strategies were adopted in assigning students to multigrade classes.

A definition of a multigrade class could therefore be formulated as:

a single teacher being responsible for instructing more than one grade level, either adjacent or discrete, on a fixed or temporary basis, depending on the needs of the school with or without teachers recognising themselves as multigrade teachers.

The factors affecting formation of school specific combinations of grades were the student numbers in each grade group, the nature of the school building, the teachers' willingness to be responsible for a multigrade class, the Grade 5 scholarship examination and the interpretation of the reform guidelines in terms of assigning teachers.

5.10.6 Challenges presented by the multigrade classes

Teachers faced a range of difficulties as a result of serving in multigrade contexts. In the analysis of these difficulties, the following challenges presented by the multigrade classes are grouped into three categories:

(1) Challenges regarding instruction

- Bridging the gap between the widely accepted monograde instruction and needs of multigrade classes.
- Catering to different ability levels of students in combined grade groups
- Functioning without support or feedback from the education office.

(2) Challenges regarding fulfilling multiple roles, such as being a teaching principal and surrogate parent for students.

(3) Challenges of addressing one's own professional development needs which are neglected as a result of being in isolated rural multigrade schools without any colleagues for encouragement and support.

5.10.7 Teacher beliefs and perceptions of multigrade teaching

The study of multigrade teaching across a range of multigrade settings in one education zone revealed that multigrade was not a recognised or an accepted form of teaching. Teachers did not recognise that they adopted multigrade

teaching to address the different grade groups at the same time, and they did not identify themselves as multigrade teachers.

Schools made a conscious effort to avoid multigrade situations. When responsibilities of taking charge of more than one grade were entrusted, the general understanding was that it was a temporary situation, necessarily faced by teachers because of teacher deployment and/or teacher deficit problems. Teachers attempted to address a single grade at a time while other grade groups waited for the teacher.

The term 'multigrade teaching' was not in use in the schools with multigrade classes. No one talked about the possibilities of teaching more than one grade group simultaneously. A majority of teachers considered that they were officially responsible for one grade group while taking care of an additional grade group until more teachers were supplied. The strategy adopted by the majority of teachers could be termed a 'quasi monograde approach'. In adopting this strategy each grade group was addressed separately as a monograde, one after the other.

There was consensus among the teachers with regard to the physical structure of classrooms for addressing more than one grade at a time. They indicated that classes in the unpartitioned hall type buildings were more convenient because the available teacher(s) could instruct and supervise several classes simultaneously, without facing the difficulties of walking across to different grade groups in different classrooms. .

CHAPTER 6

MULTIPLE CASE STUDIES OF MULTIGRADE TEACHING

This chapter presents the Phase 1: Step 2 of the 'fact-finding' phase of the action research. This phase includes three case studies conducted to address the research question 4, *What are the current practices of multigrade teaching and the challenges faced by multigrade teachers in rural Sri Lanka?*

The sub-questions formulated under this research question were:

- (i) What is the influence of the contexts of rural schools on the effectiveness of multigrade teaching?
- (ii) How do teachers approach teaching in multigrade classes?
- (iii) What is the nature and quality of multigrade teaching?
- (iv) What are the multigrade teachers' specific needs to improve the quality of multigrade teaching?

The three cases were selected based on the findings of Phase 1: Step 1. In selecting the three cases the following method and criteria were adopted:

- (1) Cases to be selected from Deraniyagala education division as its incidence of schools with multigrade teaching needs was high.
- (2) Selection of three schools that represents the most prevalent and salient conditions of multigrade contexts. Conditions have been identified and given in Chapter 5, section 5.10.3. (pp.156-157). Introductions to the cases are given below.

- i. School A was selected to represent the isolated, difficult to access small village primary school category. The school had less than 50 students and two teachers. The medium of instruction is Sinhala.
- ii. School B was selected to represent the remote plantation schools in Tamil medium instruction and having over 100 students. It faced a severe teacher shortage, having only two teachers in spite of being entitled to six teachers and a principal. The poor quality of teacher residential quarters contributed to the problem of teacher shortage as teachers became reluctant to assume duties in this school. The distance to the closest town from School B was more than 20 km.
- iii. School C was selected to represent Sinhala medium, village schools having both primary and secondary grades. The number of students was 60+ with only a small proportion of this number enrolled in the secondary grades. School C was to be down-graded to a Junior School having Grades 1-9 as a result of the school rationalisation programme. The school had no entitlement for five teachers for the primary grade span.

The case studies were conducted in June and July of the year 2000. Visits to schools were carried out on five days selected at random. The schools were uninformed of the exact days of visits. This chapter presents the three case studies and a cross-case analysis of them.

6.1 School 'A'

School 'A' was a remote village primary school, classified as a 'difficult school'. Access to the school was by an uphill drive, winding 4 km through the rubber plantation. The road was eroded as a result of fast flowing rain water. The school was on the top of a hill. The footpath for a distance of 1 km

leading to the school from the road was steep and slippery. These problems became more severe on rainy days.

School 'A' was the most accessible for the primary children of the village constituting about 75 families. Although there was another primary school about 2 km from the village, traditionally the village children have been attending School A, perhaps, according to hearsay, due to some caste issue. According to the staff members, all primary school-aged children in the village were enrolled in School 'A'. It was also the only government institution in the village.

6.1.1 Students

On an average, the annual enrolment in School 'A' had been around 50 for the past decade. In year 2000, the enrolment was 46. The numbers of students of the five grades were 12, 8, 7, 12, and 7 respectively (Table 6.1). They all were Sinhala.

Table 6.1 Students in School 'A' by grades in June 2000

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

6.1.2 The staff

The school was entitled to two primary teachers and an English teacher. However, there had never been an English teacher. The staff comprised of two members and both functioned as multigrade teachers. The principal (Mr. Sunil)¹ was new to the school and the teacher (Mrs. Kanthi) was the former

¹ All names are fictitious

principal's wife and had been in the school over a decade. The commencement of the case study coincided with the transfer of the former principal, who had been in this school for over a decade, thus depriving me of the opportunity of observing the principal-teacher couple implementing the school activities. The exact reason for the transfer of the former principal was not clear, as it was linked to a chain of transfers of principals that was taking place in the education division. After considering whether it would be advisable to change the case, I decided to continue with it as teacher transfers were taking place across the education zone resulting in changes to staff compositions of schools.

Mr. Sunil, was in his early forties having twenty years of experience as a teacher and less than five years experience as a principal. He expressed his displeasure about the transfer to School A as he considered it as a 'punishment transfer' based on a political issue. Besides, he also was not happy because it entailed problems of commuting to this remote school. Although the distance was 7 km from his permanent residence, commuting to and fro was difficult due to poor public transport services. For several days of the week the bus was late or not running and he was unable to reach the school at the official time of school commencement. There were days when he walked to the school from the turn at the main road, climbing the hilly footpaths, across the plantation.

The teacher residential quarters were adjoining the building but the principal did not even consider occupying this crumbling, small building with hardly any basic facilities. He was well-established in his own house in the main town. The second problem the principal faced was the frustration he felt because he was of the view that his capacities were going to waste in this school. He lamented the waste of his talents as a secondary mathematics teacher when there was severe shortage of trained mathematics teachers in the educational zone.

Mrs. Kanthi was in her thirties and had been in the school with her husband who was the former principal of this school for over 10 years. The couple had built their home in the village at the base of the hill. She obtained her

professional teacher training from a teachers' training college. After her training she returned to the same school. She had also regularly participated in most of the short term in-service training programmes conducted by the education office. Her child, too, attended this school. However, she aspired to get a transfer to a school in the town in order to enrol her child in a school with better facilities.

6.1.3 Multigrade teaching

6.1.3.1 Organization of multigrade classes

School 'A' was a 'fully' multigrade school because all grade groups needed to function as multigrade classes under the two teachers. Mrs. Kanthi was responsible for the Grades 1 and 2 and the Grades 3, 4 and 5 were under the responsibility of Mr. Sunil.

The grade groups were located in the long, rectangular (60ft x 20ft) unpartitioned, hall-type building. The Grades 1 and 2 were in two circular groups, facing a single blackboard, while Grades 3, 4, and 5 were arranged in rows facing three separate blackboards. The available space, desks and chairs were sufficient. However, maintenance of the building and the furniture had been neglected and the interior of the building looked gloomy. Although the furniture was movable and could be arranged as needed for any grade group combination no such activities were observed. There was no activity corner organised in any of the primary grades.

6.1.3.2 Teaching approaches

The most prominent observation made in School A was the lack of a regular programme of teaching. Hence, it became necessary to analyse intermittent episodes of teaching that prevailed therein, using the approaches reviewed through literature (Chapter 2, section 2.3, pp. 40-44). The following are examples of teaching strategies observed. Example 1 was when Mr. Sunil addressed the three grades under his responsibility.

Example 1

Mr. Sunil addressed Grades 3, 4, and 5 one after the other to teach the following three topics in mathematics: bar graphs subtraction of two digit numbers and addition of distances, respectively. On the average he spent three minutes with each grade for a brief illustration of an example, before assigning deskwork given from student textbooks.

(Field notes 7/7/2000)

In the strategy explained through example 1 the teacher selected three topics of the same subject. In the lesson implementation no significant phase of instruction and guidance by the teacher was observed for any of the grades.

Following is an example of Mrs. Kanthi who was responsible for Grades 1 and 2:

Example 2

Mrs. Kanthi after having arrived late to school commenced her teaching to Grade 1 and 2 involving the two grade groups in activities related mathematics and mother tongue respectively. Her strategy was to send the Grade 2 students to go out of the class to collect 50 pebbles while she engaged the Grade 1 students in copying the Sinhala alphabet.

(Field notes, 11/7/2000)

In example 2, the teacher appeared to have adopted the strategy that could be identified as 'subject stagger'. She had selected mathematics and mother tongue, subjects that are usually considered as demanding teachers' guidance for student learning,

Following is an example when Mrs. Kanthi, in the absence of the principal, attempted to cover the responsibilities of the multigrade classes of the principal.

Example 3

Mrs. Kanthi commenced instruction to the Grades 3, 4, and 5 by assigning a task to Grades 4 and 5 to make a free drawing, and then

made a brief introduction and assigned an exercise based on the Sinhala language textbook for Grade 3 students. It was observed that with the lapse of a short time students of Grades 4 and 5 gradually began to abandon the drawing task, and went out of the class to start playing on their own.
(Field notes, 12/7/2000)

Example 3 illustrates the usage of a ‘holding activity’ to occupy two of the grade groups while she addressed another. It appears that holding activities used did not yield the anticipated result of keeping the students engaged in work. Observations indicated that students seemed to have no interest in engaging in holding activities such as drawing or copy writing.

The three examples indicate that the predominant strategy used by teachers for multigrade teaching was ‘separate class’ teaching which could also be termed as ‘quasi-monograde’ teaching, where a teacher addresses each grade group one after the other but dividing the time between the grade groups.

6.1.3.3 The time for teacher guided learning

The principal indicated that although they did submit a timetable for official purposes to the zonal education office, it was not possible to implement it due to lack of teachers. Teaching did not begin with the completion of morning religious activities. However, the students expressed readiness to start work, settling down in their respective seats and getting ready to engage in mathematics exercises. The actual contact time with a teacher for each grade within a day calculated through field notes is given in Table 6.2.

Table 6.2 reveals that the actual contact time between teachers and students varied remarkably between lower and upper grades of the primary tier. Teachers appeared to spend more time with the two lower grades when compared with the three upper grades. Table 6.2 also shows that on this particular day the time spent by teachers on upper grades was between half or one-third of the time that was spent with the lower grades. Teachers, when interviewed said that students in Grades 1 and 2 needed constant attention and

support to engage in the tasks assigned. This was the reason why teacher guided learning time was limited for upper grades.

Table 6.2 Contact time with a teacher for academic activities

<i>Grade group</i>	<i>Contact time/day with a teacher (approximately in minutes)</i>
1	145
2	135
3	42
4	50
5	70

One of the reasons which affected the availability of time for teacher guided learning was student absenteeism. Table 6.3 illustrates the student attendance in each grade within a week (from 1.6.2000 to 5.6.2000) based on the student register.

Table 6.3 Percentage student attendance by grade within a week

<i>Day</i>	<i>Grade 1</i>	<i>Grade 2</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5</i>
Monday	46.1	88.9	57.1	80.0	57.1
Tuesday	7.6	22.2	28.6	90.0	28.6
Wednesday	61.6	77.6	71.4	50.0	85.7
Thursday	61.6	77.8	71.4	50.0	71.4
Friday	15.4	33.3	71.4	40.0	28.6

Table 6.3 shows that in every grade student attendance was fluctuating. According to teachers' explanations student absenteeism was mainly due to illness, difficulties of commuting on rainy days and problems arising out of poverty.

Another reason for limited teacher guided learning was teacher absenteeism. In School A, the principal was frequently absent from school and the only other staff member in the school had to take responsibility for all five grades, thus having to divide the instructional time between all five grades. As noted in the field diary an example of teacher absenteeism is as follows:

The principal was absent from school on three out of five days selected to visit the school for the purpose of case study. According to Mrs. Kanthi, the principal was visiting the zonal education office to forward an appeal for a transfer and to inquire about the curriculum material which was unduly delayed.
(Field notes, 10/7/2000)

The following example indicates how Mrs. Kanthi, who normally instructed Grades 1 and 2, had to face a difficult situation in having to manage all five grades in the principal's absence.

After marking attendance registers of the five grades she tried to start teaching to Grades 1 and 2. Although she had assigned some work to Grades 3, 4 and 5 the Grade 5 students did not show interest in performing the work assigned. Soon the Grades 3 and 4 students also finished their respective tasks and were anxious to show their books to the teacher and this prevented her from starting a lesson for Grades 1 and 2 (Field notes 11/7/2000).

6.1.3.4 Nature of the activities and assignments

The nature of the activities and assignments adopted in multigrade teaching included repeated assignments of copy writing, silent reading, drawing and exercises from mathematics textbooks. The following is an example where Mrs. Kanthi attempted to engage the students in textbook-based activities:

On a day when the principal was absent, Mrs. Kanthi attempted to make the students in Grades 3, 4 and 5 engage in assignments before starting work with her own class Grades 1+2. Though she intended to find suitable exercises for Grade 5s which they could manage on their own, her attempt was not successful. Failing to find a suitable exercise, she asked the students to go through the work they had done the day before.
(Field notes, 12/7/2000)

Table 6.4 illustrates activities assigned by Mr. Sunil to Grade 4, on one of the days of observation (Field notes, 7/7/2000). The following table gives the activities and the teacher and student behaviours within a period of approximately two hours and forty minutes, leaving aside the time spent on the break.

Table 6.4 Summary of student and teacher behaviours and activities in Grade 4

<i>Activities</i>	<i>Time</i>	<i>Teacher behaviour</i>	<i>Student behaviour</i>
Reading	10.45 – 11.45 (60 minutes)	Gave brief instructions to do silent reading and moved to Grade 5 to teach mathematics.	Engaged in silent reading for about 10 minutes and then gave up and started to idle.
<i>Break</i>	<i>11.45– 12.15</i> <i>(30 minutes)</i>	<i>Break</i>	<i>Playing outside the classroom</i>
No lesson	12.16 – 12.34 (18 minutes)	Attending to correspondence and other documentation in school office	Idling
Reading	12.35 – 1.15 (40 minutes)	Taking reading from the class	Reading aloud
Comprehension on the same lesson as above	1.15- 2.00 (45 minutes)	Assigned an exercise from textbook and goes to another class	Doing the assigned work.
School over	2.00		

According to Table 6.4 the students of Grade 4 were assigned silent reading, loud reading and a comprehension from the same lesson during a period of two hours and forty minutes. During this time Mr. Sunil was with the students

examining loud reading for 40 minutes. The students were on their own for two hours. Although Mr. Sunil assigned tasks such as silent reading and comprehension the students did not seriously get engaged in these activities. This is a typical example of waste of time that could be fruitfully utilised for instruction and teacher guided learning if structured skilfully, and one may note the nature of assignments that are given to students. These were common features to be found in School A.

6.1.3.5. Coverage of curriculum content

Observations of teaching made it clear that it was impossible to expect the coverage of syllabi for each grade. The content areas covered for each of the five grades on one of the days of observation is given in Table 6.5.

Table 6.5 Curriculum areas covered on a day in each grade

<i>Grade</i>	<i>Subjects dealt with during the day</i>
Grade 1	Mother tongue (Sinhala) – Hand writing
Grade 2	Sinhala – Hand writing, Mathematics- counting
Grade 3	Mother tongue - Difficult letters in Sinhala Alphabet, Mathematics- Bar graphs , Drawing
Grade 4	Sinhala- Reading and comprehension, Mathematics- subtraction
Grade 5	English– Alphabet, Mathematics- addition, Buddhism-Explanation

(Field notes, 7/7/2000)

Table 6.5 shows that mathematics and mother tongue were the dominant subjects dealt with. Apart from these, Buddhism, English and Art were given some attention. Mrs. Kanthi admitted that she did not teach Environmental Related Activities (ERA) regularly. She did not conduct, at least, a single lesson on ERA during the five days of the case study.

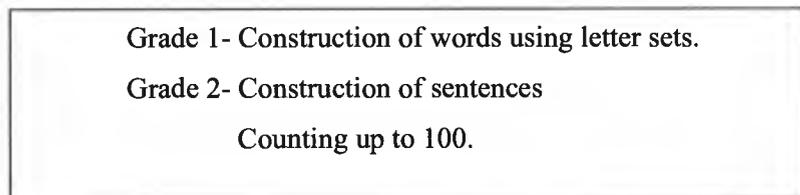
6.1.3.6 Lesson planning

Lesson planning was a sensitive issue to probe in the context of School ‘A’ due to several reasons. First, it was obvious from observations that neither of

the two teachers planned their lessons. Second, questioning about lesson plans was typical of a supervisor, which teachers generally disliked. Third, was the message communicated through various conversations, that no one had the right to ask about lesson planning from teachers without providing a teacher per grade. Hence, probing on the issues of lesson planning was done after three days of observation, allowing time for the teachers to get accustomed to me and the nature of my work. .

Though teacher guides are the essential tools for lesson planning, Mrs. Kanthi could not locate the syllabi which she claimed to possess. She showed two notebooks that she set apart for preparing lesson notes. In one she had lists of topics for mother tongue and mathematics that she copied from the syllabi. This she called the term plan. The other smaller book which she referred to as the lesson notes contained two or three sets of lesson objectives in brief. An example of one set is given below.

Figure 6.1 Lesson objectives in Mrs. Kanthi's lesson notebook



Grade 1- Construction of words using letter sets.
Grade 2- Construction of sentences
Counting up to 100.

(Field notes, 19/7/2000)

Her intention in having the two notebooks was to submit them in the event of a supervisor's visit. However, there had been no supervision by an education officer for over two years.

Mr. Sunil did not refer to the syllabi to plan his teaching. He, being a teacher of secondary grades, was not familiar with the teacher guides pertaining to primary grades. His instructions were based on mathematics and mother tongue textbooks. He also made attempts to teach English and art, as and when he intended. From these observations it was concluded that neither of the two teachers planned their lessons.

6.1.4 Summary and lessons learned from study of School A

The case study of School 'A' revealed the realities of multigrade teaching in an isolated 'fully' multigrade primary school. The smallness of the student number contributed to the non-eligibility of a teacher per grade. Frequent absenteeism of the staff members contributed to enhance the multigrade nature of the school. It was clearly seen that in this particular school teacher absenteeism was closely related to unsystematic teacher transfers.

In School 'A' the responsibility for the five grades was divided between the two members continuing the system followed by the former principal. Except for the two grade groups 1 and 2 having been arranged in two circles to form one class, no other special physical arrangement of grade groups were made for multigrade teaching. 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. Though the school is isolated and difficult of access there was no felt need for residential quarters as the school was located about 6 km from the town.

In addressing multigrade classes for instruction, both staff members adopted an approach of treating each grade separately, which could be termed as a 'quasi-monograde' approach. The following were the other salient observations made on multigrade instruction:

1. Teaching was unplanned and not done according to syllabi.
2. Teaching was fragmented and incomplete .
3. Student idle time was overwhelmingly large.
4. Assignments given to students were not challenging or interesting enough to keep them occupied.

The following reasons were inferred as contributory for poor quality in teaching:

1. Teachers were not provided with proper guidance.
2. The failure of quasi-monograde teaching for an effective multigrade teaching approach.
3. Non-use of syllabi and absence of lesson planning.
4. Lack of suitable material to engage the students in self-learning activities.
5. Non-encouragement of collaboration across grade groups.

When considering the professional status of the teachers in School A, it is clear that their number of years of teaching experience, specific experience in multigrade contexts and/or their professional training do not appear to have exerted any positive influence on them in handling situations in multigrade contexts. It also appears that being in isolation without supervision has made the lady teacher less capable of engaging in her profession even as a monograde teacher. Thus, the case study shows the essential and urgent need of training teachers to handle multigrade teaching.

6.2 School 'B'

School 'B, a Tamil school within a large commercial plantation classified as a 'very difficult' school though officially assigned to function up to Grade 8, had Grades 1 to 5 only due to lack of teachers. The closest school with secondary grades for the primary students passing out from this school was in the town 20 km away. Although the school was situated close to the road the distance from the main town and poor transport facilities available made access difficult. The majority of the students living in the vicinity walked to the school.

6.2.1 The students

The school had 126 students enrolled in the year 2000. Their distribution across the five grades is given in Table 6.6.

Table 6.6 Students in School 'B' by grades in June 2000

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

Table 6.6 indicates that except in Grade 5, on average there were more than twenty students in each grade

The data collected on student attendance from the attendance registers revealed that nearly 40 percent of the students were absent daily. However, whether this figure revealed the actual state of affairs of the school is doubtful as on the first day of my visit to the school, I observed a volunteer marking registers of all five grades covering attendance for three previous days.

Teachers attributed the student absenteeism to reasons external to the school. They said that some were engaged as casual labourers in the plantations, in boutiques, or in households as domestic servants. Some of the older girls were said to be engaged in looking after their siblings while their parents worked in plantations during day time. The teachers blamed both the parents for being addicted to drugs and not looking into their children's welfare and education, and the students for being least interested about studies. Teachers also said that according to their experience, only a few of the students would proceed to the secondary school after they finish schooling at School B.

6.2.2 The staff

The school was officially entitled 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 was a shortage of five primary teachers. The school had only a principal and an English teacher. Both staff members indicated that the main reasons for the teacher shortage were the distance from the town which made travelling difficult, and lack of residential facilities. The Principal was the only teacher available from the community and hence the rest had to be appointed from outside. As no teachers were appointed from outside, two volunteers from the community itself were mobilised by the principal. Brief profiles of the staff members are given below:

Mrs. Devarani, the principal was a Tamil lady in her early forties. She had started her career as a volunteer. Later she entered the teaching profession, had training through the distance education mode at the NIE. This was her 10th year in this school, after getting her permanent appointment. She and her family resided in the official quarters located in the school building. Her husband was a businessman. She had three daughters. She was faced with a problem of relative who was suffering from an epileptic condition. The principal aspired to move to Colombo to obtain medical treatment for her relative.

Mr. Riza was the only other permanent member. He was a Muslim bachelor of 26 years hailing from a town about 75 km from the school. He was an English trained teacher appointed to this school six years ago. He obtained his training in 1996 and reassumed duties in the same school. He desired a transfer to a semi-urban or urban school, closer to his own home. Having no room in the staff residential quarters, Mr. Riza was compelled to find a boarding house in the neighbourhood.

The voluntary teaching staff included a Catholic nun (Sister Sheila) and a youth from the community (Ganesh). Both volunteers had passed the G.C.E-

(O/L) Examination. The principal had been able to obtain assistance from the Catholic Church to support Ganesh. Being just out of school he was marking time to find a better job. Ganesh was expected to serve the school for all five days from 8.00 am to 2.00 pm. Sister Sheila had scattered experience in voluntary teaching for about two years. However, she did not possess any training for teaching in the primary grades. She visited the school three days per week from 8.30 am to 12.30 pm.

The principal said that she, with the support received from the community continued to appeal to the zonal director for more teachers for the school. Failing these efforts they had even gone to the extent of meeting the Deputy Minister of Education who was a parliamentarian of the area. However, so far their efforts had not met with success. The difficulties of accessing the school from the town and the poor teacher residential facilities in the school made the school unattractive. No initiatives were being made to rectify these shortcomings.

6.2.3 Multigrade teaching

6.2.3.1 Organisation of multigrade classes

The grade groups were arranged as single grades facing their own blackboards. It corresponded to the structure in Figure 5.4 in Chapter 5 (p 145). Teacher assignment for the grade groups was described by the principal during Phase 1: Step1. She said:

Grade 3 and 4 are Sir's (Mr. Riza) and Grade 5 is mine. The responsibility of Grade 1 has been handed over to the Sister (Sister Sheila) and the youth volunteer (Ganesh) has been assigned Grade 2.
(Field notes, 8/6/2000)

According to the above description Mr. Riza was the only teacher who was in-charge of a multigrade class. However, observations in Phase 1: Step 2 revealed that the reality of grade group assignment in School 'B' was often different from the above description. The difference was that all members of

the staff had to bear additional responsibilities, depending on the daily availability of teachers. The five day long observations in School 'B' indicated that all teachers including the volunteers were compelled to practice multigrade teaching depending on the daily availability of the teachers.

6.2.3.2 Teaching strategies

Neither the government appointed teachers nor the volunteers were able to explain any specific strategies that they adopted in multigrade teaching. Both Mrs. Devarani and Mr. Riza were aware that they were not engaged in systematic teaching, Mr. Riza said:

Most of what we do would go waste. Students would only acquire some general advice for their lives out of my teaching. No systematic learning takes place to advance their knowledge.

However, it was possible to identify the strategies they adopted for multigrade teaching. The following are several examples:

Example 1

Mr. Riza who was compelled to address Grades 3 and 5, first assigned a few mathematics problems to Grade 5 students and moved to Grade 3 for an English lesson. He spent forty-minutes to do the lesson for Grade 3 but neither gave Grade 5 any guidance for completing the assignment nor did he make any attempt to correct the exercises.
(Field notes, 29/6/2000).

Example 1 describes the adoption of a quasi-monograde approach to instruct two discrete grade groups. The teacher gave an assignment to one of the grade groups based on a previous lesson enabling him to find an opportunity to address the other for direct instruction.

Example 2

The principal who had to bear the responsibilities of the Grades 3+4+5, first assigned Grade 5 students a reading task. While they

were engaged in the task she moved to Grade 3 and assigned a mathematics exercise from the textbook. Thereafter, she wrote five sums on the blackboard for the Grade 4 students. She moved to each grade group to correct the assignments when students completed them

(Field notes 22/6/2000).

In example 2, the strategy adopted by the teacher did not involve any direct instruction to any of the grades. Her strategy was to assign individual mathematics exercises. Frequent assignments of deskwork to students was the predominant strategy adopted by the teachers in School 'B', to keep the students in their seats.

The next set of examples illustrates situations similar to the whole class approach to multigrade teaching described in Chapter 2 (pp.40-42). In approaching different grade groups in a single lesson, the teachers imparted common explanations and/or assignments to students of different grades.

Example 3

Mr. Riza in teaching English and Physical Education attempted to engage the students in different grade groups in common assignments and activities

Example 4

Mr. Riza attempted to give an awareness on personal hygiene for all students in the school on a whole class approach,

Example 5

Sister Sheila engaged Grade 1+2 in a common mathematics lesson on counting. The instructions and questions were undifferentiated by grade level.

An example of a mixed approach, consisting of both 'quasi-monograde teaching' and 'whole class teaching', was observed being adopted by Mr. Riza on a day when he was compelled to simultaneously address Grades 1, 3, 4 and 5, when the principal and one of the volunteers were absent. He organised his teaching for Grades 1 and 3 to be as quasi-monograde teaching while the whole class teaching was adopted for Grades 4+5.

The steps he adopted were as follows:

1. Commenced instruction by assigning an exercise on two mathematical operations to Grade 3. He assigned additions and subtractions to Grade 3 (written horizontally) spending ten minutes in writing the sums on the board. He did not use any curricular material in assigning the task.
2. Moved to Grade 4 and 5 and rearranged the grade groups as one class facing a single blackboard. He put up a crossword puzzle on the blackboard in English, demonstrated one entry of the puzzle and instructed the students to complete it.
3. Moved to Grade 1 to make a brief introduction on counting and thereafter put up an exercise on numbers on the blackboard. He drew baskets of fruit containing different numbers and asked the students to copy the pictures, count them and write the number in each cluster. He assigned two students from Grade 5 to take care of the Grade 1 students.
4. Returned to Grades 4+5 to help students in completing the English puzzle on which he spent five minutes. While doing this he focused his attention towards Grade 3, as the students, having completed the assignment given to them half an hour ago, became restless.
5. Moved to Grade 3 to discuss the sums with the students for fifteen minutes and reassigned more sums.
6. Returned to Grades 4+5 and started correcting the puzzle exercise. After correcting, he assigned another activity on map marking giving a brief introduction on the task. Then he distributed maps of Sri Lanka to students..

The described steps of events took place within a period of one hour and thirty minutes.

6.2.3.3 Time for teacher guided learning

Time for teacher guided learning in School 'B' was limited and could not be calculated due to the fluidity of the daily routine. The school did not function

according to a timetable. Although the students showed readiness to engage in learning activities immediately after the morning assembly, they had to wait until the teachers focused their instruction to each specific grade group.

When both teachers and the volunteers were present, for the first hour and a half of the school time the whole school was observed to be engaged in some deskwork. Even during this period the students were seen to be spending a large proportion of time idling at their seats, either because they had completed the assignments as they were too easy, or had abandoned the tasks as they had lost interest in them. Another reason for the loss of students' interest was their awareness that the teachers' attention would not be directed towards them for some time. The following are some examples:

Example 1

Principal after assigning work to all the grade groups under her teaching responsibility started marking the registers. The Grade 3s for whom she assigned work first, had already completed their assignment and started to become restless. Before long, most of the Grade 4s also were observed to be idling either because they completed the work or had lost interest in the activity. Some of them were scribbling and not seriously attending to the work. The Grade 5s for whom a mother tongue exercise was assigned about an hour ago were observed to be doing the assignment, abandoning and taking it up again as they liked. (Field notes 22/6/2000)

Generally, after 11.00 am hardly any teaching-learning activities took place in the school. The Grades 1 and 2 students left for their homes at 11.30 am after spending their official time duration in school. The Grade 3 students left the school around 12.noon, one hour before their scheduled time, as some students had to take the bus which reached the school at about 12.20 pm. If they were to miss this bus they had to wait for another three hours to take the next bus. With the winding up of the activities Grades 4 and 5, students also left school one hour earlier than the official schedule. Only on one out of the five days of observation did the teachers keep the school open till 2.00 pm for Grade 5.

Absenteeism of the staff including the volunteers further reduced the time available for teacher guided learning. Out of the five days of visits, there was

not a single day when both government appointed staff members were present in the school. There was a day on which both government teachers were absent and the volunteers were in-charge of the school. The two government teachers seemed to be functioning according to a mutually agreed schedule so that one of them could be away from the school while the other was in school. Even the attendance of the volunteers was also highly irregular. The principal once stated:

Riza went home last Friday and will return only tomorrow (Meaning Tuesday). Then I want to go to Colombo with my child to consult a doctor
(Field notes, 12/7/2000)

The following extracts from field notes illustrates the situation arising from teachers' absence:

Example 1

The principal who started working with Grade 5s after a month of absence said that due to her absence she found that performance levels of students to be very poor. She blamed the children for not studying. She told me that students were not afraid of anyone but her and they disregard the presence of the volunteer youth, because he is from the community.
(Field notes, 22/6/2000)

Example 2

On one day as the principal was away in Colombo with her sick daughter and both the volunteers were absent only Mr. Riza was in the school. Student attendance was high with 98 students: 40 in Grades 1, 33 in Grade 3 and 15 in Grade 4 and 10 in Grade 5. He said he is unable do any teaching by himself and only wrote on the respective blackboards the timetables of the coming tests for the students to copy.
(Field notes, 18/7/2000).

Early leaving and late arrival of staff members was also another regular feature. In addition to daily early closure of school, every Friday, Mr. Riza left the school by the second period in the morning for the weekend. He said he did this because on his way home he had to attend the midday prayers in the Mosque in the town.

From these examples it is seen how students, irrespective of the presence or absence of the teachers, had to frequently spend time idling in School 'B'.

6.2.3.4 Nature of activities and assignments

Assignments and activities observed were mainly based on mathematics and mother tongue textbooks. They frequently included reading from text, copy writing or doing sums. The range of laminated assignment cards stored in the resource cupboard looked very new, suggesting that they had hardly ever been used.

6.2.3.5 Curriculum content coverage

Mrs. Devarani and Mr. Riza considered that mathematics and mother tongue are two subjects that should be compulsorily taught to all children. Mr. Riza, although he was trained as an English teacher, taught Mathematics as well. Mrs. Devarani taught Mathematics and Tamil Language. While none of the teachers taught ERA, they often gave explanations on personal health and carried out morning physical exercises .

6.2.3.6 Lesson planning

Both Mrs. Devarani and Mr. Riza openly admitted that they neither planned lessons nor used syllabi-cum-teacher guides. Instructions were merely concerned with implementing assignments in mother tongue and mathematics textbooks. Mr. Riza was annoyed at the mentioning of lesson planning. He queried:

If we work according to a syllabus of one grade and try to implement it properly what will happen to the other children?

Neither of them had attended any in-service training sessions on the introduction of education reforms. They ignored guidelines related to reforms sent by the ZEO and were not particularly worried about it as they had already

informed the divisional director of education about the situation. They said the response they received from the ZEO was to carry out teaching in whatever manner possible.

6.2.4 Summary and lessons learned

The case study of School 'B' illustrated the status of teaching in a remote Tamil medium plantation school. The primary reason for multigrade teaching to become a necessity in this school was the shortage of teachers to fill the teacher cadre entitlement. Insufficient teacher residential quarters was said to be the key reason for unwillingness to serve in this school. The buildings available for grade groups were sufficient and student furniture was more than enough.

The government teachers were unable to address the demands of multigrade classes although both of them had been in School 'B' for over a decade under the same conditions. Observations revealed that they predominantly attempted to adopt the 'quasi monograde' approach to address each grade separately, and sometimes 'whole class' teaching to address several grade groups without differentiating the needs of the two grade levels.

Daily student absenteeism was as high as 40%, and one reason for this could be the poor quality of teaching. From the teachers' expressions it was evident that though the education officers were aware of the quality of teaching done, no remedial action had been carried out.

The absence of an incentive scheme for the teachers, who served the school in spite of the difficult conditions and personal problems, was a major demotivating factor. The teacher low morale has led to high teacher absenteeism. The teachers seemed to have an agreed pattern of being absent from school without systematic recording of leave obtained. One of the teachers was exploring ways to find another job.

The services of the volunteers seemed to be highly useful to the two government teachers as they could share the responsibilities of the school. The volunteers attempted to model some of the teaching approaches of the regular teachers and keep the students engaged in some writing activities. Although the lack of teachers in this school was a grave problem it is uncertain as to when remedial measures would be taken. Therefore the teachers who serve and will serve in schools similar to School 'B' should necessarily be equipped with multigrade teaching skills.

6.3 School 'C'

School 'C', a Type 2 school situated 10 km away from the main town of the education division could be accessed by public transport, but the journey to it was difficult as the road was hilly and curvy. The public bus service from the main town was irregular. It was classified as a 'difficult' school.

6.3.1 The students

This school was with multigrade teaching needs in both primary and secondary grades. The distribution of students by grade and tier is given in Table. 6.7

Table 6.7 Students in School 'C' by grades in June 2000

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

Table 6.7 shows that the student numbers in the secondary grades was small (17) when compared with the primary grades (61). The decline of student numbers in the upper grades had been aggravated in the recent past. Six students had dropped out since my first visit to the school for Phase 1:Step 1, which was about a month previously. The teachers predicted that this school would ultimately get closed down or become a primary school.

There were several reasons for the decline of student numbers. The first was the lack of mathematics and science teachers. The students who still attended the school expressed their frustrations over the teacher shortages. They pointed out that they had no other school to attend within a reasonable distance. The second was the consolidation of GCE (O/L) classes as a result of the rationalization and restructure programme. According to teachers, several students had dropped out since last year as they had thought the education provided by the school would be incomplete when it became a Junior School with grades 1-9. However, the principal indicated that some of the students who dropped out had been slow learners. He also admitted that he allowed the students who were very weak in their studies to leave the school.

The majority of the students who attended the school lived within a radius of 1 km or less from the school. This school having Grades 1 to 10 was the most accessible for them. The irregular transport facilities and the cost involved in commuting to the town schools prevented them attending the popular schools in the town. The number of applications for the next academic year for Grade 1 was 12, indicating a decline in primary student enrolment as well. .

6.3.2 The staff

The staff comprised of the principal and six teachers. Out of the six, three were assigned to the primary and the other three were assigned to secondary grades. According to the circular on teacher requirement, teacher entitlement for the primary grades was two, a primary teacher and an primary English teacher. Thus, there was an excess of one primary teacher and a shortage of a

primary English teacher at the time of observation. The secondary school teacher entitlement was three, for science/mathematics, English and other subjects. However, none of the three available teachers were in a position to teach science and mathematics. Although this school had a science and mathematics teacher in my Phase 1 visit she had left the school obtaining a transfer to a school of her choice. No replacement had been made although the principal and the staff continued to complain about the lack of a teacher for the two core subjects of the curriculum. All members of the staff except the principal and the English teacher lived in close proximity and hence did not encounter problems of transport.

The principal was a gentleman who had 26 years experience working in a range of schools in the same educational zone. He had only three more years to serve prior to reaching retirement age. His permanent residence was 18 km away from School 'C'. He was dissatisfied about his recent transfer to this school because of the difficulties involved in daily commuting. Although there were staff residential quarters, he was unwilling to make use of them as he felt that it was far better to commute daily and be with his family. Out of his years of service, he had spent 14 years in a school very close to his home from where he was transferred to this school.

Of the three teachers assigned to the primary, two were lady teachers. They had obtained training for primary teaching through the distance mode from the NIE. They had also followed all the in-service training for Grades 1 and 2 and were responsible for the two grades in School C. The multigrade teacher who had been present at the time this school was selected for Phase 1: Step 2 had just been transferred to another school. Thereafter, Mr. Vijaya who was the recent addition to the staff was given the responsibility for Grades 3 and 4.

Mr. Vijaya was a graduate teacher with 11 years of experience. He had been a secondary teacher for over five years at the National school in the town before he obtained a transfer to School 'C' as this was his home village. He was a past pupil of School 'C' in which he had his education up to G.C.E.(O/L). At

the time of the case study he had just commenced his training through the part-time post-graduate diploma course offered by the NIE.

6.3.3 Multigrade teaching

6.3.3.1 Organization of multigrade classes

School 'C' had two rectangular buildings situated on two elevations but close to each other. The building on the upper elevation had three separated classrooms of which some of the partitioning had crumbled. This building housed Grades 1, 2 and the multigrade class Grades 3+4. The open hall on the lower elevation housed the school office, the staffroom, and the classes from Grade 5 upwards. Except for Grade 3 and 4, all the other grade groups were physically organised separately.

According to the principal, the Grade 3+4 multigrade class was formed as a result of two reasons. The first was to allocate space for the Grades 1 and 2 to function separately under separate teachers, in accordance with the guidelines issued with the reforms implementation. The principal also indicated that two teachers were specially trained for the two grades by the in-service sessions. The second reason was to allow Grade 5 as a monograde class to be given extra attention to prepare the students for the Grade 5 scholarship examination, through which they could gain admission to a school with better facilities and also receive a bursary for their education.

However, Vijaya anticipated that assignment of two grades would be temporary. Further, he claimed that he was assigned to the Grade 4 by the principal, and since there was no teacher for Grade 3, opted to be responsible for the latter until a teacher was supplied to the school. Vijaya made the four students of the Grade 3 sit in a corner of the classroom, while the Grade 4 group was arranged in front, much closer to the teacher's desk.

6.3.3.2 Teaching approaches

Observations made on Vijaya's teaching (13/7/2000) illustrated the paradox between his explanations and actions. He conducted a mathematics lesson on the same topic for both grade groups.

He structured the lesson to introduce fractions according to the Grade 4 textbook, illustrating with diagrams on the chalkboard. The introductory examples included cutting a loaf of bread and a fruit into halves, which appeared simple and familiar enough even to be understood by the Grade 3 students. He reinforced the explanation by questioning and examples. This activity continued for little over a quarter of an hour.

In assigning exercises to the grade groups he first assigned an exercise to Grade 4 from the textbook to be completed individually. Next, he assigned four simpler problems for Grade 3 without referring to any curricular material. The smallness of the number of students in the multigrade class allowed him to correct all the books and to provide necessary feedback on an individual basis. He assigned more textbook-based sums for Grade 4 students as homework. The duration of the lesson was 45 minutes.

A similar strategy was adopted by Vijaya in teaching ERA (19/7/2000). He presented the same topic for both grades. He commenced the lesson with a general discussion on how water is polluted, and continued his explanation at a level suitable for both grades. The discussion went on for fifteen minutes. Thereafter, assignments were given to students. He asked the Grade 3s to write three ways of water pollution taking place while he wanted the Grade 5s to write five ways. The duration of the lesson was 30 minutes. However, the degree of participation obtained from Grade 3 students throughout the lesson was small.

An interview conducted later revealed that although he adopted whole class teaching with gradual advancement to suit the levels of both grades in his class, he did not believe that there could be a systematic way of doing it. He

was neither aware of the specific grade level objectives of the lesson for Grade 3 nor did he refer to Grade 3 syllabi. He indicated that the content would be completely different in each grade. He confessed that he usually did not do whole class teaching, and that he attempted to do the mathematics lesson for both Grade 3 and 4 together because the principal indicated that there was a researcher from the University coming to study about multigrade teaching of which he was unaware as he was absent on my first visit.

Perusal of student exercise books confirmed what he stated. Table 6.8 depicts the contents in student mathematics exercise books on two days, where work had been done for both the grades.

Table 6.8 Topics of lessons of Grade 3 and 4 on two days

<i>Day</i>	<i>Topics for Grade 3</i>	<i>Topics for Grade 4</i>
Day 'X'	Division	Addition
Day 'Y'	Problem solving	Identifying Sri Lankan currency

Table 6.8 illustrates that two different topics had been dealt with for the two grades during the two days. One pair consisted of 'division' and 'addition' while the other comprised of 'identifying Sri Lankan currency' and 'problem solving'. The problem solving activity was not related to 'currency'. It was not possible to extract more examples of teaching from student notebooks as they were undated and incomplete. However, not a single example could be found where teachers implemented the same topic for both grades.

6.3.3.3 Time for teacher guided learning

The time for teacher guided learning for Grades 3+4 was found to be impossible to calculate because of the large amounts of time that students idled daily due to teacher absenteeism and lack of alternative measures to compensate. The Grade 3+4 multigrade teacher was absent on two days out of

the five days of observation. The principal explained that it was impossible to make any alternative measures to cover for teacher absenteeism, as there was a severe shortage of staff.

Although all the teachers complained to me about their personal teaching workload, the observations were contradictory. The principal who came late to school almost every day due to problems of transport, hardly engaged in teaching. Although he said that he was in-charge of Grade 5, he either spent most of his time seated in the office with an empty desk surface, or discussing about developing the buildings of the school with a teacher who happened to be also idling at that time. As a routine in the school hardly any work was done after the interval.

6.3.3.4 Nature of activities and assignments

Observations on the teaching-learning process revealed that the assignments and activities given by the multigrade teacher for mathematics was mainly based on textbook for mathematics. ERA assignments were based on Grade 4 teacher guide. The same assignment was simplified for Grade 3. Vijaya said that he obtains participation of Grade 3 students and tries to do some activities for them.

6.3.3.5 Coverage of content

Vijaya stated that he makes an attempt to teach all the subjects for the Grade 4. Though he did not recognize himself as responsible for completing the syllabi of Grade 3 he indicated that he has to face the problem of lack of time to cover the topics, as the former teacher had left school without covering a sufficient number of lessons.

6.3.3.6 Lesson planning

In planning the lessons Vijaya consulted the Grade 4 teacher guide occasionally to get an idea about the assigned content. However, in teaching mathematics he mainly depended on the textbook. He never had consulted the Grade 3 syllabus. He further indicated that he attempted to plan the lessons in his mind although did not write any lesson notes. However, his high rate of absenteeism showed that his actions contradicted his explanations.

6.3.3.7 Problems of the multigrade teacher

The major problem faced by Vijaya as a multigrade teacher was that he did not recognize himself as a multigrade teacher. He wanted to become a monograde teacher and give up Grade 3. The other problem was the difficulties he faced due to unfamiliarity with the curricular content across the primary grade span and lack of any training for primary teaching as he had been a secondary level teacher.

6.3.4 Summary and lessons learned

School 'C' belonged to the category of multigrade schools with both primary and secondary grades, and contained multigrade needs in both grade spans. However, the nature of the prevalence of the multigrade teaching needs in School 'C' was not clearly visible from a simple indicator such as 'having five or less teachers' The school had seven teachers inclusive of the principal.

Out of the ten grades in the school only the Grades 1 and 2 seemed to function somewhat systematically, as each grade group had a teacher on a fixed basis to enable monograde teaching. However, one could question the usefulness of this teacher assignment. On the one hand, these grade groups functioned at the expense of other grades, especially the Grade 5 which did not have a permanent teacher; while on the other, the students of Grade 1 and/or 2 would have to function compulsorily in a multigrade structure in the next year due to

the lack of teachers, and hence, there seemed to be no special reason for those grades to function as monogrades.

The case study on School 'C' revealed the realities of multigrade teaching in a primary multigrade class. The Grades 3+4 were not recognised as a multigrade class but as a temporary arrangement until a teacher was transferred in. It seems that case study visits to the school influenced the teacher's attempts to handle the multigrade class. He was making attempts to teach the two grades together without letting one grade group idle. The teacher needed curricular knowledge for him to realise possibilities of addressing multigrade classes in a systematic way.

On the whole, the school seemed to be malfunctioning, with increasing rates of student dropping out due to poor teaching quality, high rates of teacher absenteeism, teacher and student demotivation, and pessimistic attitudes about the future of the school.

6.4 Cross case analysis

A cross-case analysis was carried out to draw out both case-specific and common-across-cases data, in order to ascertain the existing status of multigrade practice. The analysis was done step-wise. First, was to analyse how contextual factors influenced multigrade practice.

6.4.1 Influence of school context factors on teaching

Contextual characteristics of the three case schools are presented in Figure 6.2.

Figure 6.2 Contextual characteristics of three case study schools

<i>School A</i>	<i>School B</i>	<i>School C</i>
<p><u>1. Location and access</u></p> <p>* Isolated. Situated within large plantation of tea and rubber. * Access is difficult to due to difficult terrain and poor transport services</p>		
<p><u>2. School type and medium</u></p> <p>* Type 3 (Sinhala) * Type 3 (Tamil) * Type 2 (Sinhala)</p>		
<p><u>3. Buildings and furniture</u></p> <p>* Classroom space and furniture adequate for students</p>		
<p>* Teachers' residential facility unsatisfactory.</p>	<p>* Teachers' residential facility inadequate to accommodate all who needed such facility.</p>	<p>* Residential facility not needed for the staff.</p>
<p><u>4. Community</u></p>		
<p>* Sinhala ethnic group. Unskilled plantation labourers</p>	<p>* Tamil ethnic group. Unskilled plantation labourers. A minority are in foreign employment in the middle-eastern countries.</p>	<p>* A mixed group of unskilled, semi-skilled plantation workers, small-scale traders and tea small holders.</p>
<p>* Keen to see that the village school functions well. * Support the principal in appealing for more teachers,</p>		
	<p>* Community youth participated in teaching as volunteers.</p>	

The study of the contextual features enabled me to understand how they affected multigrade teaching. The first, school location and access was a major

factor that affected teaching in all three schools. The access difficulties faced by the teachers who travelled to the village influenced teaching in the following manner:

- physical fatigue
- low attendance and loss of teaching time
- dissatisfaction caused by poor basic facilities

The teachers who were residing within close proximity of the schools also were adversely affected by the distance to the urban centre and this led to high absenteeism rates of teachers. The teachers went out of school to visit the urban centre for the following reasons:

- to obtain banking, medical and services from government offices.
- to visit the education office to resolve official and personal problems

School location and access influenced the process of supervision as well. The officers from the divisional or zonal office supervised none of the three schools regularly. The main reason for lack of supervision was the difficulty of access. Teachers were in isolation without any feedback and support which contributed to demoralisation.

Second, in terms of the school type and medium of instruction, it could be noted that both Type 3 and Type 2 schools and schools of both media faced problems of effective organisation in multigrade teaching situations.

The third contextual factor was the physical plant of the schools. The nature of the school building did not create any problems for teaching, as all three schools had unpartitioned, halls, which were considered by the teachers themselves as helpful for multigrade teaching. However, the unsatisfactory teacher residential facilities gave rise to problems of dissatisfaction and demoralisation of the teachers.

The fourth factor is the influence of the community on multigrade teaching. According to the staff members, the communities of all the three schools were

concerned about the lack of a teacher per grade. Participation of volunteers in teaching activities by invitation of the principal was a positive indication of community involvement.

Conclusions arrived at regarding the influence of contextual factors are as follows:

- since a majority of schools with multigrade teaching needs were faced with a range of contextual difficulties, most of the teachers were reluctant to serve in them.
- quality of teaching was affected by the difficulties the teachers had to face in accessing the schools and/or urban centres.
- the need for teacher motivation through supervision and incentives.
- the need for basic infrastructure facilities, especially residential facilities for teachers.
- the need for more appropriate utilisation of community resources such as volunteer teachers.

6.4 2 Quality of multigrade practice

In the three schools principals were found to be ineffective in managing the specific multigrade situations. Several aspects influenced their ineffectiveness in managing multigrade situations. First was the bias they showed towards maintaining monograde teaching. Second was the handing over of the responsibility of multigrade classes to inexperienced volunteers, while experienced regular teachers were given monograde classes. Third was the high frequency of their absenteeism. Fourth, was the fact that they themselves were required to function as multigrade teachers. Thus, principals needed awareness in effective management of multigrade situations.

When student number and teacher number are taken together, the sizes of the grade groups varied widely within as well as across schools due to the fluctuating enrolment trends. The teacher-pupil ratios of the three schools were 1:23, 1:65 and 1:8 respectively. However, when considering issues such

as the number of students in each grade group, the number of grade groups per teacher, teacher absenteeism etc, it is apparent that the teacher-pupil ratios, which were often fluctuating, do not represent the real state of multigrade teaching that prevailed in the three schools.

In Schools 'A' and 'B', the most frequent strategy adopted was 'quasi-monograde' teaching. Teaching in School 'C' with a whole class approach seemed somewhat more effective than in the others, as students in both grade groups were addressed by the teacher simultaneously with the same lesson topic. However, the teacher was unaware of the possibilities of teaching the two grades together, but did it accidentally in good faith to accommodate the grade group that was assigned to him until a teacher was transferred in.

In spite of the different modes of professional teacher training which the teachers have had they all faced same difficulties in addressing multigrade teaching.

The teachers did not use syllabi and teacher guides even though they approached the grades one by one in a quasi-monograde approach. The activities were spontaneously initiated and ended when they came to a natural halt or when teachers or students deviated from them. The absence of a working timetable was obvious in all three schools. The daily routine was highly flexible, and could be referred as 'fluid', unsystematic or ad hoc. In all three schools at the beginning of the school day there was some enthusiasm and order. However, after a short time from the commencement of the school, the activities became ad hoc and unsystematic.

6.4.3 Outcomes of adopting 'quasi-monograde' approach

Observations revealed that the quasi-monograde approach failed to address the challenges of teaching in multigrade classes. The outcomes of adopting 'quasi-monograde' approach are as follows:

- **Limitations imposed on teacher guided learning**

Management of time distribution for different grade groups was a problem faced by multigrade teachers when adopting the 'quasi-monograde' approach. The time available for teacher-guided learning for each grade was dependent on the number of grade groups the teacher was responsible for at a particular time. Thus, a large proportion of instructional time in each grade was spent without any teacher guidance.

- **High degree of student idle time**

During quasi-monograde teaching the time the students were expected to engage themselves in self-learning activities was high because the time available for teacher guided learning was limited. However, the teachers were unable to keep them occupied for any length of time with the activities assigned. In spite of the students being assigned with work they either idled or abandoned the work. The reasons for abandoning the work assigned were numerous. However, the most predominant was the uninteresting nature of the activities assigned.

- **Incomplete lessons leading to fragmented learning**

Though mathematics and mother tongue are the two main subjects taught in multigrade classes, there were hardly any complete lessons among those observed, which focused towards concept building in students. By way of adopting quasi-monograde teaching, lessons in mathematics were limited to brief explanations of an example in the textbook. Teaching of the mother tongue was done mainly by silent reading, copy writing, and/or other such uninteresting simple assignments. This kind of unplanned quasi-monograde teaching did not produce any consistent learning.

- **Incomplete coverage of curriculum content**

In adopting quasi-monograde teaching teachers failed to implement the curriculum, at least, to a satisfactorily systematic degree. Teaching hardly progressed towards covering the syllabi, but stagnated around a few topics. The effective delivery of the full breadth of the curriculum was a challenge not truly met by adopting this approach

- **Lack of opportunities for peer tutoring across grades**

Multigrade teaching carried out in a quasi-monograde approach, in a setting where each grade group was physically separated from others, prevented any scaffolding across students in different grades. Often each grade group was instructed on a different subject and students engaged in activities pertaining to different subjects.

- **Demotivation of students**

Inconsistent teaching, lack of continuity of learning and passive teaching-learning was observed to be demoralising students. This was reflected through lack of enthusiasm shown to complete the assigned work; high rates of absenteeism and increasing student drop out.

- **Teacher exhaustion and demoralisation**

Attempting to teach grade-by-grade was found to be exhausting for the teachers. Added to exhaustion, none of the teachers felt satisfied about their teaching. They were confused about the conditions of teaching that they had to face. As time passed, teachers seem to get further demoralised and demotivated and appeared to become ineffective as teachers.

6.4.4 Unexploited resources and opportunities

There were several resources and opportunities which were not exploited by the multigrade teachers, as observed in the three schools.

(1) Student capacities for self-learning

In all three schools, students showed capacities for self-motivation and self-learning which teachers did not seem to notice and appreciate. Several examples of this could be given to illustrate the self-motivation in the majority of the students:

- Attending school even with minimum hope of receiving teacher guided learning
- Eagerly waiting for instructions after the completion of morning assembly.
- Continued engagement in assigned tasks, at least, for short periods of time, in spite of the delay or absence of feedback from teachers
- Coping with the changing circumstances in learning-teaching situations.
- Eagerness shown to get their work assessed by the teachers

If any improvement is to be made in the teaching-learning in multigrade classes teachers need to encourage student engagement in self-learning activities accompanied with peer learning.

(2) Movable furniture and un-partitioned hall type classes

The open hall type classes and the movable furniture bear a high resource value in multigrade teaching situations, as changes in physical arrangements could make the teaching-learning environment more effective to suit the specific needs of a given situation. However, none of the teachers made attempts to change the physical structure to deviate from the monograde class arrangement.

(3) More effective utilisation of the services of volunteers

The prevailing practice is to assign volunteers with the total responsibility for grade groups. This is non-productive as well as harmful. Their services could be more effectively utilised by assigning them with supportive tasks which they could accomplish willingly and confidently.

6.5 Summing up conclusion

The analysis of the three cases indicates that there is an urgent need for equipping teachers with multigrade teaching skills. The students in multigrade contexts are subjected to low quality education. The reforms in primary education have failed to focus attention on improving the quality of teaching in multigrade teaching contexts. The case studies show the crying need for an immediate intervention to change the prevailing poor state of multigrade teaching.

CHAPTER 7

AN INNOVATION FOR MULTIGRADE TEACHING THROUGH CURRICULUM ADAPTATION

This chapter incorporates Step 1 of Phase 2 of the action research which addresses the research question, “*What innovations could be planned to improve multigrade teaching?*” The discussion on the development of the innovation to improve multigrade teaching is included in this chapter.

7.1 Plan for developing an innovation

The two Steps of Phase 1 revealed that in spite of the fact that the majority of the multigrade teachers were trained teachers, the quality of teaching in multigrade classes was poor. Observations of teaching and as well as interviews with teachers revealed the grave need for support in addressing multigrade teaching. Thus, the plan for Phase 2: Step 1 included the following:

- Activity 1: Reviewing the pedagogical needs of teachers based on Phase 1: Step 2
- Activity 2: Based on the needs exposed in activity 1, planning an innovative strategy for multigrade teaching

Planning was to be carried out in the months of October, November and December, 2000.

7.2 Activity 1: Reviewing the pedagogical needs based on Phase 1: Step 2

Review of the pedagogical needs of multigrade teachers revealed that teachers needed awareness about systematic strategies to address multigrade classes. The observed multigrade teaching was unsystematic due to non-use of teacher guides, absence of lesson planning, and non-coverage of curricular content of the respective grades. A typical question raised by teachers was, ‘If we set out to plan and do a lesson for one grade group, then what would happen to others?’ The findings revealed that teachers hardly used syllabi or the teacher

guide in planning lessons. Only one teacher indicated that he browsed the syllabi occasionally to implement a lesson.

The quasi-monograde approach and the whole-class approach were the multigrade approaches adopted by teachers. Neither of the two approaches was effective, either in terms of delivering the curriculum content to grade groups of multigrade classes or in utilising time to engage students in productive work. These aspects pointed to the need for a systematic approach to lesson planning and implementing the curriculum in multigrade teaching situations.

Teachers were familiar with the contexts and were trained in content and general pedagogy for teaching in monograde classes. However, the teachers were neither able to adapt monograde curricula in spite of their availability nor utilise the potential of the learners although the students exhibited willingness for self-learning.

The above findings are consistent with some of the categories of teacher knowledge analysed by Shulman (1986: 8). Categories congruent in particular are:

- General pedagogical knowledge, with special reference to broad principles and strategies of classroom management and organisation that appear to transcend subject matter
- Curricular knowledge, with particular grasp of the materials and programmes that arise as 'tools of the trade' for teachers.
- Pedagogical content knowledge, the special amalgam of content and pedagogy.

When comparing the findings and literature, the key need of the multigrade teachers was for support for acquisition of skills to address multigrade classes through adaptation of monograde curricula.

7.3 Activity 2: Planning an innovative strategy for multigrade teaching

Planning an innovative strategy to support multigrade teaching was the main activity in Phase 2: Step 1. It involved several sub-steps such as a preliminary analysis of the structure of the primary curriculum, the construction of a rationale to justify the selection of mathematics as the subject for an action research innovation and an analysis of primary mathematics curriculum.

7.3.1 Analysis of the primary curriculum structure

In planning an innovative strategy for multigrade teaching, the initial requirement was to address the challenge of adapting the monograde curriculum to multigrade situations. For this it was necessary to understand the structure and organisation of the graded-curriculum. The primary curriculum has a one-year graded structure. This section presents an analysis of the framework of the primary curriculum as a continuation to the introduction presented in Chapter 3, section 3.7, pp.74-76..

This discussion lays emphasis on the new curriculum under reform to explore the possibilities and strategies of adaptation to suit the needs of multigrade teaching. Nevertheless, the curriculum reform process was an added challenge in developing an innovative strategy for multigrade teaching because at that time the introduction of the new curricula had only been partly completed. Complete revisions had only been made in Grades 1 and 2 curricula at the time of planning the innovation, while the new curriculum of Grade 3 was nearing completion. By then reforms to Grades 4 and 5 curricula had not yet begun. However, in analysing the curriculum both new and old curricula were taken into consideration because multigrade classes in schools comprised of combinations of grades comprising both revised and un-revised curricula.

7.3.1.1 The model of the primary curriculum

The primary curriculum of Sri Lanka has been constructed by setting objectives that were capable of evaluation. Hence, it conforms to the ‘objectives-driven’ curriculum model by Tyler (1949 cited in Ross, 2000: 118). The new primary curriculum sets its objectives on a long-term basis while an additional term gives more specific indications to outcomes of the curriculum implementation at each grade level. This ‘competency-based’ curriculum could be considered as an extension of an ‘objectives-based’ curriculum.

7.3.1.2 Subject areas in the primary curriculum

Both the former and the new primary curricula in Sri Lanka, conform to the ‘subject-based’ structure. The new curriculum encompasses four core subject areas: the first-language, mathematics, environment-related activities and religion. Besides the emphasis laid on these core subjects, the curriculum reformers focussed attention on promotion and encouragement of inter-subject and intra-subject integration. The units of knowledge and their relative strengths of the boundaries need to be considered in analysing the nature of the curricula. (Ross, 2000: 97). However, conducting such in-depth analysis was not feasible due to the lack of documents related to construction of the curricula.

7.3.1.3 Teaching methods

The forms of instruction recommended for implementation of the ‘competency-based’ curriculum are ‘guided-play’, ‘activities’ and ‘deskwork’. A mix of guided-play and activities is promoted in the KS1, while a mix of activities and deskwork is promoted for KS2 and KS3 in varying proportions.

7.3.1.4 Assessment

Continuous classroom-based assessment is recommended by the curriculum reform where increased emphasis has been placed on informal methods of assessment. Teachers are encouraged to gather information on students' learning during the teaching-learning process. In addition, teachers are informed that teacher-made tests could be implemented whenever written tests are administered.

The assessment procedure is based on 'essential' and 'desired' learning competencies specified for each key stage. Teachers are expected to ensure that a majority of students attain mastery on essential learning competencies (ELCs) of a particular KS. This process is considered as enabling teachers to assess the degree of success achieved by the students, and to take corrective measures.

7.3.1.5 Instructional time

According to the national curriculum guidelines, schools' hours are specified according to KS. For KS1, four hours, for KS 2 five and a half-hours and for KS 3 six hours. Specific time durations for each subject are given in Appendix 4 (p. 338).

7.3.2 Rationale for selecting mathematics for planning innovation

In planning the innovative strategy for multigrade teaching it was felt necessary to limit the focus to one subject area. Based on this necessity mathematics was selected as the subject area. There were two major reasons for selecting mathematics as the particular subject area. The first was the fact that, as revealed by Phase 1 of the study, mathematics was found to be given priority by all multigrade teachers. The second was the widely reported problem situation in mathematics in the education system, especially in the rural areas.

Two major studies of primary mathematics in Sri Lanka were reviewed to analyse teaching and learning of primary mathematics at the time of planning the intervention. The first was a cross-sectional study by Nanayakkara (1994) on factors for low achievement in mathematics of primary students in Sri Lanka. The study has revealed the existence of a wide disparity between urban and rural pupils in mathematics achievement. The reasons for this low achievement had been identified and divided into several categories. The first category included student-related reasons such as parental economic poverty in underprivileged rural areas, lack of parental support for academic work, student absenteeism and lack of basic skills in reading and comprehension. The second category included teacher-related reasons such as the lack of proper training, late attendance to school and high rates of absenteeism from school. The third category included factors related to instruction, such as ineffective use of teaching time, use of teaching approaches inappropriate to promote meaningful learning, the minimal use of teaching aids other than the blackboard, and a high level of teacher-centred approaches. The researcher had also noted the excessive use of teacher domination in preparing students for the Grade 5 scholarship examination. The study included directives to improve in-service teacher training, focusing on content, pedagogy, text books and assessment techniques. The researcher has recommended individualised instruction, peer and cross-age tutoring and small group instruction. The fourth category comprised classroom-related physical reasons such as non-availability of classrooms and lack of space due to large class sizes. The study also revealed that the mathematics textbooks which were in use needed to be revised as they contained factual inaccuracies and inappropriate illustrations as well as being poor in concept representations. However, these mathematics textbooks were found to be widely used by the Sri Lankan teachers.

The second major study was the National Basic Mathematics Survey of Sri Lanka conducted by Primary Mathematics Project (PMP) in 1998-99. For this survey 65 Sinhala medium schools, 20 Tamil medium schools, and 242 teachers of Grades 3, 5 and 7 and students of the respective teachers were studied. The student achievement outcomes of this survey indicated that the students did not show the mastery levels desired for each grade. Observations

of teaching revealed the following: actual time spent on mathematics teaching was low, review of previous lessons was not done before starting a lesson, higher cognitive level questions and one-to-one mathematics conversations were rare. In addition to these, overcrowded classrooms, lack of teachers and poor attendance of students were found to be other factors contributing to low student achievement. Other findings were that comparatively high scoring education zones did not necessarily have a high incidence of small classes and a majority of the high scoring classes had over 30 students. The survey also revealed that low language ability was one of the major hindrances for mathematics achievement.

The two studies (Nanayakkara, 1994, and PMP, 1998-99) indicate low mathematics achievement levels. They, however, do not make special reference to any multigrade teaching situations in their samples. Nevertheless, when compared with the findings of Phase 1: Step 1 of the present study the majority of the reasons mentioned in the above studies for low achievement are common to multigrade settings as well.

7.3.3 Analysis of primary mathematics curriculum

The primary mathematics curriculum development was the responsibility of the mathematics curriculum development team of the Primary Education Department of the NIE until 1998. Thereafter it became the responsibility of the Primary Mathematics Project (PMP) which was initiated as a supportive project with the sponsorship of the Department for International Development (DFID), United Kingdom (PMP, 1998:13). The PMP was led by a team of Sri Lankan and British specialists in mathematics education that directed its activities to reform of the primary mathematics curriculum and teacher development programmes.

To understand the structure of the mathematics curriculum, I made attempts to analyse curriculum-related documents produced by the NIE and to interview two curriculum developers of the mathematics team.

A discussion document by the Director, Primary Education, NIE (Nanayakkara, 1996) indicated that the primary curriculum is constructed in a spiralling structure, where each theme is visited and revisited several times while increasing its depth during an academic year as well as throughout the primary cycle. This spiralling structure is visible when objectives of content are arranged across the grades. An example from PMP curricular materials is given in Appendix 5, p.339.

The mathematics curriculum content has a topical organisation within the one year graded structure. Figure 7.1 shows that the scope of the content for the five grades is centred around eight broad topics and 26 specific topics. It illustrates the topics addressed in each of the five grades by 'X' marks.

Figure 7.1 Curriculum Blueprint for Mathematics Grade 1 to 5, 1999

Broad topic	Specific topic	KS1		KS2		KS3
		Gr1	Gr2	Gr3	Gr4	Gr5
<i>Pre-number concepts</i>	Sorting	X	X	-	-	-
	One-to-one correspondence	X	-	-	-	-
	Ordering	X	X			
<i>Number</i>	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
<i>Mathematical operations</i>	Addition	X	X	X	X	X
	Subtraction	-	X	X	X	X
	Multiplication	-	-	X	X	X
	Division	-	-	X	X	X
<i>Measurement</i>	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
<i>Money</i>	Identification and transaction	-	X	X	X	X
<i>Shapes and space</i>	Solids and plane figures	X	X	X	X	X
	Right angle	-	-	-	X	X
	Directions	-	-	X	X	X
	Spatial concepts	X	X	X	X	X
<i>Data handling</i>	Tables and Graphs	-	-	X	X	X
		12	14	16	20	20

Source: Primary Mathematics Project, Sri Lanka (1999)

According to figure 7.1, there are 15 topics for Grade 1, 14 for Grade 2, 17 for Grade 3, 21 each for Grade 4 and 5. The distribution of topics shows three patterns across the grades. First, certain topics are found to be addressed only in the KS1 and these could be considered as pre-mathematical competencies. They are namely, pre-number concepts and counting. Second, there are some topics addressed across the entire range of the primary grade span. They are namely, number concepts, number patterns, addition, subtraction, measurement (length, distance, volume, and time), money, solids, plane figures and spatial concepts. Third, there are some topics that need higher thinking skills and hence, are arranged in the second and third key stages. They include fractions, decimals, Roman numerals, multiplication, division, measurement of area, directions, right angle, tables, graphs and problem-solving. However, the documents were not comprehensive enough to make a full study of the structure of the primary mathematics curriculum.

7.3.4 Curriculum materials

The curricular materials which had been produced for primary mathematics teaching were the syllabi, the teacher guides, student textbooks and student workbooks. These had been structured on a grade-wise format. A mathematics resource book had also been developed for teachers in Grade 2 which provided the teachers with extra support. All curricular materials were in both national languages, Sinhala and Tamil.

At the time of Phase 1 of the present study, the Grades 1 and 2 were required to implement the revised syllabi with new curricular materials. The implementation of the Grade 3 revised syllabus coincided with the Phase 2: Step 2 of the study, and the Grades 4 and 5 continued to implement the earlier versions of the curriculum as revisions were yet to be made.

Since the establishment of the PMP, the syllabi-cum-teacher guides were laid out on a new format and were published as a separate document while other subjects' documents were published in a single volume. The structure of the

mathematics syllabi-cum-teacher guides consisted of weekly programmes giving five lesson plans for a topic for each week. The new format of the syllabi-cum-teacher guide was designed to provide guidance for teachers through a series of detailed lesson plans (NIE, 2001). The format included the following:

- Lesson unit title for each grade
- Lesson title for each grade
- Time duration for the lesson
- A clear statement of the lesson objectives
- A full list of the teaching resources required
- Essential mathematical vocabulary to be taught and explained to pupils
- Suitable introductory activities to teach the pupils the concepts involved in the lesson
- Activities and mathematical games for group work to consolidate pupils' learning
- Extension activities for fast learners and suggestions for the support of slow learners
- Suggestions for assessment and follow-up work to ensure that pupils have learned and understood the concepts used.

An example of a lesson plan from Grade 3 teacher guide is attached in Appendix 6, p.340.

7.4 An innovative strategy for multigrade teaching

The objective of planning an innovative strategy for multigrade teaching was to enable simultaneous instruction across more than one grade group or ability group within a multigrade class. A lesson planning strategy was developed in collaboration with the primary mathematics curriculum developers of the NIE and the London supervisor. The development of the strategy was influenced by the experimental approach on spiral curriculum by Laukkanen and Selventoinen (1978) and whole-class approach' by Mason and Burns (1996:36-43) reviewed in Chapter 2, section 2.3.1, pp. 41-42.

The innovative strategy for lesson planning and implementation of multigrade teaching incorporated the following sequence of activities:

1. Familiarising myself/teachers with the subject content of the graded syllabi pertaining to the grade combination of the multigrade class.
2. Selecting similar topics from the graded syllabi of the grade combination.
3. Selecting the objectives under the specific topics to be covered for each grade.
4. Re-sequencing the two or more sets of objectives selected from different grades in a logical sequence where a gradual advancement of the lesson could take place.
5. Clustering the re-sequenced objectives for a suitable number of lessons considering time allocations and students' ability levels.
6. Organising the content of the re-sequenced objectives to include an introduction to the lesson at a level suitable for grade combination, and to develop the lesson deviating sequentially to meet different needs of grade levels.
7. Allocating suitable assignments for different grades/ ability levels.
8. Concluding the lesson by directing the students of different grades to extend their learning depending on their different levels.

The anticipated advantages of the innovative strategy were as follows:

1. Student-related advantages

- Being subjected to teacher-guided learning would reduce idling time.
- Obtaining consistent and more systematic learning
- Becoming more motivated to attend school regularly and participate in learning activities

2. Teacher-related advantages

- Becoming less exhausted in teaching
- Becoming able to effectively manage more than one grade at a given time
- Becoming motivated and satisfied both professionally and personally.

7.5 Summary

This chapter presented the process of development of an innovative strategy for multigrade teaching. Mathematics was the subject selected to develop the innovation. The structure of mathematics curricula was analysed in order to understand the possibility of planning lessons through curriculum adaptation and address the issue of instructing more than one grade at a time. The innovative strategy thus developed included a series of activities leading to a lesson planning innovation where a multigrade lesson on a single topic could be implemented in more than one grade simultaneously. Lessons thus planned were anticipated to be more advantageous for both the teacher and the learner.

CHAPTER 8

INTERVENTION THROUGH COLLABORATION

This chapter presents Phase 2: Step 2 of the action research, which addressed the research question, “*What is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?*” The aim of this step was to implement the innovative strategy for multigrade teaching developed in Phase 2: Step 1 through a collaborative model between the researcher and multigrade teachers.

Phase 2: Step 2 describes a small-scale intervention carried out with a group of multigrade teachers in ten schools of Deraniyagala education division. The term ‘intervention’ is used to refer to the ‘systematic commitment’ of the researcher and a group of 18 teachers, towards a positive change in the quality of multigrade practice adopting the innovative strategy described in Chapter 7.

The intervention was made in two cycles, each comprising four stages: (i)planning, (ii)action, (iii)monitoring with facilitation, and (iv)reflection. The chapter presents these stages of the Cycles 1 and 2.

8.1 Assessing my ability for initiating the intervention

I realised the challenge of initiating the intervention through the literature on action research. My visualisation of the role of the facilitator included dimensions of a change-agent, a co-ordinator, a co-worker, a convener, an evaluator, a critical friend, a mentor, a teacher educator and a mediator. Thus, I made a self-assessment of my values, strengths and weaknesses in this regard. Self-assessment brought out the following as my strengths:

- Familiarity gained on the physical characteristics of the sample area through living in the area during data collection.

- The insight developed on the contexts of multigrade teaching through the analysis of a range of multigrade contexts during the two steps of Phase 1.
- The commitment within me to make an effort to enhance access to good quality education for a rural student population who are compelled to face multigrade teaching-learning situations.
- The understanding obtained through the systematic study of the pedagogical needs of multigrade teachers.
- The consent obtained from multigrade teachers and other stakeholders to participate in the intervention, through winning their confidence.
- The insights gained through literature and visits to multigrade contexts in Wales, Vietnam and Peru, and participating in workshops and conferences on multigrade teaching as a member of the research team of the international project on multigrade teaching.
- The promise of support by colleagues for the intervention.

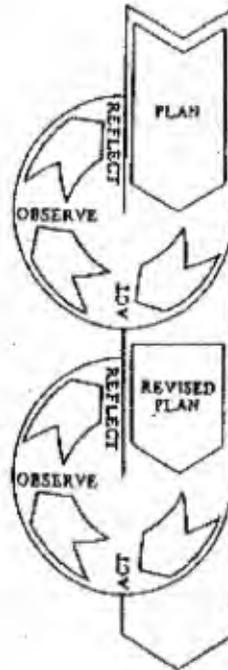
The confidence I gained along with the support from practitioners, stakeholders and colleagues led me to embark on the intervention with determination and positive thoughts.

8.2 Plan for intervention

The objective of the intervention was to implement the innovative teaching strategy for multigrade teaching with a group of teachers with a view to making an improvement in their multigrade practice. Planning of the approach for teacher development through collaboration was influenced by the Escuela Nueva teacher in-service training strategy in Colombia reviewed in Chapter 2 section 2.4, p.45. Features such as teacher learning groups, reflecting on practice, participatory observation and workshops were adopted in preparing the plan. Each loop of the self-reflective spiral proposed by Kemmis and Mc Taggart (1988) comprised plan, act, observe, reflect (Figure 8.1). This basic structure was useful in developing the intervention model. The field plan for intervention was developed as two cycles emerging from the overall action

research (see Chapter 1, Figure 1.1, p. 32). The four corresponding stages in the intervention were: (i) planning, (ii) action, (iii) monitoring with facilitation and (iv) reflection. Cycle 2 commenced with re-planning based on the reflections made in Cycle 1 and thereafter proceeded with action, monitoring with facilitation, and reflection.

Figure 8.1 Self-reflective spiral of action research by Kemmis and Mc Taggart (1988)



8.3 Cycle 1 of the intervention

The intervention commenced in January 2001. The efforts made until July 2001, which was the end of the second term of the annual school calendar, were considered as Cycle 1. The activities planned for Cycle 1 are given in Figure 8.2. This was the provisional plan for intervention. The plan was considered as flexible, to allow for changes to be incorporated during the intervention.

Figure 8.2 The plan for Cycle 1 of the intervention

- **Stage 1: Planning and setting the context**
 - Activity 1- Negotiation with the principals and extending invitations to the teachers to participate in the intervention
 - Activity 2- Making field arrangements
 - Activity 3- Pre-briefing the co-facilitator on the approach for intervention
 - Activity 4- Deciding on data generation and record keeping

- **Stage 2: Action**
 - Activity 1- Inauguration and bringing the intervention group together
 - Activity 2- Introducing the innovation to teachers at a workshop
 - Activity 3- First attempts at implementing the innovative strategy by the teachers in their own classes

- **Stage 3 : Monitoring with facilitation**
 - Activity 1- School visits by the researcher for monitoring and facilitation
 - Activity 2- Workshops for review and facilitation

- **Stage 4: Inviting reflections and re-planning for improving the intervention**
 - Activity 1- Inviting reflections on the intervention from teachers
 - Activity 2- Researcher's reflections and re-planning for improving the intervention

8.3.1 Stage 1: Planning and setting the context

Four activities in planning and setting the context for the intervention are given in the following sections.

8.3.1.1 Stage 1: Activity 1: Negotiation with the principals and extending invitations to the teachers to participate in the intervention

The discussions with the London Supervisor led me to invite a group of about 15 multigrade teachers for the intervention. A series of school visits were made during January and February 2001 in order to negotiate with the principals on the inclusion of their schools in the intervention. It was encouraging from the beginning as the principals of the first 10 schools visited expressed their willingness to participate in the intervention. These schools were termed in the study as the 'intervention schools'. I confined the intervention to Sinhala medium schools because my knowledge of Tamil was poor. Finally, a team was constituted of 18 teachers who were willing to participate as members of the intervention group. Out of them three were members of the community who were serving as volunteers in two of the selected schools. The remaining 15 were government appointed teachers. Although the principals were keener on involving permanent teachers than volunteers in the intervention, I decided to include the volunteers as they were responsible for multigrade teaching in their schools.

Other than the willingness of the teachers to participate in the intervention, two more criteria were considered in the selection of teachers. Firstly, it was the likelihood of a particular teacher serving in the same school throughout the academic year. Secondly, I selected teachers of Grades 3, 4 and 5 as far as possible so that it would help to limit the possible variables coming in the way of the intervention. However, the latter criterion could not be strictly considered due to the following reasons:

1. The closely knit social climate of the schools made it difficult to select only the teacher/s who handled Grade 3, 4 and 5, when the other primary teacher/s were also willing to participate in the intervention.

2. There were situations where grade combinations included Grades 1 and/or 2 with Grade 3, 4, or 5 and it was not suitable to eliminate that teacher. Two examples were Grades 1+4 and 2+3.
3. In certain instances, Grades 3, 4 and 5 were handled as multigrade classes by volunteers and Grades 1 and 2 were handled as monogrades by government appointed teachers. It then became necessary to include the latter category as well, as it was felt that it would help in developing a better team effort to approach multigrade teaching.

The descriptions of the sample of teachers are given in Table 8.1. The names of the teachers are fictitious. Table 8.1 shows the age, gender, experience, training, responsible grade groups and the number of students in each grade, of the teachers who participated in the intervention from the 10 schools. These 18 teachers comprised 11 females and 7 males. The majority had obtained their training at the NIE on the distance mode specialising in teaching to primary grades. Only one government teacher did not possess any training certificate. The teaching experience of the sample of teachers ranged from 1 to 23 years. In some of the schools the teachers were given responsibilities for fixed grade combinations, whereas in some other schools there was no such limitation. As the Table shows, there is a marked difference in the number of students in each grade ranging from 1 to 28.

Table 8.1 Descriptions of the sample of the teachers by school

<i>School</i>	<i>Name/Age/Gender</i>	<i>Professional Qualifications Mode of training/ Spécialisation</i>	<i>Expérience (years)</i>	<i>Grade groups</i>	<i>No. of Students</i>
1	Kumara/38/M	Distance/Primary	10	1, 2, 3, 4, and 5 (not fixed)	6, 8 5, 5, and 6
	Gamunu*/22.M	Untrained	1		
	Bimal*/24/M	Untrained	-		
2	Vijaya/34/M	Following PGDE	10	4+5	4 +12
3	Sumanawathi/44/F	Distance/Primary	23	2+3	11+12
4	Chitra/34/F	Distance/Primary	10	2+3	11+9
	Kalyani/48/F	Distance/Primary	10	4+5	5+7
5	Athula/34/M	Distance/Primary	12	1+4	6+5
6	Nirmala/32/F	NCOE/Primary	7	1+2	4+7
	Kulasena/44/M	Distance/Primary	12	3+4	5+6
7	Malini/43/F	Distance/Primary	10	1+2+3	1+ 9+6
	Sena/41/M	PGDE	9	4+5 (not fixed)	2+7
8	Geetha/41/F	Distance/Primary	13	1	14
	Seeta/38/F	Distance/Primary	13	2	18
	Ajantha*/22/F	Untrained	1	4+5	16+12
9	Hema/43/F	Untrained/ Graduate	16	4+5	28+27
10	Kusuma/53/F	Distance/Primary	16	2,3,4,and	6, 6, 5, 6
	Latha/45/F	Distance/Primary	10	5 (not fixed.)	

*Volunteers

The age distribution of teachers by gender is presented in Table 8.2.

Table 8.2 The group of teachers by gender and age

<i>Age ranges</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
20-30	2	1	3
31-40	2	3	5
41-50	3	6	9
51-55	0	1	1
	7	11	18

Table 8.2 shows that the sample comprised teachers whose ages ranged between 20 and 55 years. The majority were between 30 and 50 years of age.

Table 8.3 gives the number of years of professional experience of the multigrade teacher sample.

Table 8.3 Composition of the teacher group according to teaching experience

<i>Years of teaching experience</i>	<i>No.</i>
Less than 1 year	3
1- 4 years	0
5- 9 years	2
10 -19 years	13
	18

Table 8.3 shows that the majority of the teachers possessed teaching experience of more than 10 years. These teachers were not able to state clearly their experience in multigrade teaching.

The first activity in planning the intervention was completed with the selection of teachers for the intervention team.

8.3.1.2 Stage 1: Activity 2: Field arrangements

The fieldwork for the intervention involved organising workshops and school visits. However, the latter needed no new arrangements as these school visits were to be carried out in the same way as in the Phase 1. The arrangements for the workshops, included several aspects such as selection of a venue, fixing the dates of the workshops on weekends to suit the whole team, arranging transport and refreshments.

The most suitable and convenient venue for the workshops was the Teacher Centre situated in the main town of the education division. The officer-in-charge of the Teacher Centre warmly welcomed the idea to have the workshops at the centre. He considered that the proposed intervention was an invaluable attempt as multigrade teaching is essential for this education division.

Transport facilities had to be provided for both facilitators and teachers. For the facilitators and the observer, a van was arranged from Colombo. A travel allowance was provided for the teachers to travel from and to their villages. The duration of the workshop was five and a half hours.

Arrangements were made with regard to refreshments for the workshops as there were two sessions, and all the members travelled a considerable distance spent a considerable amount of time in travelling. Tea was provided by the Officer-in-charge of the Teacher Centre on his personal account. My host family agreed to supply lunch for the group at a subsidized rate. I bought some snacks on our way to the workshops to be shared during the morning tea break. Making field arrangements were completed by the end of February 2002.

8.3.1.3 Stage 1: Activity 3: Prebriefing the co-facilitator and the observer

Having planned an intervention focused on mathematics, Mr. Sibli, the Senior Research Associate (SRA) of the multigrade international project, who was a

senior mathematics curriculum developer, was invited to function as a co-facilitator in the intervention. A colleague from NIE, who had experience in educational research, was invited to function as the facilitator. I did a pre-briefing for both colleagues regarding my expectations and beliefs on the approach for initiating the intervention in collaboration with the teachers. It included the following aspects:

- I believed in an approach with scaffolding, as required by the teachers to bridge the gap between the teachers' current practice and the innovative strategy of multigrade teaching as presented in Chapter 7.
- I believed that we should not force the teachers to adopt the innovative strategy but make them realise the need to adopt it and then improve on it.
- I expected the teachers to feel that the attempts at improvement of multigrade teaching were their own.

The co-facilitator and the observer agreed on these suggestions.

8.3.1.4 Stage 1: Activity 4: Deciding on data generation and record keeping

Unlike other steps of the study, data collection involved the gathering of information generated during the process of intervention. The following strategies were identified as appropriate for data collection:

- tape recording the selected proceedings of the workshops and interviews during school visits, to obtain teachers' verbal observations on multigrade teaching and reflections on the intervention. Arrangements were made to carry a mini-tape recorder for the workshops and school visits
- keeping notes as a participant observer
- classroom observations on improvements in adopting the innovative strategy,
- collecting lesson plans

- taking photographs
- administering questionnaires and interviews
- requesting the observer to keep a record of the proceedings of the workshop in detail.
- maintaining a record of self-reflections

8.3.2 Stage 2: Action

Stage 2 comprised three activities. They were, commencing the intervention by bringing the intervention group together, the introduction of the innovative strategy to the teachers, and reviewing the teachers' first attempts at implementing the innovation in their respective multigrade classes.

8.3.2.1 Stage 2: Activity 1 - Bringing the intervention team together

The members of the intervention team met for the first time on Sunday the 25th March, 2001. The first session of the day was planned as an inaugural meeting for which I extended an invitation to all the principals of the intervention schools, the Zonal Education Director, the Planning officer and the Primary Education Co-ordinator from the ZEO, the Divisional Education Director of the Deraniyagala education division and the Officer-in-Charge of the Teacher Centre of Deraniyagala, as they were the important stakeholders within the system whose co-operation was essential for the successful implementation of the intervention. However, only one out of the six principals invited (the others were members of the team) attended. The absentees sent their apologies, along with their good wishes for the success of the intervention. The Zonal Planning Officer represented the ZEO.

The objectives of the inaugural meeting were to:

- welcome the participants and other stakeholders and to come to know each other
- introduce the work carried out so far by the international project on multigrade teaching which formed the base of this study.

- share the experiences made on the Phase 1 of the present study
- share the views about multigrade teaching and the need for multigrade teaching
- introduce the present study outline and expected outcomes.

In order to achieve the objectives, the following agenda was prepared:

1. Welcome address by the researcher
2. Self introductions of the participants
3. A joint presentation on the international project by the SRA and the researcher.
4. A synthesis of the research activities carried out in Phase 1 in the Dehiowita education zone by the researcher.
5. An address by the Zonal Planning Officer
6. Discussion and tea.

In addition to the above listed items of the agenda, the Officer-in-Charge of the Teacher Centre and the observer presented a summary account of their experiences of multigrade teaching. The discussion which followed the presentation raised a number of issues. The following were the main issues:

- Multigrade teaching could be seen as a useful teaching strategy rather than as a teaching problem.
- There is a need for multigrade teaching within the education zone due to teacher deficits and teacher absenteeism.
- The schools that are difficult to access have a permanent need for multigrade teaching.
- Knowledge and awareness about the curriculum across several grades is useful for a teacher even in a monograde context, to understand the students' abilities.
- No serious efforts had been made to address the needs of multigrade teachers.

By the end of the inaugural session, the participants readily expressed their willingness to proceed with the intervention which encouraged me.

8.3.2.2 Stage 2: Activity 2: Eliciting teachers' current practices, beliefs and concerns regarding multigrade teaching

The activity 2 of stage 2 in the provisional plan was the introduction of the innovation to the teacher group. However, I felt that it was advisable to have a discussion on the status of the teaching activities of their respective classes keeping in mind to find a suitable point for introducing the innovation. I believed that for any innovation to result in a positive impact, it should be built on participants' current knowledge, skills, attitudes and beliefs. Thus, activity 2 was directed to elicit teachers' current practices and beliefs on multigrade teaching.

All the teachers said that this was the first opportunity they had had to share their problems relating to difficulties in teaching multigrade classes. However, only two teachers expressed their problems and they are given in Table 8.4 .

Table 8.4 Problems faced in multigrade teaching expressed by two multigrade teachers at workshop 1

<i>Teacher/grade group</i>	<i>Problems</i>
Kusuma/ Grades 1+2+3	<ul style="list-style-type: none"> • Grade 1 students demand for more attention and therefore a larger proportion of time needs to be spent with them; as a result the other grade groups are neglected. • Only some students would complete the work assigned due to lack of supervision and there is no time to look into the problems of those who do not complete. • Limitations of time to pay attention to slow learning child in Grade 3.
Hema/ Grades 4+5	<ul style="list-style-type: none"> • The school building facilities do not permit accommodation of both grade groups (25 students in Grade 4 and 30 in Grade 5) in a single classroom. Therefore, it is difficult to manage two grade groups at the same time.

Though the other teachers did not elaborate their difficulties, they confirmed the expressed problems in Table 8.4. The nature of the problems indicate that the teachers considered them to be originating from diverse problems of the students, inadequacy of available instructional time and/or inadequacies of physical resources rather than from the inadequacies of their own strategy adopted for teaching.

In discussing the approaches adopted in multigrade teaching, two examples were elicited. First, Kusuma having served in multigrade situations for more than 10 years explained in one sentence how she did two lessons on mathematics for Grades, 1, 2, 3 and 4 simultaneously.

For the Grades 1 and 2, I introduced the numbers and for the Grades 3 and 4, the concept of money and both groups were made to engage in activities.

Second, Sumanawathi, who was a monograde teacher in the previous year for Grade 2, described a lesson she was conducting on ERA for Grade 2+3 class this year. She expressed that since she was exposed to training on Grade 3 new syllabi implementation programme she had been able to recognise the fact that there was a large number of topics common to Grade 2 and 3 in the ERA syllabi. She said:

I sometimes select topics that are similar in the syllabi of two grades, specially in teaching ERA. The unit on animals is laid out for both Grades 2 and 3.

The first example confirmed the findings of the Phase 1: Step 2, while the second indicated that teachers, when having responsibilities of single grades, were inclined to refer to the teacher guides. Consequently Sumanawathi was beginning to see a pattern in the distribution of topics in the curricula of different grades.

This limited number of teacher narrations suggested that they were not aware of the fact that there are strategies available for planning multigrade teaching. Their narrations also brought to light that they themselves have not

consciously evolved any effective strategy. However, as facilitators we realised that Sumanawathi's experience was a suitable point for elaboration and discussion, to make an introduction of the innovative strategy for multigrade teaching.

8.3.2.3 Stage 2: Activity 3: Introducing the innovative lesson planning strategy

Introducing the innovative strategy for lesson planning for multigrade teaching through curriculum adaptation was a challenging task, as the majority of the teachers were unfamiliar with the national curriculum as teachers hardly used syllabi. However, the idea Sumanawathi expressed, "select similar topics from different syllabi" was extended towards introducing the innovative strategy discussed in Chapter 7.

First, the syllabi and teacher guides which I brought to the workshop were distributed among the teachers. Second, the SRA described the structure of the curriculum using the Figure 7.1 given in Chapter 7 (p.210). Third, a discussion was directed towards the possibility of selecting common topics from graded syllabi for the specific combinations of grades of multigrade classes. Fourth, selecting and sequencing the respective lesson objectives from the different grades to suit the development of a single lesson was described. Fifth, a discussion on different grade level assignments for developing a lesson on a selected common topic. Sixth, was to design student assessments using respective grade level assignments in graded textbooks.

After the basic ideas of the innovation were presented by the two facilitators, an open discussion was encouraged to elicit views on the innovative strategy. Five teachers presented their views and concerns (Table 8.5).

Table 8.5 The first set of teachers reactions to the innovative strategy in multigrade teaching

<i>Teacher/class</i>	<i>Ideas/ issues/ concerns on the innovation at its introduction</i>
Sena /3+4	Concerns over combining ‘old’ syllabi of Grade 4 and ‘new’ syllabi of Grade 3.
Nirmala/1+2	Concerns over combining Grade 1 and 2 for a lesson which has common elements, as the Grade 1 students, being very immature, needed the special attention of the teacher.
Hema /4+5 and Seeta/4+5	Concerns regarding teaching two grade groups in the same classroom that would arise due to limitations of physical space.
Athula/1+4	Concerns over the problematic nature of the combination of discrete grade groups.

Table 8.5 shows that teachers were not inclined to totally reject the strategy introduced for multigrade teaching but were getting concerned over the challenges and opportunities it presented. The discussion proceeded and centred on suggesting ways and means of lessening the anxieties. The first problem was the combination of ‘old’ and ‘new’ syllabi. The SRA assured that most of the lesson objectives of the ‘old’ and ‘new’ syllabi were similar and what was new was the novel teaching methods presented by the guidebooks.

The second problem was handling students in Grades 1 and 2 together, with the younger age group demanding more teachers’ time and attention. However, this problem remained and was unwittingly unaddressed.

The third was the problem of classroom space to accommodate two grade groups. No exact solution could be offered as none had seen the particular classrooms. The two teachers who posed the problem agreed to find out their own solutions.

The fourth was the problems faced by Athula who had to teach two discrete grades. As this was a very complex situation no final solution was arrived at. However, Athula determinedly promised to adopt the innovative strategy and I promised to help him on my next visit to his school.

The next task of the facilitators was to address the anticipated challenges (if any), the teachers would face in implementing the innovation while being engaged in already assigned responsibilities. However, as I had anticipated this problem I had already made plans to speak to the principals to obtain maximum support to ease such situations. The following were the anticipated problems:

- In School 1, the principal being a non-member of the intervention group as well as his frequent absence from school, happened to be a drawback in effecting any restructuring.
- In School 8, the two primary trained teachers, Geetha and Seetha, were entrusted with a monograde class each, while Ajantha, a volunteer teacher was entrusted with the multigrade class.
- In School 10, the reluctance shown by Kusuma and Latha to take responsibility for fixed grade groups.

The following were the outcomes of the discussion on the above problems pertaining to the three schools:

- School 1: three members agreed to engage in group lesson planning and in team teaching for multigrade classes formed with Grades 1+2 and 3+4+5.
- School 8: three members agreed to engage in collaborative lesson planning and team teaching for the multigrade class Grades 4+5.
- School 10: two members agreed to fix responsibilities for two multigrade classes composed of Grades 2+3 and Grades 4+5.

At the end of workshop 1, the participants agreed to adopt the innovation in the coming two weeks and to share the experiences at the next workshop.

The observer commented at the end of the workshop:

I am glad that I got the opportunity to be in these workshops. I am sure you are going to make a big change.

By the end of the workshop my anxieties about commencing the intervention faded away. I was encouraged by the participation and positive responses from the teachers, as it was an indication that they were amenable to change.

8.3.2.4 Stage 2: Activity 4: Sharing the initial attempts

Sharing experiences of the initial attempts at implementing the innovation was the main purpose of the workshop 2, held two weeks after the first. It was encouraging to observe full attendance of teachers. Open reflections were invited from the teachers to present experiences of two past weeks. However, it was soon realised that it would be better to start by inviting reflections on a pre-structured format. The team agreed on the structure presented by the SRA. The structure was as follows:

- (a) the lesson topic
- (b) the grade level objectives
- (c) physical arrangements
- (d) the resources used for planning the lesson
- (e) brief composition of common introduction
- (f) the nature of grade level assignments given
- (g) the time taken for the lesson
- (h) the teacher's observations and evaluations on the lesson.

Four teachers, Nirmala, Athula, Chitra and Kalyani reported their experiences. Two of these are given in Tables 8.6 and 8.7.

Table 8.6 Nirmala's first attempt at adopting the innovative strategy

<i>Aspects of change</i>	<i>The details</i>
Grade combination	Grade 1 and 2
Topic	Shapes
Grade level objectives	Grade 1: to make patterns with the shapes Grade 2: to identify the shapes with their names.
Physical arrangements	Two grades in the same classroom with mixed grade groups
Resources used for planning the lesson	Two syllabi-cum-teacher guides
Common introduction	Questions and review of the shapes of objects in the classroom
Grade level assignments	Grade 1- Pasting patterns from cut-out shapes Grade 2- Identifying shapes with names.
Teachers' observations and evaluation of the lesson	<ul style="list-style-type: none">• The Grade 2 students answered most questions.• Grade 2 students helped Grade 1s to paste and form the patterns.• All students did the assignments.
Time	45 minutes

Table 8.6 shows that Nirmala had attempted to make suitable changes in the physical arrangement of grade groups using space in the same classroom. By having both grade groups in the same classroom and by forming mixed grade groups, she was able to resolve her expressed anxieties at workshop 1.

Table 8.7 shows that Athula had attempted to apply the innovation to discrete combination of grades. He had adopted our suggested strategy with slight modifications to teach counting and place values of numbers to two discrete grades.

Table 8.7 Athula's first attempts at adopting the innovative strategy

<i>Aspects of change</i>	<i>The details</i>
Grade combination	Grade 1 and 4
Topic	Numbers
Objectives	Grade 1 - Counting from 1 to 10 Grade 4 - Understanding of place values of numbers between 100 to 999.
Physical arrangements	Two grade level groups on the two sides of the same room
Resources used for planning	Teacher guides
Common introduction	Introducing the two activities
Grade level assignments	Activity 1: Two specific activities of arranging number cards in ascending order. Specific activities for each Grade are: For Grade 1, cards with number 1-10 For Grade 4, cards in the range of 100 -500. Activity 2: A game using a dice to guess the number.
Teachers' observations and evaluation of the lesson	Satisfied with the lesson.
Time	45 minutes

The other two teachers who shared the experiences were Kalyani and Chitra. They were both from the same school. Kalyani combined Grades 4 and 5 through a lesson on 'currency of Sri Lanka', while Chitra attempted to engage students in Grades 2 and 3, in 'subtraction'.

Though only four of the teachers shared their experiences, it was an indication of the applicability of the innovation. I felt that the discussion already held had been conducive to reduce their initial anxieties.

The aforesaid experiences provided the facilitators the below given facts:

- Teachers showed positive reactions to the innovative strategy and began to deviate from the previous strategy of quasi-monograde teaching.

- Teachers were getting used to selecting common topics and activities from graded syllabi.
- The adoption of the innovative strategy made teachers adhere to instructions given in teacher guides.

At the end of the morning session we (the whole team) thought that it would be appropriate to engage in a group lesson planning activity so that all teachers would be able to get a hands-on experience. This was the second activity that was added to the provisional plan of the intervention. The decision to engage lesson planning in groups was the first decision taken by the intervention team.

8.3.2.5 Stage 2: Activity 5: Lesson planning in groups

To initiate the lesson planning as a group activity, first the teachers grouped themselves according to grade combinations under their responsibility. Next, they selected topics and engaged in lesson planning using the appropriate graded mathematics syllabi. The topics and objectives are given in Table 8.8

Table 8.8 Combinations of objectives selected for lesson planning in groups

<i>Lesson topic</i>	<i>Grade combination</i>	<i>Grade level objectives</i>
Length	2+3	Grade 2-Measuring and comparing a length with an arbitrary unit. Grade 3-Introducing the concept of standard measuring units.
Length	3+4	Grade 3-Measuring and estimating a length in metres Grade 4-Estimating and measuring a length in metres and writing with standard symbols
Length	3+4 +5	Grade 3-Introducing the metre as the standard concept of measuring, and measuring in metres and centimetres. Grade 4- Writing in standard symbols
Volume	1+2	Grade 1-Comparing the capacities of two vessels using water. Grade 2- Measuring the capacities of vessels using arbitrary units.
Shapes	4+5	Grade 4-Identifying the geometric shapes Grade 5-Identifying the basic characteristics of a square using a solid object

Table 8.8 presents the combination of objectives for five lesson plans for five grade combinations. Four of the topics selected were on measurement. One was on shapes. The lesson plans prepared were presented by each group. In examining the lesson plans it was possible to gather that the teachers were becoming familiarised with selecting suitable objectives for multigrade lessons. However, the gradual advancement of the lesson to suit the different grades was less well planned. At the end of workshop 2, the teachers said that they were gradually gaining confidence about the systematic adaptation of the national curriculum in planning for multigrade teaching.

8.3.3 Stage 3: Monitoring and facilitation at classroom level (1st round)

The Stage 3 of the Cycle 1 was focused on monitoring and providing facilitation for the implementation of the innovation. I believed that difficulties teachers encountered in implementing an innovation should be first resolved to encourage their efforts. Thus, monitoring and facilitation at two levels, namely at school level and during workshops, was carried out. The school level monitoring and facilitation was carried out by me, while both SRA and I provided facilitation during the workshops.

8.3.3.1 Stage 3: Activity 1: Monitoring and facilitation at classroom level

The first round of school visits for monitoring and facilitation was carried out in May 2001, after the teachers had had three weeks to implement the innovation. During school visits, I was somewhat disappointed about the number of the teachers who had actually implemented the innovation. Only three teachers had actually planned one or two lessons per week. Others said that in spite of their attempts they had failed due to reasons such as limitations of time, the overload of work due to the absence of the other staff member/s who shared the work. Given below are three such examples:

Example 1

In School 1, in spite of the promised support, the principal failed to make an effective contribution for adopting multigrade teaching innovation as he was keen to adopt monograde teaching with volunteers. Perhaps, the reason for this is that he did not have an orientation towards the activities of the intervention as he was absent on the inaugural session.

Example 2

In School 7, according to Malini, Sena was often away from school to attend to official matters. Even on the day of my visit Malini was in-charge of the whole school. She indicated that she failed to adopt the new strategy as grade combinations coming under her changed frequently. Nevertheless, I could gather that she had made attempts to plan one or two lessons. Her problem was that she did not feel confident enough to share about the experience. I encouraged Malini to explore the possibilities of planning the lessons in collaboration with Sena, to minimise the disadvantages caused for this project due to his absence from the school.

Example 3

In School 10, the two teachers, while dividing the responsibilities between them on fixed grade combinations, faced problems in trying to implement the innovation as planned, due to Kusuma's frequent absence. Her advanced age and deteriorating health made treading the difficult terrain a very cumbersome undertaking.

With these prevailing situations I tried my best to make the situation more conducive for the teachers to implement multigrade lessons. In this regard, an attempt was made during facilitation to explain to the principals who were not members of the intervention team about the new arrangements concerning multigrade teaching. Another step taken was to encourage the teachers to maintain a diary to record the experiences and difficulties, so that it would be possible find solutions. Above all, I continued to encourage the teachers by educating them about the contribution they as a pioneer group could make for

the improvement of the quality of learning-teaching in multigrade classes in Sri Lanka through participation in this intervention.

Monitoring and facilitation at classroom level was advantageous for the intervention as it encouraged the commitment of the teachers who were greatly appreciative of my visits to their remote schools, for this was a new experience to them.

8.3.3.2 Stage 3: Activity 2- Monitoring and facilitation at the workshop

Workshop 3 was planned to consolidate the attempts of planning multigrade lessons and to provide teachers with more opportunities for clarification. At this point of intervention two members dropped out from the group due to unavoidable circumstances. First, Kumara was compelled to return to his former school, consequent to a court order issued cancelling the teacher transfers carried out in the past few months, where he was engaged in monograde teaching. Second, Bimal having got a job in the armed forces left the school. Their dropping out created an acute problem because both of them were from School 1. In spite of this unexpected dropping out, the work of the innovative project continued smoothly as several teachers had dedicatedly prepared, on their own, the lesson plans to be presented to the workshop. They were Nirmala, Chitra, Kalyani, Kusuma and Sumanawathi.

At the beginning of the workshop 3, the teacher group made a suggestion to change the seating arrangement so as to allow more interaction with each other. Teachers formed into three groups in accordance with the grade combinations they taught in school. At the discussion it was revealed that the issues raised by teachers centred mostly on mathematics subject knowledge. Explanations on implementing a lesson on solids and plane figures for Grade 4+5 class presented by Kalyani revealed that teachers' knowledge regarding identifying characteristics of pyramid and tetrahedron was inadequate. Teachers had misconceptions when attempting to analyse the shapes of the sides and bases of solid objects in the environment.

Figure 8.3 illustrates an interaction between Vijaya and SRA illustrating how a misconception was addressed by an experienced curriculum developer.

Figure 8.3 An example of a supportive facilitation episode during a workshop

Vijaya: I used number patterns to explain about the place value
SRA: How did you do it?
Vijaya: The text book says to circle the larger number in an array of numbers.
SRA: You are referring to the value of the number. Let me show you.
Three of you come forward, (called three teachers to the front of the class)

Demonstration:

Three teachers came forward and SRA gave three numbers 1, 2, and 3 written on pieces of paper to each of them and asked them to stand in different sequences. With the change of places of the numbers the teachers saw how value also underwent change with change of places of the number.

SRA: What curriculum materials did you use in your teaching?
Vijaya: The textbook
SRA: The basics of the concept are not completely given in student textbooks. Therefore, before using the textbooks you have to explore for knowledge and understand the concept. You can teach mathematics if you know the basics of a concept.

This example indicates that Vijaya's specific problem was that he was confused with regard to the two concepts, 'place value' and 'value of a number'. This fact indicated the importance of enriching the teacher's subject content knowledge, along with the introduction to pedagogical innovations during an intervention.

8.3.3.3 Stage 3: Activity 3: Monitoring and facilitation at the classroom level (2nd round)

The second round of school visits during Cycle 1 was made one month after the workshop 3. During the visits I found that teachers exerted more effort than before to implement the innovation. They were eager to talk about their attempts more readily than on former occasions. Examples from Schools 3, 9, 8 and 10 are discussed.

In School 3, Sumanawathi explained her difficulties due to the mismatch of the sequence of topics in different grade level syllabi. The example she forwarded was the topic ‘two dimensional shapes’ for Grade 2 and 3. This shows that she was faced with a dilemma. At in-service training sessions she had been instructed to follow the syllabi sequentially. In our instructions she was asked to combine similar topics. She on her own tried to utilize both types of instruction when planning her lesson, and discovered that there was a sequential difference in topics in the way they are presented in Grades 2 and 3 syllabi. The topic sequence of Grade 2 syllabus indicates topic 2 as three-dimensional shapes and topic 8 as two-dimensional shapes, whereas in Grade 3 syllabus both two and three dimensional shapes are included in topic 11. The sequence of topics of Grades 2 and 3 are given in Appendix 7, (p.342). Thus the problem she raised was one which we had not addressed when planning the strategy for multigrade lesson planning. Hence, this was considered as an important issue as it brought to light the teachers’ need for support in selecting and combining objectives from graded syllabi which do not have the same topic sequence.

In School 9, Hema discussed her unresolved issue of classroom space to arrange her multigrade class. She said:

I find it difficult to adopt the strategy because of the large number of students in the Grade 4+5 class. It is impossible to find classroom space to make a suitable seating arrangement for 55 students. However, as the rate of absenteeism is high I was able to try a few lessons using the new strategy. I am trying to think of an alternative arrangement to resolve this problem.

Since there was no extra space that she could use in the school, because some of the buildings were threatened with the danger of land slides, I suggested to her to exchange classroom space with another teacher who was conducting the classes in a comparatively spacious temporary structure and who did not need much space for her class.

In School 10, Latha was compelled to be responsible for Grades 2, 3, 4, and 5 during Kusuma's frequent absence. However, she expressed her dissatisfaction about adopting the innovative strategy as she felt that students got confused when taught together. Her explanations indicated that she was becoming conscious of the problems involved in her teaching. Although it appears that she found the experience of implementing the innovation to be not encouraging, in reality she was discovering the misconceptions the students have had for a long time. At that point I did not wish to argue against her explanation, but requested her to continue adapting the innovation and collect data to share with us at the next workshop.

In School 8, it was rewarding to see Ajantha having arranged her multigrade class in a separate classroom. She found that it was more convenient to have all students in one classroom rather than as two groups arranged apart in a large hall, among secondary grade groups. She was being supported by Geetha and Seetha, after the school time was over for Grades 1 and 2. In addition to these, Ajantha was also trying to adopt the innovation on her own in teaching other subjects than mathematics. However, she could not give the details of her experiences. I discussed with her how easy it would be to communicate about her classroom experiences if she had maintained a diary. I explained how a teacher could maintain a diary for reflection.

On the whole, the second round of school visits for monitoring and facilitation offered many more positive and encouraging experiences than the first. More teachers were found to be implementing the innovative strategy. Teachers found the innovation useful, and therefore they needed more support. The support they needed could be broadly stated as follows:

- Principals' support to organize grade combinations and physical space.
- More collaboration between multigrade teachers in planning the lessons.
- Re-sequenced syllabi to facilitate combination of objectives or pre-planned lessons for easier adaptation

However, there were situations which could not be resolved successfully. In School 1, although Gamunu was undergoing a stressful time being in-charge of the school by himself for most of the days of the week, he made efforts to implement the innovation whenever possible.

8.3.4. Stage 4: Reflection and review of Cycle 1

Stage 4 of Cycle 1 was reflection and review. The end of Cycle 1 was demarcated by the end of the school term. Thereafter, workshop 5 was held for reflection and review of Cycle 1.

8.3.4.1 Stage 4: Activity 1: Inviting teachers' reflections

Teachers were invited to reflect aloud on the intervention. Teachers actively engaged in reflection when compared to what they did at workshop 1. One of them was able to recollect her initial anxieties about participation in the programme:

Initially I thought this programme was going to add to the problems we already have. But that feeling soon faded with the increasing understanding about lesson planning. I have developed an interest and an enthusiasm towards experimenting on multigrade teaching (Geeta).

It was encouraging to see teachers making comparisons between their earlier and current practice. The following are four examples:

Example 1

I used to arrange the two grade groups separately and teach separately following the mathematics textbooks. Since I began participation in the multigrade workshops, I realized the following as shortcomings of my practices.

1. One group would idle and make a lot of noise while I teach the other grade group.
2. It is inadequate to teach only through referring to textbooks (Vijaya).

Example 2

I used to move from one classroom to another to address the two grades that I was responsible for, because these were housed in separate classrooms. After the suggestion made at the workshop, I arranged both grades in one classroom because then I could teach them together. It is a great consolation for me as well as to my students (Nirmala).

Example 3

I frequently face the situation of teaching all five grades in the primary, due to various reasons. The method that I adopted was to first assign work to Grades 5, 4, 3 and 2 one after the other and be with the Grade 1 students because they need a lot of support. As a result of participation in the workshops now I combine Grade 1+2 and Grade 3+4+5, and now I have organised my class into manageable units and do lessons in common considering them as multigrade classes (Kusuma).

Example 4

Being the only teacher of a school with two discrete grades, I found the new strategy effective as I could plan work for both grades at the same time. I hope to continue to extend the same strategy to address other subjects. It makes my teaching easier (Athula).

It was encouraging to know from teachers' reflections that they appreciated the increased use of syllabi and teacher guides. The following are two examples:

Example 1

Now I realize the importance of reading the syllabi and teacher guides. When reading the objectives and the instructions, a suitable activity automatically flows into my mind. With the new lesson planning strategy it is now even possible to plan lessons quickly based on a common theme for two grades (Kalyani).

Example 2

It was a surprise for me when I got to know that most of the concepts in mathematics are common to several grades and they have been laid out at different levels within the graded syllabi. Hence, I began to see the possibilities of teaching by combining objectives of two different grades (Vijaya).

Chitra's reflections as a teaching principal emphasized the effectiveness of the innovative strategy in time management:

Prior to the participation in workshops I encountered many problems in teaching for more than one grade at a time. Being the acting principal it was difficult to cope up with the administration tasks as well as teaching for several grade groups. However, I was able to solve this problem by utilising the new ideas gained by participating in workshops.

Teachers were able to appreciate the innovation in terms of increased teacher guided learning time than before. Three teachers expressed the following:

I find that students are exposed to more teaching and learning experiences now. (Hema, Ajantha, Geeta)

The following reflection shows how one of the experienced teachers had a preconception that multigrade teaching was not an effective teaching method and how she changed this misperception of hers after adopting the innovation:

Initially I thought multigrade teaching is a very unsystematic style of teaching. After I participated in workshops I find that it is a systematic way of teaching (Hema).

The teachers were able to observe the reactions and changes in students during the intervention. Most teachers had the difficulty of handling smaller age groups in a multigrade class. Nirmala commented on the impact that was made on the Grades 1 and 2 students:

The two grade groups preferred being in the same classroom and they expressed their dislike to do different lessons after getting used to common lessons. When I tried to do separate lessons for other subjects after doing a mathematics lesson in common, the students did not appreciate this. I observed the collaboration among the students when doing work, a feature I had never observed before.

Ajantha expressed the observed change in the level of motivation in Grade 4+5 students. She said:

I noticed a change in Grade 4 and 5 students in my multigrade class after we started to teach adopting the new strategy. They are now motivated to engage in learning. I feel it is due to the improvement of their self esteem through engaging in activities. The students look forward to challenging activities.

The responses revealed that the innovative teaching strategy helped to improve students' as well as teachers' enthusiasm bringing about a change in their perception about multigrade teaching.

8.3.4.2 Stage 4: Activity 2: Researcher's reflections of Cycle 1

For me, the process of reflection was a continuing activity during the intervention. However, at the end of Cycle 1 my reflections centred on the following:

- 1) What did I hope to achieve?
- 2) What did I actually achieve with the members of the team?
- 3) Which of the activities were successful and which should be revised?

At the commencement of the innovation, I hoped that teachers would adopt the innovation readily, once it was introduced. I assumed that the support extended through workshops and school-based monitoring and facilitation would enable them fully to improve their quality of daily teaching.

However, during the school visits for monitoring and facilitation, I realised that my expectations were somewhat unrealistic. Some of the teachers faced various context specific problems. As a result, the innovative teaching strategy could not be adopted fully. However, this did not discourage me as evidence of successful implementation found in the explanations offered by the teachers enabled me to learn that the innovative strategy was useful for multigrade contexts. At the end of the Cycle 1, teacher reflections revealed that a considerable amount of change had taken place in teachers' practices and beliefs. I realised that it was being too ambitious to expect a total change within a short time.

The two main lessons learned with the completion of Cycle 1 were:

- 1 The innovative strategy for lesson planning was useful to teachers.
- .2. Teachers still had difficulties in adopting the innovation on a daily basis as too much time was needed to prepare a single lesson plan using several teacher guides and combining suitable objectives.

With the above I was convinced that more support should be extended to them if the teachers were to adopt the innovative strategy on a daily basis.

8.3.4.3 Stage 4: Activity 3: Inviting reflections from the co-facilitator and comments from the observer

At the end of each workshop, while returning home from the Teacher Centre, the co-facilitator, the observer and I reflected on and discussed the activities carried out during the day. Nevertheless, at the completion of the Cycle 1, reflections were invited from the co-facilitator and the observer. They both

participated in all workshops; two of their reflections are given below as examples:

It is very satisfying to see how teachers are making a marked improvement. They are very keen to have us visiting their classrooms to share the experiences of engaging in multigrade teaching (SRA).

This experience of observing the workshops is a valuable one for me, as it enables me to learn how to work collaboratively with the teachers. It is amazing how the teacher group is changing their beliefs about multigrade teaching (Observer).

The Cycle 1 ended on a positive note.

8.4 Cycle 2 of the intervention

The sections that follow in this chapter describe the Cycle 2 of the intervention. With the continuous reflection process and through review of the outcomes, a re-planning was effected for the Cycle 2 to make the intervention more effective. The Cycle 2 commenced in August and was completed in November 2001.

8.4.1 The plan for Cycle 2

The plan for Cycle 2 was detailed out based on the experience gained from Cycle 1.

Figure 8.4 The plan for Cycle 2 of the intervention

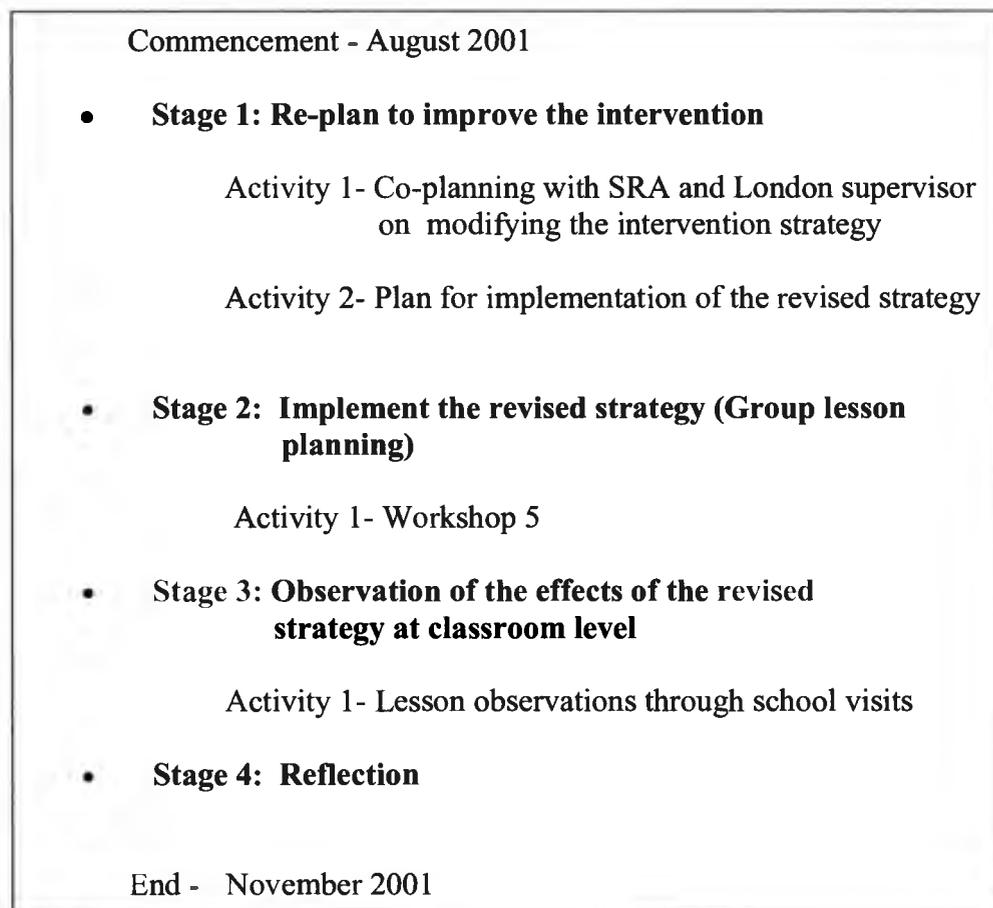


Figure 8.4 shows the plan for Cycle 2. It included four stages: Stage 1 was re-planning of the intervention with the lessons learned from Cycle 1, Stage 2 included implementation of the revised strategy, Stage 3 was focused on monitoring the effects of the implementation of the revised strategy and Stage 4 was devoted to reflection on the process.

8.4.2 Stage 1: Modifying the intervention

The reflections on Cycle 1 revealed that the teachers needed more guidance in planning lessons using graded syllabi on a daily basis. Therefore, it was felt necessary to modify the intervention to provide the means of giving effective support to teachers.

8.4.2.1 Stage 1: Activity 1: Discussion with London supervisor to modify the intervention

Discussions I had with the London supervisor on the outcomes of Cycle 1 assured me of the success the intervention. My subsequent reflections made me feel that the teachers had undergone significant changes in their knowledge, skills and attitudes towards multigrade teaching. However, the problem of time consumed in adapting several monograde syllabi to plan a multigrade lesson remained unresolved. Hence, we both agreed that the Cycle 2 should focus on preparing a set of lesson plans to be used by the teachers so that they would be relieved of the burden of planning on their own. Hence, the main purpose of the Cycle 2 was to compile a set of lesson plans, which were to be implemented during the third school term.

8.4.2.2 Stage 1: Activity 2: Planning for residential workshop

A two-day residential workshop for lesson planning was thought to be as a suitable strategy to address the need to compile a set of multigrade lesson plans for diverse grade combinations. The teachers agreed to attend a residential workshop at a hotel in a nearby town.

8.4.3 Stage 2: Implementing the modified intervention

The implementation of the modified mode of lesson planning was the activity for stage 2.

8.4.3.1 Stage 2: Activity 1: Workshop 5 for group lesson planning

The workshop 5 was held during the school vacation with the participation of all team members. The activity of lesson planning in groups was planned in collaboration with the whole team.

First, a list of lesson topics for each grade combination was made within the whole group. Second, objectives related to each topic given in the teacher guides were combined for the necessary grade combinations. Third, small groups were formed by different grade combinations and draft lesson plans were prepared in consultation with the SRA, the observer and I. Fourth, plenary sessions were conducted in between lesson planning activities to share the experiences and resolve the problems. .

The two co-facilitators, the observer and the teacher group worked intensively for two days to prepare lessons for a range of topics for the necessary grade combinations. A set of 22 detailed multigrade mathematics lesson plans was the output of the two-day residential workshop. Of these, Table 8.9 presents the combinations of objectives for lessons on the four mathematical operations for selected grade combinations.

The drafts of the 22 lesson plans were edited as much as possible during the workshop. Thereafter, the set of plans was word processed and distributed to the teachers one week after the workshop. A few are attached in Appendix 8, pp. 343-346.

Table 8.9 Combinations of objectives of lesson plans for the four mathematical operations for selected grade combinations

<i>Grade combination (lesson duration)</i>	<i>Topic objectives by grade</i>
	Addition
1+4 (1 hour)	1- Adding two sets of objects- sum not exceeding 9. 4- Addition of two numbers up to three digits without carrying over.
1+2+3 (1 hour)	1- Adding two sets of objects – sum not exceeding 9. 2- Adding two sets of numbers – sum not exceeding 99. 3- Adding of two numbers up to three digits without carrying over.
4+5 (1 hour)	4- Addition of two numbers up to four digits with carrying over at two places. 5- Addition up to three numbers up to four digits with carrying over at two places.
	Subtraction
2+3 (50 minutes)	2- Subtraction from a number not greater than 20. 3- Subtraction from a number not greater than 99 without bringing forward.
4+5 (1 hour)	4- Subtraction of two numbers not greater than 999 with bringing forward from two places. 5- Subtraction of two numbers not greater than 9999. with bringing forward from two places
	Multiplication
3+4 (1 hour)	3- Multiplication by 2 and 3 using practical methods. 4- Multiplication by four using practical methods and then using numbers.
	Division
3+4 (40 minutes)	3- Division by 2 using practical methods. 4- Division by 2 and 3 without remainder.
4+5 (40 minutes)	4- Division of three digit numbers by 2 and 3 using practical methods. 5- Consolidating division of three digit numbers by 2 and 3.

One of the lesson plans prepared by the intervention team is given in Figure 8.5.

Figure 8.5 A lesson plan prepared by the team during Cycle 2

<p>Grades: 4 and 5</p> <p>Topic: Addition</p> <p>Specific objectives:</p> <p>Grade 4: Add two numbers sum not exceeding 999 with carrying over at 'units' and 'tens' places</p> <p>Grade 5: Add two numbers sum not exceeding 9999 with carrying over at 'units' and 'tens' places</p> <p>Resources: Dienes apparatus or Ekels (singles and bundles of ten), number cards, Place value charts and Assignment cards.</p> <p>Step 1: Whole-class introduction:</p> <ul style="list-style-type: none">• Recall addition by writing single digits on the board up to sum not exceeding 50.• Divide the class into about four groups disregarding the grade level. Give each group a place value chart with two columns, Dienes apparatus (small cubes and rods) or Ekels (singles and bundles). Encourage a competition between groups where one group shows two numbers with number cards while the other group adds them. <p>Step 2: Lesson development with differentiating grade levels:</p> <p>Sub-step 1:</p> <ul style="list-style-type: none">• Write three digit number which will add up with carrying over at 'units' place on the board.• Ask a volunteer to come up and add them. Repeat this three or four times. <p>Discuss with the students.</p> <p>Sub-step 3:</p> <ul style="list-style-type: none">• Write three digit number which will add up with carrying over at 'units' place and 'tens' place on the board.• Ask a volunteer to come up and add them. Repeat this several times. <p>Step 3: Set different grade level assignments</p> <p>Assign students with pre-structured sums. Visit groups and help the students.</p> <p>Step 4: Conclusion</p> <p>Discuss one or two sums after diagnosing common errors made by the students</p>

8.4.4 Stage 3: Observation of the effects of the revised strategy

8.4.4.1 Stage 3: Activity 1: Lesson observation through school visits

School visits for monitoring and facilitation were made six weeks after the third school term started, allowing time for the teachers to work independently in their schools. The experiences encountered were different from those in Cycle 1 school visits. All teachers were keen to implement a lesson in my presence. They displayed a marked improvement in multigrade teaching.

A range of encouraging observations with examples are presented. First, all teachers readily indicated that the set of lessons plans was highly useful. They attributed their success to its availability. Three examples are presented below:

Example 1

Kulasena in School 5 appreciated the lesson plans as they were helpful in eliminating the problem of searching for objectives that could be used to teach across the grades.

Example 2

Geeta and Seeta in School 8 were relieved to have the set of lesson plans as it reduced their burden to plan the lessons for Grades 4+5 multigrade class, while engaging in monograde teaching in the lower primary grades. They participated in team teaching with Ajantha without having to plan their lessons after school hours. .

Example 3

Malini and Sena who were in School 7 also felt relieved as they could directly implement these lesson plans which contained applicable variations in teaching different grade combinations.

Second, the teachers showed motivation for the preparation of teaching aids for lessons. Chitra, Nirmala, Athula, Kalyani, Sumanawathi and Vijaya, showed me the charts and assignments cards developed for several lessons.

Third, the teachers who earlier used to depend on outside sources for solutions to all problems now appeared to be finding solutions to their problems by themselves.

Example 1

One of the main concerns of teachers pertained to students' wide-ranging ability levels within one class. Hema and Latha seemed to have found the possibility of using multilevel teaching within multigrade teaching.

Example 2

Hema, though she was compelled to become a monograde teacher, was attempting to use multilevel teaching within her Grade 5 monograde class. In teaching on a multilevel basis she paid attention to the variations in abilities found in the students of Grade 5.

Example 3

Latha who had identified the student ability levels of two or three grades was able to focus on multilevel teaching within her multigrade class.

Example 4

Athula who actively participated in the intervention adapted the innovation to address the combination of discrete grades

Fourth, teachers retained samples of student work on separate sheets of paper to show me.

Fifth, some of the teachers were inclined to prepare additional lesson plans as a contribution to the lesson plan collection.

Nirmala, appreciated the innovation and adopted the innovation for her Grade 1+2 class. She brought the lesson plans that she prepared to the workshops. She was less concerned about the limited number of lesson plans for Grade 1+2 prepared at the workshop. She prepared her own lesson plans for the Grade 1+2 multigrade class.

Nevertheless, there were persisting problems in organising multigrade teaching in some of the schools. The situations are as follows:

In School 1, Gamunu, who remained in the school along with the principal after Kumara and Bimal had left the school, confided in me that the principal's

daily attendance became highly erratic. Although Gamunu showed some development of his capacity to engage in multigrade teaching, especially after the group lesson planning activity, he was unable to experiment with the lesson plans due to the problem of handling the whole school on his own which was too much to cope up with.

In School 10, Kusuma, who was the principal of school, had problems regarding an illness of a close family member during the third school term. Hence, I found her contribution had become minimal in teaching in the remote school far away from her home.

The main loss for the intervention during Cycle 2 was Kalyani's transfer from School 4. She was showing high commitment and competence for adopting the innovative strategy. She was compelled to return to her former school, as a result of the cancellation of all teacher transfers carried out during a stipulated period as a result of a court order issued after the legal proceedings of a case filed against zonal authorities. As a result she was unable to get involved in the intervention, apart from participating in workshops.

Malini from School 7 and Seeta from School 9 stated problems regarding completion of the syllabi on time:

Example 1

A considerable amount of lessons were remaining out of the previous term work in all grades. Although I was planning to concentrate on Grade 1 and 2, I could hardly engage in doing the work as planned because the principals had to go out of the school for many days for official purposes. In addition, I had to work on the Grade 2 essential learning competencies. I could implement only very few lessons out of the lesson plans (Malini).

Example 2

We could implement only a few lesson plans as the previous knowledge of students were much lower than their grade level expectations which made us (the team teaching trio) start with very basic facts. We devoted many lessons for one concept e.g., division. Ultimately however, we managed to improve the students' knowledge, skills and the joy for doing division (Seeta)

8.4.5 Stage 4: A summary review of Cycle 2

In Cycle 2, it was observed that there was a marked improvement in the commitment to successful engagement in multigrade teaching. Similarly, an improvement was observed in lesson implementation. A noteworthy significant feature was that all teachers had shown positive attitudes towards innovative lesson planning. It was also seen that a main reason for the success was the lesson planning in groups during a workshop. The observer's notes also corroborated the above reflections. The observer's notes on the workshop activities are as follows:

Teachers realized that they have not been able to engage in lesson planning meaningfully in Cycle 1; although common topics were selected according to teacher guides they were unable to combine it successfully for a single lesson (Observers notes. 25/8/2001).

Teachers showed a keenness to engage in self-reflection on their practices. They had overcome their hesitation in talking about multigrade teaching. They expressed readiness to share their experiences. Whereas at the beginning of the intervention they rarely discussed their attempts to teach but only dealt with the difficulties and problems they were facing in isolated schools, at this stage they showed more positive attitudes and eagerly engaged in conversations on classroom processes.

8.5 Summary

This chapter presented the intervention initiated by the researcher and implemented by a team including 18 teachers and two facilitators in the presence of an observer. The intervention was in two Cycles, each having four stages: planning, implementation, monitoring with facilitation and reflection. The main objective of the intervention was to implement the innovative strategy of lesson planning with curriculum adaptation. Cycle 1 revealed that the innovative strategy was useful. However, the teachers found it difficult to plan multigrade lessons on their own. Hence in the Cycle 2 arrangements were made to prepare the lesson plans in groups. Teachers obtained skill in planning and implementing multigrade lessons. Teachers observed the benefits of multigrade teaching through a systematic whole-class approach. The process revealed the challenges of adapting monograde syllabi for multigrade lesson planning.

CHAPTER 9

THE IMPACT OF THE INTERVENTION

This chapter incorporates Phase 3 of the study, assessing the impact of the intervention. Impact assessment is an essential element of any intervention programme, to obtain feedback on its effectiveness in order to decide on its suitability for future adoption and expansion with a view to wider application.

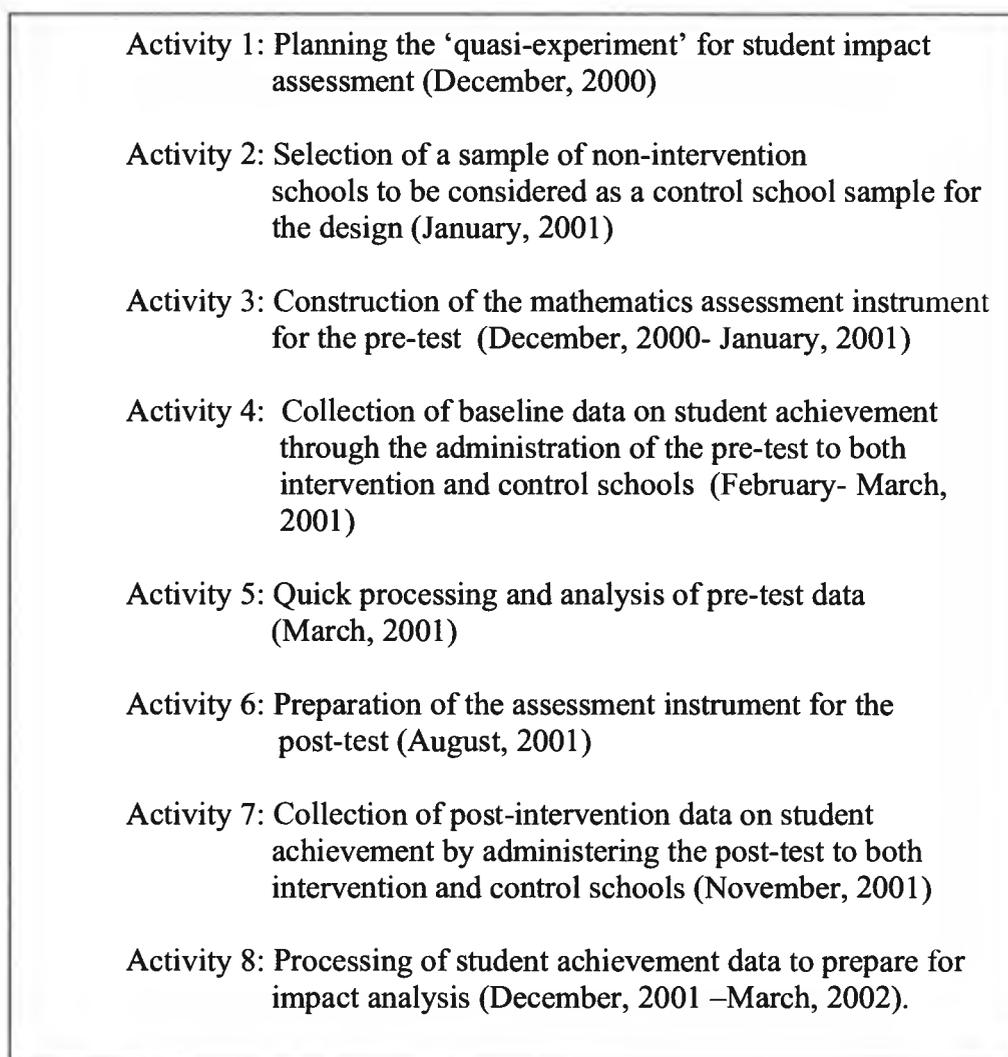
The chapter presents the impact of the intervention carried out across two dimensions. First, its effect on the achievement of the students (Phase 3: Step 1). Second, its effect on the team of teachers (Phase 3: Step 2). The impact on students was assessed through a quasi-experimental design and the results were statistically analysed and interpreted. The impact on the teachers was assessed through the expression of teacher satisfaction on the intervention.

9.1 Planning and data collection of Phase 3: Step 1

The objective of Phase 3: Step 1 was to assess whether the students who were taught by the teachers of the intervention team showed greater progress than the students in a group of schools not subjected to intervention but similar in most of the contextual conditions. The pre-test data generation and collection in Phase 3: Step 1 was planned simultaneously with the planning of the first step of the intervention, because baseline data had to be collected before the beginning of the intervention. The impact assessment of student achievement was limited to Grade 3, 4 and 5.

A plan was prepared to generate and collect data on the impact assessment with regard to student achievement (Figure 9.1):

Figure 9.1 Plan for impact assessment of student achievement



The main limitation in the impact assessment was the non-inclusion of Grade 1 and 2 students (mainly Grade 2) in the experiment although they were subjected to the intervention in Schools 1, 3, 5, 6, and 7. If they were to be included other modes of assessment, apart from written tests, had to be administered.

9.1.1 Activity 1: Planning the 'quasi-experiment'

The 'quasi-experiment' to assess the impact of the intervention was designed as given in Cook and Campbell (1979). The design is given in Figure 9.2

Figure 9.2: The ‘quasi-experiment’ design

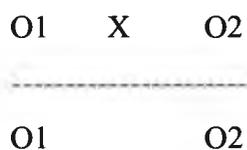


Figure 9.2 illustrates the ‘quasi-experiment’ model adopted for the study. The abbreviations used are as given in Cook and Campbell (1979). The fragmented line indicates that the model is a ‘quasi-experiment’, where items for experimental and control groups are not randomly selected. The intervention is denoted by ‘X’. Two groups to be compared are above and below the line. The group above the fragmented line is the ‘experimental’ group and the group below the line denotes the ‘control’ group. Both groups are tested at two points in time. The digits 01 indicate the pre-test and 02 indicate the post-test. This design conforms to ‘pre and post-test–one-control group’ design.

In this experiment, the experimental group is a group of students who were taught by the teachers who participated in the intervention. The control group has to be constituted of students from a group of schools comparable to those coming under the intervention. In the experimental model, the schools in which the intervention was made are referred to as ‘intervention schools’ and the sample multigrade schools selected from non-intervention multigrade schools were termed as ‘control schools’. The objective of the ‘quasi-experiment’ was to make a comparison of the difference in the achievement between the two groups of students after seven months of instruction.

9.1.2 Activity 2: Selection of a sample of control schools

The selection of a group of control schools was the activity 2 of the Phase 3: Step1. In order to make a valid comparison, a group of schools with comparable conditions to the intervention schools was purposefully selected.

The selection was done in two stages:

1. Selection of a comparable educational division.

Control schools were selected from an education division other than the education division from which the students were selected for the intervention. This measure was adopted to ensure that the schools constituting control schools are those that have not come under the influence of intervention schools. Kitulgala education division was selected out of the four in Dehiowita education zone, as it exhibited the closest contextual characteristics to the Deraniyagala education division.

2. Selection of the schools.

Five comparable schools from the Kitulgala education division were purposefully selected as control schools considering the data from Phase 1: Step 1 and by visits to several other schools which were not visited in Phase 1: Step 1. Characteristics considered were the degree of difficulty in access and physical conditions, student numbers, teacher numbers and multigrade arrangements. The instruments used for collection of contextual data are annexed (Appendix 9, pp.347-349). A summary of characteristics of the control schools are given in Table 9. 1.

Table 9.1 indicates that in the five control schools the conditions are mixed, with schools having only primary grade span as well as schools with post primary classes. Each of these schools had two multigrade classes handled by trained teachers with the main teaching approach adopted being the quasi-monograde approach.

Table 9.1 Multigrade arrangements in control schools

<i>School</i>	<i>Grade span and no. of students</i>	<i>Total no. of teachers</i>	<i>Grade combinations and student numbers</i>	<i>No. of multigrade teachers</i>	<i>Multigrade teachers' professional status</i>
11	1-11, 132 in total. 56 in primary	9 with 2 volunteers	1+2+3 (25) and 4+5 (31)	2	Both primary trained (through distance mode)
12	1-5, 33	3	1+2 (7) and 4+5 (8)	2	Both primary trained (through distance mode)
13	1-5, 51	3	1+2 (24) and 3+4 (19)	2	Both primary trained (through distance mode)
14	1-8, 69 in total. 49 in primary	5	1+2 (25) and 4+5 (14)	2	1+2 teacher is primary trained and 4+5 is ordinary trained in mother tongue (Sinhala)
15	1-5, 23	2	1+5 (13) and 3+4 (12)	2	Both primary trained (through distance mode)

9.1.3 Activity 3: Construction of the mathematics assessment instrument

Three instruments were prepared to assess the performance of the students in mathematics, at entry to Grades 3, 4, and 5. Construction of instruments was carried out in collaboration with the SRA and the Director of Primary Education, NIE, who was also the leader of the mathematics curriculum team.

The tasks involved in the construction of the instruments were as follows:

1. Selection of topics from the syllabi

It was decided to consider the following in the selection of topics:

- Include topics that are essential for development of basic competencies in Grades 3, 4 and 5.
- Select topics that develop across Grades 3, 4 and 5
- Include topics which could be assessed through a written test.

2. Determining the levels of testing

The pre-test was planned to be held at the beginning of academic year 2001 so that the intervention could be made during the year. As a result the baseline assessment instrument had to be constructed based on the contents of the syllabi of the previous grade. Thus, the tests were constructed to suit assessment of objectives laid out for Grades 2, 3 and 4 in the teacher guides. The summary of objectives expected to be reached at the entry to Grades 3, 4, and 5 on the five selected topics are given in Appendix 10, pp.350-351.

3. Preparation of test items

The items were selected from a question bank of the Primary Education Department of the NIE. Three test papers were constructed to enable self-administration. These three test papers are in Appendix 11, pp. 352-358.

Although the tests were restricted to a limited number of topics from the syllabi of each grade, teaching during intervention did not over-emphasise the importance of the selected five topics. Teachers were unaware of the selected topics for the achievement test. No copies of the pre-test papers were left in schools and there was no possibility of either teachers or students personally possessing copies of these test papers.

9.1.4 Activity 4: Collection of baseline data on student achievement

According to the 'quasi-experiment' the collection of baseline data prior to intervention was carried out through administration of the pre-test. The pre-test was administered across the intervention and control schools during February and March 2001.

Collection of data was carried out with the assistance of two personnel who were outsiders to the context and the project. Their assistance was obtained to serve two reasons. One was that collection of data of the fifteen schools (10 intervention and 5 control schools) had to be completed within a short period of time. As access to these schools was difficult it would have taken a long period of time if one person engaged in collecting data. The other was the necessity to maintain credibility of the findings through the involvement of outsiders who were not involved in implementing the intervention.

The conditions under which the achievement test was to be implemented were agreed amongst the three of us (the two assistants and I) in order to improve the reliability of the data. In administering the test it was agreed to:

1. prevent any teachers helping students in answering the test paper.
2. adopt measures to minimize copying from each other.
3. ensure that no blank test papers were left in the schools.
4. allow the students the time they require to complete the test.

With the arrangements that were made the pre-test data collection was completed by the second week of March 2001.

9.1.5 Activity 5: Quick processing and preliminary analysis of pre-test data

Processing of pre-test data had to be done rapidly to obtain an idea about the levels of achievement before the intervention. First, the answer sheets were

corrected with the help of two colleagues. Each correct answer was given one mark. The marks were tabulated using a SPSS data sheet.

9.1.6 Activity 6: Preparation of the student assessment instrument for the post-test

The post-test was prepared by selecting items from NIE test item collection. It was constructed on a format parallel to the format of the pre-test papers to make the comparison between the pre- and post-test scores possible. One of the papers is attached (Appendix 12, pp.359-361).

9.1.7 Activity 7: Collection of post-intervention data

The post-test was administered to both the intervention and non-intervention control groups, seven months after administering the pre-test. During the seven months the intervention schools were subjected to the intervention while the control schools functioned without the influence of any intervention.

9.1.8 Activity 8: Processing of pre- and post-test data for impact assessment

The processing of pre- and post-test data involved a range of tasks. First, test paper correcting was done with the help of a colleague. Second, the scores were tabulated into SPSS data files. Third, the pre and post-test data sets were matched and the students who did not take up both tests, due to absenteeism, were excluded from the data set. Fourth, verifications were made to arrive at a data set with matching pairs of pre and post-test scores. The following were the adjustments made:

1. The Grade 4 group from School 11 was eliminated because it became a monograde class during the intervention period and the combination resulting was 3+5.
2. The Grade 3 group from School 1 was eliminated as the teacher dropped out from the project as he was transferred out of the school. Hence, the combination included in the experiment was 4+5.

3. The Grades 4+5 multigrade class in School 4 was eliminated from the model, as the teacher was transferred.
4. The Grade 4 class from School 9 was eliminated as it became a monograde class when the principal of the school wanted to assign the class to a volunteer who was a music teacher in order to retain her in the school. The students in the Grade 5 class which functioned in a 'multilevel' mode was included in the experiment. However, a sub-set of Grade 5 students who were subjected to teaching focused at Grade 4, as a result of multilevel teaching, was inadvertently given the Grade 4 post-test, instead of Grade 5 test.

Once the processing was over, the number of subjects in the data set was as given in Table 9.2.

Table 9.2 Student numbers in the final data set of the experiment

<i>Grade</i>	<i>No. of students from Intervention Schools</i>	<i>No. of students from Control Schools</i>
Grade 3	28	15
Grade 4	44	14
Grade 5	47	27
Total	119	56

Table 9.2 shows that the number of multigrade students considered for the analysis was 175. Out of them 119 were from intervention schools and 56 were from control schools.

9.2 Analysis of data and interpretation of findings

Analysis of the pre- and post-test scores of student achievement data was carried out from March 2002. First, a preliminary analysis was carried out to describe the pre- and post-test outcomes. Second, further analysis was done

through a regression analysis to find out whether there was a significant change in the progress made by the schools under the intervention in contrast to the control group at the post-test. The following sections discuss the analysis and results.

9.2.1 Descriptive statistics

A descriptive data analysis was done to calculate the means and standard deviations of pre- and post-test scores of students' mathematics achievement (Table 9.3).

Table 9.3 Means, standard deviations and differences between means of the pre and post-tests in intervention and control schools

<i>Grade / maximum test score</i>	<i>Group/number of students</i>	<i>Pre-test mean and standard deviation</i>	<i>Post- test mean and standard deviation</i>	<i>Difference between the means</i>
3 (Max= 20)	Intervention N= 28	16.8 [3.7]	17.5 [2.6]	0.7
	Control N=15	16.3 [3.4]	15.7 [3.5]	-0.6
4 (Max= 17)	Intervention N=44	6.9 [4.2]	13.2 [4.3]	6.3
	Control N=14	8.1 [3.5]	8.5 [4.3]	0.4
5 (Max= 20)	Intervention N=47	9.9 [5.2]	14.8 [5.7]	4.9
	Control N=27	6.2 [5.0]	7.4 [4.8]	1.2

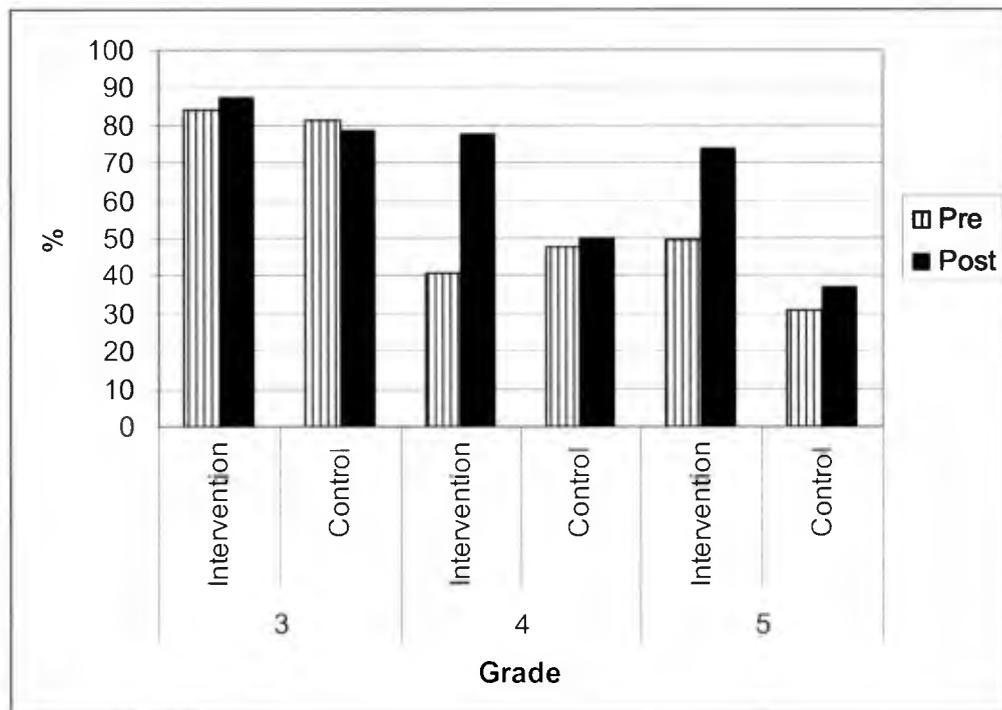
Table 9.3 shows the nature of the two data sets amongst the two groups of schools. The Grade 3 pre-test means of intervention and that of the control schools were 16.8 and 16.3 respectively out of a maximum test score of 20, which could be considered as relatively high. The Grade 4 pre-test means were 6.9 and 8.1 for intervention and control schools respectively out of a total test score of 17, which could be considered as below 50% level of the total score. The pre-test means of the Grade 5 intervention and control schools were 9.9 and 6.2 respectively out of a total test score of 20, which were much below the 50% level. It is apparent that Grade 3 has performed better than the other two

grades in intervention as well as in control schools. The mean score percentages are shown in Table 9.4 and Figure 9.3.

Table 9.4 The mean score percentages of pre- and post-tests

<i>Grade Group</i>	<i>Pre-test mean %</i>	<i>Post- test mean %</i>	<i>% Difference</i>
3-Intervention	84.0	87.5	+3.5
3-Control	81.5	78.5	-3.0
4-Intervention	40.6	77.6	+37.0
4-Control	47.6	50.0	+2.4
5-Intervention	49.5	74.0	+24.5
5-Control	31.0	37.0	+6.0

Figure 9.3 Graphical representation of the percentages of pre- and post- test mean scores



Comparison of differences of pre-and post test means of the different grades among the intervention and control schools using percentage mean scores illustrates several aspects. Among the mean differences in the intervention schools the smallest was between the post and pre-test sample means in Grade 3 (3.5%). However, the mean of the post-test of Grade 3 students in control schools was lower than that of the pre-test. Marked positive differences of the mean gains were obtained from intervention schools for Grade 4 and Grade 5 with 37% and 24.5% respectively. The corresponding values for the control schools were 2.4% and 6%. With these observed wide gains in the mean, it was reasonable to infer that it was more due to intervention than to chance. However, further analysis was done in order to determine the significance of the impact.

9.2.2 Linear regression analysis

A test of significance between intervention and control schools was carried out as the next step in analysis. The method of analysis was suggested by a member of the staff in the Mathematics Department of the Institute of Education, University of London after discussion of the nature of the data set (F. Steele, 2002, personal communication). The analysis is presented in the next sections.

A linear regression model was adopted with the difference (D) between pre and post-test scores as the response variable. When D was positive the post-test score was higher than pre-test score. Here D denotes the ‘gain in score’ (Plewis, 1997).

The hypotheses tested by the design were:

Hypothesis 1: On an average the difference between the mean of ‘gain in score’ of students in intervention schools will be significantly greater than that of students in control schools after two school terms of instruction.

Hypothesis 2: This difference will be consistent at the individual school level.

9.2.2.1 Testing for Hypothesis 1

The hypothesis 1 predicts that on an average the students in the intervention schools will show better progress than students in control schools. In the process of testing the hypothesis a variable named ‘Group’ was created to incorporate the two types of schools, the intervention and the control. In the regression model this variable was treated as the binary categorical explanatory variable. The ‘gain in score’ was considered as the response variable. To relate these two variables, one dummy variable was created for the binary explanatory variable. The dummy variable was coded value ‘0’ to denote the control group and value ‘1’ for the intervention group. The linear regression analysis was done using statistical package for SPSS version 9.

The results of the linear regression analysis to test Hypothesis 1 are given in Table 9.5

Hypothesis 1: On an average the difference between the ‘mean gain in score’ of students in the intervention schools will be significantly greater than that of students in control schools after two school terms of instruction.

Table 9.5 Results of linear regression analysis of the mathematics ‘mean gain in score’ by grades

	<i>Grade 3</i>		<i>Grade 4</i>		<i>Grade 5</i>	
	B	T	B	T	B	T
	1.38	-.83	5.89**	.36	3.69**	1.86
Constant	.67		.43		1.22	
Adjusted R square	.21		.24		.21	
F	1.91		18.77**		20.22**	
N	43		58		74	

Table 9.5 shows the results of the linear regression analysis of the mathematics 'mean gain in score' for the Grades 3, 4 and 5 for the intervention and control groups. The model explains about 20 percent of the variance (as shown by adjusted R square) indicating a somewhat high influence of other extraneous variables on the model. In the model, N denotes the sample size, which is the addition of units under both in the intervention and control schools. The sample size takes the values of 43, 58 and 74 for the Grades 3, 4 and 5 respectively. With reference to the Table 9.5 explanations on the grade-wise outcomes followed by a summary are as follows:

(i) Outcomes of Grade 3 analysis

As shown by the adjusted R square, 21 percent of the variance in mathematics gain in score is explained by this model.

As shown by F value of 1.91 with 1 and 41 *df* which gives a *p* value of .174, there is no hard evidence that mathematics 'mean gain in score' varies across these two groups, the intervention and the control.

As shown by *B*, the difference between the means of the 'gain in score' between the intervention and control groups is 1.38, which is not significant.

(ii) Outcomes of Grade 4 analysis

As shown by the adjusted R square, 24 percent of the variance in mathematics gain in score is explained by this model.

As shown by F value of 18.77 with 1 and 56 *df* which gives a *p* value of .0005, there is evidence that mathematics gain in score varies significantly across the two groups, the intervention and control.

As shown by *B* the difference between the means of the 'gain in score' is 5.89 which is significant at .05 level.

(iii) Outcomes of Grade 5 analysis

As shown by the adjusted R square, 21 percent of the variance in mathematics gain in score is explained by this model.

As shown by F value of 20.22 with 1 and 72 *df* which gives a *p* value of .0005, there is evidence that mathematics gain in score varies significantly across the two groups, the intervention and control.

As shown by *B*, the difference between the means of the 'gain in score' is 3.69 which is significant at .05 level.

In summary the differences between the means of the 'gain in scores' of control and intervention groups for the Grades 4 and 5 are significant at $p=.000$ level indicating the positive impact of the intervention.

9.2.2.2 Testing for Hypothesis 2

The hypothesis 2 of the design predicts that differences in the progress in mathematics between the intervention and control schools were consistent among the schools within each category. The assumption made here was that the students in all intervention schools would make better progress than the students in the control schools.

To run the linear regression model to test the hypothesis 2 a categorical explanatory variable 'School' was created for each school. Dummy variables were created according to the number of schools subjected for tests in each grade.

For Grade 3 analysis, 8 dummy variables were created as the total number of schools incorporated for the model was 9. Ten dummy variables were created for Grades 4 and 5 for the eleven schools incorporated for the model.

In creating the dummy variables, School 14 was considered as the baseline category. Although any school could have been selected as the baseline category, School 14 was thought as the most suitable as a baseline category as it had all the three grades included in the experiment with student numbers in each grade reasonably higher than the other schools.

The school-wise results of the linear regression analysis to test the Hypothesis 2 are given in Tables 9.6, 9.7 and 9.8.

Hypothesis 2: The differences in the progress in mathematics between the intervention and control schools were consistent among the schools within each category.

Table 9.6 School-wise linear regression analysis of mean gain in score for Grade 3

Intervention Schools	<i>Grade 3</i>	
	B	T
School 3	1.53 (1.73)	.89 (.38)
School 4	4.00 (2.03)	1.97 (.05)*
School 6	3.75 (2.03)	1.84 (.07)
School 7	-1.25 (1.93)	-.65 (.52)
School 10	.42 (1.85)	.23 (.82)
Control Schools		
School 11	1.15 (1.93)	.59 (.55)
School 13	-2.00 (2.03)	-.99 (.33)
School 15	1.75 (2.49)	.71 (.49)
Constant	-.75	
Adjusted R square	.17	
F	2.08 (.06)	
N	43	

Table 9.6 shows that in Grade 3, the model accounts for only 17 percent of the variance (as measured by R square). Consequently, most of the variance in the gain in score is unexplained by the intervention. F statistic is not significant indicating that there are hardly any differences between the variables in the

model. Out of the intervention schools only School 4 has a positive significant impact when compared with the School 14. Intervention schools 3, 6 and 10 although showing positive effects had failed to reach levels of significance. The intervention School 7 shows a negative impact.

Control schools 11 and 15 show positive impacts which are not significant. Control School 13 has a non-significant negative impact.

The school-wise results of the Grade 4 analysis is given in Table 9.7

Table 9.7 School-wise linear regression analysis of mean gain in score for Grade 4

Intervention Schools	Grade 4	
	B	T
School 1	3.17 (3.90)	.81 (.42)
School 2	3.27 (3.12)	1.05 (.30)
School 5	5.27 (3.12)	1.69 (.09)
School 6	4.67 (2.85)	1.64 (.10)
School 7	10.67 (3.90)	2.73 (.00)**
School 8	6.04 (2.69)	2.25 (.02)*
School 10	10.87 (3.12)	3.48 (.00)**
Control Schools		
School 12	-.58 (3.26)	-.18 (.85)
School 13	.87 (3.12)	.28 (.78)
School 15	-.33 (3.90)	-.08 (.93)
Constant	.33	
Adjusted R square	.29	
F	3.32 (.002)**	
N	58	

Table 9.7 shows that in Grade 4, the model accounts for 29% of the variance of the gain in score (as measured by adjusted R square), which means that model explains a satisfactory amount of the change that had occurred. F statistic indicates that there are significant differences between the variables in the model. The average gains in scores in all intervention schools are higher

than the School 14 and other control schools. The intervention schools 7, 8 and 10 have a significant effect on gain in score compared to control School 14. This is significant at $p = .05$ level. The positive effects of the intervention in schools 1, 2, 5 and 6 have failed to reach levels of significance.

The students in control schools 12 and 15 have made less progress than that in School 14. The progress of School 13 is almost similar to School 14.

Table 9.8 School-wise linear regression analysis of mean gain in score for Grade 5

Intervention Schools	Grade 5	
	B	T
School 1	2.87 (1.83)	1.57 (.12)
School 2	3.30 (1.47)	2.24 (.03)*
School 7	4.87 (1.82)	2.67 (.01) *
School 8	6.08 (1.44)	4.21 (.00) **
School 9	4.78 (1.54)	3.09 (.00) **
School 10	4.87 (1.82)	2.67 (.01) *
Control Schools		
School 11	3.81 (1.65)	2.31 (.02)*
School 12	1.33 (2.18)	.61 (.54)
School 13	-.33 (1.83)	-.18 (-.85)
School 15	-1.67 (2.18)	-.76 (.45)
Constant	.33	
Adjusted R square	.26	
F	3.6 (.001)**	
N	74	

Table 9.8 shows that in Grade 5, the model accounts for 26% of the variance (as measured by adjusted R square) which indicates that a significant amount of variation is explained by the model and the effect of extraneous variables is less. The F statistic indicates that there are significant differences between the variables in the model. The Table 9.8 shows that all the intervention schools except School 1 have positive significant impact on gain in score compared to

the control school 14. The impact of schools 2, 7, 8, 9 and 10 are significant at $p=.05$ level.

Out of the control schools, School 11 shows a significant positive impact as well. Control School 12 shows a positive non-significant impact, while students in Schools 13 and 15 show less progress than students in School 14.

9.3 Summary of outcomes of student achievement impact

The most salient finding of the quasi-experiment was that on an average the students of Grades 4 and 5 of the intervention schools made significantly better progress in mathematics after seven months of instruction than the students of the control schools. However, there was an improvement in the Grade 3 of the intervention schools over the control schools although not significant. An unexpected finding was that, in Grade 3 the control group post-test mean score showed a decline from the pre-test mean score.

In considering the school-wise performances of Grade 4 students, the progress made by School 7, and School 10 were highly significant. The progress made by School 8 was also significant. The progress made by all other intervention schools (Schools 1, 2, 5 and 6), although they did not show a significant difference, were better than the control schools.

The school-wise performance of Grade 5 students illustrates that the progress made by Schools 8 and 9 was highly significant. The progress made by Schools 2, 7 and 10 were noteworthy. School 11, which was a control school also made a somewhat significant progress. The only intervention school that did not make significant progress was School 1. However, it made more progress than two of the control schools, School 14 and School 11.

9.4 Post-hoc analysis of unintended outcomes

This section includes possible explanations for the following unintended outcomes of the quasi-experiment. The following questions are raised:

1. Why did not the intervention bring out a statistically positive significant impact on Grade 3 students?
2. How did the achievement levels of Grade 3 students in control schools decline at the post-test in contrast to those of the intervention schools?
3. How did the Grade 5 students of Control School 11 attain a statistically significant positive impact without having been subjected to intervention?
4. Why was not the progress made by the intervention Schools 1, 5 and 6 statistically significant?

The possible explanations for these questions are discussed.

1. Why did not the intervention bring out a statistically positive significant impact on Grade 3 students?

In analysing the achievement levels of Grade 3 students several issues come to the forefront. The major issue is the relatively high attainment levels shown by Grade 3 as against Grades 4 and 5. This discrepancy in attainment levels can be explained on different grounds. This particular Grade 3 group of 2001 was the first grade group which was exposed to primary education reforms in 1999 and hence, by 2001 the schools have had two years of attempting to teach them in accordance with education reforms. By the end of Key Stage 1 (Grade 2) they had also been subjected to assessment of Essential Learning Competencies. Besides, some schools focused special attention on this particular grade group and subjected them to monograde teaching, at the same time either advertently or inadvertently neglecting the other grades due to the lack of clarity and proper guidance in teacher assignment to grade groups in implementing reforms. Perhaps these causes may have contributed to the better performance of Grade 3 students in the pre-test when compared with other grades in both intervention and control schools.

Perhaps the 'ceiling effect' of the instrument did not allow a marked change in achievement levels of the Grade 3 groups to appear, which could be

pinpointed as the reason for the absence of a significant improvement at the post-test.

2. How did the achievement levels of Grade 3 students in control schools decline at the post-test in contrast to those of the intervention schools?

The teachers in both intervention and control schools responsible for Grade 3 faced problems in implementing the new Grade 3 curriculum in a multigrade mode. This was because the curriculum was new to them and also they were not conversant with multigrade teaching methods. However, this problem was eased out in the intervention schools through the support of the present study, whereas the control schools did not receive any such support. Therefore, it is possible that the students who got the guidance from the teachers of the control schools did not benefit as much as the students of intervention schools. This could be the main reason for the decline of the achievement level at the post-test in the Grade 3 students in control schools.

3. How was it possible for the Grade 5 students of Control School 11 to attain a statistically significant positive impact without having been subjected to intervention?

In Control School 11, the Grade 5 functioned in combination with Grade 4 at the beginning of the experimental period. It was later combined with Grade 3 as a result of Grade 4 being handed over to a volunteer. As the students in Grade 5 had to be prepared for the Grade 5 scholarship examination of that year the teachers naturally paid greater attention to them. This would have contributed to enhancing the achievement levels of Grade 5 students in the Control School 11.

4. Why was the progress made by the intervention Schools 1, 5 and 6 not statistically significant?

In the Intervention School 1, volunteer teacher Gamini was the only one from the school to participate in the intervention. Both the regular teacher and the

volunteer teacher who were in school at the beginning of the intervention left the school due to unavoidable circumstances. Gamini had to work amidst problems caused by high incidence of absenteeism by the principal who happened to be the only other teacher in the school. His commitment to the intervention was reflected through the improvement shown by the students although it was not statistically significant.

In the Intervention School 5, Athula although he adapted the innovative teaching strategy to the discrete grade combination, did not succeed in showing a significant impact on the student achievement. This may be due to the ineffectiveness of the innovative strategy for teaching to two grades far apart from each other in the grade span.

In the Intervention School 6, Kulasena who was responsible for the Grade 3+4 multigrade class failed to make a significant impact on the students' achievement levels. His absenteeism could have caused this effect. This came to light through Nirmala who was the teacher-in-charge of Grade 1+2 in the same school when she indicated that she attempted to compensate for Kulasena's absence.

9.5 Conclusions drawn from the student achievement impact assessment

From the statistical analysis on the mathematical test achievement data it could be concluded that the intervention had a positive impact on the multigrade teaching of mathematics. Thus, it shows the feasibility and suitability of the innovative strategy in teaching mathematics to multigrade classes. It also showed the necessity of training all members of the staff in schools with multigrade teaching needs.

The full impact made by the students could not be incorporated in to the design. For example, the impact made on the Grade 2 students when combined with Grade 3 and the improvement made by a set of Grade 5 students who were subjected to a level of instruction equivalent to Grade 4 as a result of the teacher adopting multilevel teaching strategy in School 9 etc, were not shown

in the design. Another aspect of impact that could not be assessed by the model was to gauge the degree of progress that students had made in attempting to answer though they had not succeeded in arriving at the correct answer.

9.6 Planning and data collection of Phase 3: Step 2

The change that occurred in the participants and how satisfied the teachers were with the changes were considered as measures of assessing the impact of an intervention. The active involvement of participants in the intervention process itself is an indication of success. The attendance for the workshops was almost one hundred percent. In addition, changes in the attitudes and beliefs of participants and stakeholders of any programme are also important for the sustainability and development of a programme. Although the teachers' participation in implementing the innovative strategy was closely monitored during the intervention to observe any impact, a terminal assessment was done in order to make an overall assessment of the impact made on the participants. The Phase 3: Step 2 was carried out to analyse the impact of the intervention on the teachers' views and beliefs.

The planned process involved two activities.

Activity 1: Inviting teachers' reflections (Workshop 6)

Activity 2: Analysis of reflections.

Workshop 6 was organised for the assessment of impact of the intervention on the teachers. It was led by me in the presence of the observer. The objective of inviting reflections from the teachers was to assess the impact of the intervention as a strategy for teaching in multigrade classes and as a model for teacher development. In order to achieve the objective the following indicators were used:

Indicator 1: Change in teachers' knowledge, attitudes and beliefs on multigrade teaching.

Indicator 2: Teacher satisfaction about the benefits received in respect

of the development of professional skills.

To generate data for indicator 1, both oral and written feedback for the following three questions were obtained:

1. What were the changes you experienced as a result of adopting the innovative strategy?
2. What do you think are the advantages of multigrade teaching for teachers and students?
3. Which do you prefer, monograde teaching or multigrade teaching?

To generate data on indicator 2, open reflections, both verbal and written were invited from the teachers.

9.7 Change in teachers' attitudes and beliefs on multigrade teaching

The beliefs of teachers are an important factor that determines the nature of their teaching. Chapter 5 indicated the general nature of the beliefs of the teachers who were faced with multigrade teaching needs. This section presents the beliefs of the team of teachers who participated as members of the intervention team at the end of Cycle 2.

All the teachers were convinced that the intervention had had a positive impact on student learning. Teachers gave examples to demonstrate improvements in student achievement. They had observed the changes in the motivation levels of students to engage in learning experiences. Teachers also indicated that the different grade groups preferred to learn in same classroom and that student absenteeism gradually decreased.

The most important breakthrough in teachers' beliefs was the dispelling of the view that multigrade teaching was an ineffective strategy. The teachers came to believe that multigrade teaching is an effective and a feasible strategy if implemented systematically. All the teachers said that their teaching prior to

the intervention was unsystematic and was carried out with little confidence. Further, before the intervention was made the teachers believed that mathematics was a subject that has to be taught to each grade separately and that it was impossible to teach it in a combined lesson. They were highly satisfied with the experience and the skills they obtained in multigrade practice through their participation in the intervention.

The teachers expressed their gratitude to the project as they became confident about their capability to make a contribution to the education of the isolated rural village children. The teachers recommended multigrade teaching as a strategy that is useful for all teachers in remote schools.

9.7.1 Advantages for students and teachers

By the end of the Cycle 2, teachers openly spoke about advantages of multigrade teaching for both the teachers and students. Teachers said that multigrade teaching is highly effective as it eases the difficulties of teachers who need to address more than one grade at a time. Their specific articulations could be categorised as follows:

(a) Better learning environment for students

Peer learning among students during multigrade teaching makes the teachers' task easier (Ajatha, Nirmala).

Students in upper grades get an opportunity of refreshing their memory on the subject matter and clarifying their doubts if any (Sena, Hema, Latha, Ajantha).

Students in lower grades could widen their knowledge from listening to subject content taught to upper grades (Sena, Hema, Ajantha, Kalyani).

Working environment become more lively when grades are combined in schools where number per grade group is small (Gamunu, Ajantha, Latha, Malini, Nirmala, Athula).

Peer learning gives opportunities for the students to learn and also imbibe good attitudes and practices such as empathy, helping others, co-operation (Nirmala, Hema, Kalyani, Vijaya, Chitra).

When the lessons are structured with common introductory activities in a multigrade class, students can recall and revise the previous knowledge (Kalyani).

Students of different grades can be grouped according to their abilities and they could gain from peer interactions (Malini, Chitra).

More student groups are subjected to teacher guided learning/activities in a given time (Kulasena, Gamunu, Vijaya, Nirmala, Ajatha).

It allows the teacher to identify the ability levels of students more effectively (Geeta, Malini).

Slow learners can benefit from working at their own levels (Chitra).

(b) Better utilisation of time

It is an effective strategy in terms of managing time (Kulasena, Sena, Hema, Kalyani, Malini, Kususms, Vijaya, Ajantha)

(c) Convenient for lesson planning

The possibility of addressing multiple grades with the same lesson topic makes lesson planning more convenient as there is no need to prepare two lesson plans separately (Nirmala, Hema, Latha, Kusuma).

(d) Addresses problems arising out of lack of teachers

It prevents disciplinary problems arising out of idling grade groups (Hema, Kusuma, Ajantha).

The problem of teacher shortages gets minimised (Nirmala, Hema, Geeta, Ajantha).

It is a solution for teacher absenteeism (Geeta)

9.7.2 Multigrade vs monograde teaching

Teachers were asked for their preference between multigrade and monograde teaching. All except two teachers stated that they preferred monograde teaching to multigrade teaching. However, all those teachers indicated they

would not mind engaging in multigrade teaching to address the unavoidable need in their schools. The following were some of their comments:

We do not mind engaging in multigrade teaching as it is a need (Sena, Hema, Nirmala, Kusuma, Malini).

It is a convenient strategy to address the need to handle more than one grade at a time due to lack of teachers (Latha, Ajantha, Gemunu, Athula).

The following were the responses of the two teachers who said they preferred multigrade teaching to monograde teaching:

It is possible to gain more self-satisfaction when thinking of the service it renders to the under privileged children (Kulasena).

Multigrade teaching is more challenging than monograde teaching. Therefore it is interesting and rewarding to experiment for more strategies (Kalyani).

9.8 The teachers turning out to be reflective practitioners and researchers

At the beginning of the intervention the teachers were heavily dependant on the facilitators in implementing the innovation. Most of them were reluctant to express ideas or to ask questions at workshops. As a result, the number of lessons implemented by each teacher during Cycle 1 was very few. However, with continued facilitation teachers began to engage themselves in experimenting with lesson planning and some of them even attempted to make further adaptations to lesson planning strategy. The impact of the intervention was such that most teachers took the initiative to experiment further to improve the situation. Also they shared their attempts with me. The following are some examples.

(a) Adoption of the innovative strategy to teach subjects other than mathematics

Some of the teachers had experimented to adopt the innovative strategy in teaching the mother tongue (Nirmala) , ENV (Sena and Kulasena) and Religion (Wijaya),

(b) Multi-level teaching in a monograde class

At the time of Cycle 2, Hema faced a situation where she had to let go one of her grade groups to a new voluntary teacher to oblige the directive of the principal. At that stage she was giving thought to implementing 'multi-level' teaching within the same grade. The following is her story:

I was relieved to give away Grade 4 as I faced the problem of handling a large number with a wide range of abilities. Then I faced that problem of implementing the multigrade lesson plans. The idea of multilevel teaching within a single grade impressed me as it seemed a suitable strategy to adopt in my Grade 5 class. Although the students were in Grade 5 some of them had learning needs of Grade 3 and/or 4. levels as they were subjected to ad hoc learning-teaching. I was able to match their abilities as being equivalent to Grades 3, 4 and 5. First, I used the few lesson plans that we prepared during the workshop, and attempted to prepare more when the need arose. I feel that this structure was more suitable for my Grade 5 class because students are now more relaxed, attentive and willingly participating in learning activities.

(c) Multigrade teaching in secondary grades

In the Cycle 2, Kalyani, in consequence of a court order had to leave School 4 and go back to her former school where there were already three teachers participating in the intervention. Kalyani was assigned to teach in secondary classes. She said that in that situation she adopted the multigrade strategy for the secondary grades, which existed as an unaddressed need.

(d) Maintaining teacher diaries

During the facilitation process teachers were encouraged to maintain reflective notes on their daily teaching and thinking. Seven teachers had maintained a notebook for reflective writing after being encouraged by the facilitators. None of the teachers had ever done that before.

A few entries made by Nirmala who was responsible for Grade 1 and 2 were as follows:

4.5.2001 Removed the cupboard that was kept as a partitioning between Grade 1 and 2. Now the two grades are in one class.

11.6.2001 Today I started teaching 'Addition'. I did the lesson for both grades although more lessons had to be completed for Grade 1 before doing this lesson. However, it was possible to do the lesson for both grades.

2.7.2001 Started measuring length for both grades. All were doing the activities as one group.

3.8.2001 Shapes – circle and square
Both grades observed the two shapes in the environment.
Grade 1s drew the objects while Grade 2s wrote the names of the objects.

Counting in twos. – It was a lesson in Grade 2 syllabi. However, Grade 1's were happy to join.

16.10.2001 Today I am responsible for all five grades. For Grades 4 and 5 did a lesson on problem-solving and gave them assignments from text book. Did a lesson for Grades 1,2, and 4 on reading the time. Although it is not included in the Grade 1 syllabi it was not difficult to make them join in.

The above is an example of a teacher attempting to solve the problems of multigrade practice, who became aware of the contextual demands, began questioning the practice, participated in curriculum development and tried to effect institutional change efforts.

9.9 Teachers' feedback and reflections on support received

The intervention framework had two main support mechanisms for the teachers. They were the whole group workshops and the school-based monitoring and facilitation at each school by the researcher. Responses were obtained regarding the two features.

All teachers gave highly positive feedback on workshops. According to the responses teachers appreciated the opportunity they got to participate in the workshops. The main reason for their favourable responses was the fact that they received a satisfying hearing for their problems and ideas.

In addition they appreciated the friendly environment in the workshops that encouraged them and emboldened them to come out with their ideas. The following statements from the diary notes they have made show how they appreciated the opportunity given to share their experiences:

We highly appreciate the attempt made to bring a group of multigrade teachers to share the experiences and to work as a group (Vijaya, Chitra, Seeta).

From the first session itself I came to understand the nature of the project and about all of you (meaning facilitators). I was impressed and became more interested (Seeta).

The atmosphere at the workshops was very friendly and therefore it was possible to speak out and express the difficulties and ideas (Seeta, Chita and Geeta).

All the teachers and especially those who were in remote locations were highly grateful to me for regular visits for monitoring and support during the intervention. The remarks of two teachers who were in the most difficult schools in the zone are given below:

We carried out our work in isolation under very difficult circumstances for a long time. This is the first instance that a very sincere and friendly type of attention was paid to us (Nirmala).

I am extremely thankful to you on behalf of the poor students for visiting my school to offer feedback to me. No one visits my school due to extreme difficulties of access (Athula).

The teachers' responses on the school-based observation and facilitation revealed the extent of the teachers' need for support and feedback during introduction of an innovation into their practice. The school-based monitoring and facilitation was found to be an essential component for the intervention action plan. It was doubtful whether the teachers would have accomplished the task of implementation of the innovation or even participated continuously in the intervention team if not for this feature. If not for the regular visits their feelings of isolation might have made the teachers abandon the innovation.

Visits to their classrooms were a relief to them because they wanted someone to understand the total situation of the school, their isolation and the difficulties.

The teachers' responses reflected the type of interaction I have had as a facilitator during school visits. They said that interactions with me made them confident and inspired and encouraged them.

Some of the comments were:

The motivation and the feedback received through your visits was invaluable (Vijaya).

Whenever I was faced with difficulty, I found there was an opportunity to clear my doubts and obtain support (Sumanawathi, Sena).

I appreciate on behalf of the innocent children in the school the service rendered through the school visits to discuss the problem situations that we face and the suggestions made to resolve them (Geeta).

The following statement reveals the concern a teacher had for my school visit:

I was expecting you last week and I was worried whether you had encountered any trouble (Hema)

The final few words of the teacher who spoke on behalf of the group was the best compliment I received in doing this study. The comment was spontaneous, and gave me the answer to the question that I never posed to the group of teachers but to which I was eager to have an answer. It was as follows:

You were like a sister to us. You gave us the encouragement and support that we needed which we never received before in our career.

This comment reflects the nature of the relationship I had developed with the teachers during the intervention.

9.10 Summary

This chapter presented the process and findings of the impact assessment of the intervention. The impact of the intervention was positive with regard to both students and teachers. The quasi-experiment on student achievement revealed that the innovative multigrade teaching strategy was successful in making an improvement in student learning outcomes.

The outcomes of the impact assessment on the teachers indicated that the innovative strategy of lesson planning accompanied with curriculum adaptation was effective in addressing the challenges of multigrade teaching and satisfying the needs of multigrade teachers.

CHAPTER 10

REFLECTIONS, CORE FINDINGS, IMPLICATIONS AND RECOMMENDATIONS

This chapter includes the researcher's reflections on the study, core findings with respect to each research question addressed by the field study, implications of the findings, and the recommendations for policy formulation and further research.

10.1 Researcher's reflections on conducting the study

This whole study evolved out of a continuous process of reflection. Such reflections made during the study were enormous. A few are presented in this section.

First, my reflections focused on the challenges of researching multigrade teaching in remote rural schools. It was a challenging task to locate and visit 54 schools in a rural area, where most schools were located in difficult terrain and in isolation. This became still more challenging as this was my first experience as an action researcher in which I had to adopt different roles in accordance with each situation that arose. In each of the steps of the three phases of the field study, the researcher's role was different. First, in Phase 1: Step 1, the researcher was 'a detached observer' surveying school contexts with multigrade teaching needs. Second, in Phase 1: Step 2, this role had to be modified to that of 'an observer-as-a-participant' in studying three selected multigrade schools for prolonged periods. Third, in Phase 2: Step 1, the researcher had to adopt the role of 'a planner' to make an intervention. Fourth, in Phase 2: Step 2, the role was a little more complex as it had to be a combination of 'a facilitator' of an intervention and 'a participant observer'. Fifth, in Phase 3 the researcher played the role of 'an evaluator' engaged in evaluating the impact through two different approaches, involving the administering of student achievement tests and the collection of feedback from

teachers. Just as it was challenging it was highly interesting and satisfying, too.

This study shows the importance of collaboration for action research. Different types of collaborative relationships were developed. Collaborations with the London supervisor, the SRA, the mathematics curriculum developers, the officer-in-charge of the teacher centre, and the teachers in the intervention group were key relationships that contributed to the study. These collaborations helped me to address the issues and overcome problems at different junctures and inspired me to research deeper and find solutions. In spite of all this I feel that there were limitations to my efforts. Some of them are given below:

- When problems and strategies were getting gradually clarified after two cycles of the intervention it was felt that further prolonging the intervention would have served a better purpose. Yet, the constraints were such that the intervention had to be concluded. Hence, I would prefer to regard this study merely as ‘the beginning of an action research’.
- I feel there were more reflections than those I have reported in this study and there were also smaller cycles within, in addition to the two intervention cycles or ‘shooting outs’ from the two intervention cycles, reporting of which is beyond the scope of this study. Such aspects emerged at the annual conferences cum field visits through participating as a member of the international research team; and the details of teamwork done by teachers within schools, could also not be reported.

10.2 Core findings of the field study

Core findings pertaining to research questions 3 to 7 which focused on the field study are presented in this section.

RQ3 what are the contextual characteristics of multigrade teaching schools in rural Sri Lanka?

RQ4 what are the current practices of multigrade teaching and the challenges faced by multigrade teachers in rural Sri Lanka?

RQ5 what innovations could be planned to improve multigrade teaching?

RQ6 what is the nature of the intervention that could be made in collaboration with teachers to improve multigrade teaching?

RQ7 what is the impact of the intervention?

The core findings pertaining to the above research questions are given in five sections 10.2.1 to 10.2.5 respectively.

10.2.1 Status of rural multigrade school contexts

The study has contributed to the education system of Sri Lanka by revealing the extent of the prevalence of multigrade teaching and its nature in rural areas. According to the findings based on the school sample in Dehiowita education zone, it is more appropriate to use the phrase ‘schools with multigrade teaching needs’ than ‘multigrade teaching schools’ to denote the existing status of multigrade teaching. The reason being that multigrade teaching was not found to be recognised as an option for teaching although the schools faced the need for it. Teachers and principals considered multigrade needs either as conditions or anomalies of teacher deployment which needed rectification by the education authorities. The field visits revealed that multigrade teaching conditions arose due to three main reasons:

- non-entitlement for a teacher per grade due to smallness of the student numbers of some of the schools
- teacher deployment disparities arisen due to teacher deficits and ad hoc transfers
- teacher absenteeism due to personal problems, lack of residential facilities, transport failures, rain and/or teachers taking long term-leave for maternity, study leave and medical leave

Five school situations needing multigrade teaching due to the three above factors could be identified through analysis of contextual factors of the school sample in Phase1: Step1. They were:

1. Schools mainly located in sparsely populated villages entitled to four or less teachers because of the low student enrolment.
2. Deficiency of teacher supply even to schools entitled to a full number of teachers forcing them to adopt multigrade teaching.

3. Schools which continue to lose popularity due to downgrading as a result of the rationalisation process and/or teacher shortages.
4. Schools located within growing communities and deciding to expand the grade range to cater for a small number of upper grade students.
5. The frequently occurring teacher absenteeism in schools which barely have a teacher entitlement to conduct monograde teaching.

The conditions revealed through this study matches with the category numbers 1, 3, 4, 5, 6 and 8 mentioned by Little (2001), referred to in Chapter 2, section 2.2.2 , pp.37-38.

Multigrade teaching situations were found in Type 1C, Type 2 and Type 3 schools. Of these the majority was Type 3 having less than 50 students among both Sinhala and Tamil schools. Hence, this study is an eye opener to realise the so far neglected needs of the rural small schools. The proportions of 'full' and 'partial' multigrade schools of the sample were 40% and 60% respectively. The projected estimation made according to the findings suggests the prevalence of multigrade teaching in about 40% of schools in Sri Lanka.

One of the major problems of multigrade schools in other countries in south and south-east Asia was found to be common to Sri Lanka as well. The majority of the sample schools were difficult to access from the main town of the area. This aspect corresponds with the statements by Veenman (1995) and Little (1995, 2001) as given Chapter 2, section 2.2.1 (pp.36-37) that most of the schools are located in areas with geographical barriers. However, these schools were the most convenient for the students of the respective remote villages in which the schools were situated.

According to the findings the school buildings, though not well maintained, did not impose obstacles for teaching-learning. The problems with regard to teachers' residential quarters were acute and were contributory to problems regarding teacher non-availability. However, the majority of these schools did not possess any resources other than poorly maintained school buildings, desks, chairs and one or two cupboards. This finding corroborated with other research carried out in rural schools in Sri Lanka (see Chapter 1, pp.19- 20).

The definition of multigrade teaching formulated according to the responses of teachers and principals was as follows:

A multigrade teaching situation is where a single teacher being responsible for instructing students belonging to more than one grade level, either adjacent or discrete, on a fixed or temporary basis, depending on the needs of the school, with or without teachers' recognising themselves as multigrade teachers.

This definition does not cover the meaning of the definitions of multigrade teaching given in Chapter 2, section 2.1.1 (pp. 33-34) as it only emphasises the act of 'being responsible' for rather than 'instructing' or 'organising instruction'.

Of the sample of teachers except for a few, all government appointed teachers had obtained their professional qualifications. These teachers, although they had heard the term 'multigrade teaching', were not aware of strategies for multigrade practice. Nevertheless they have served in multigrade contexts for a number of years. They were not able to give specific details of their service in multigrade schools. Except for one or two teachers, the majority possessed strong negative perceptions regarding multigrade teaching. They believed that monograde teaching is the only way for effective instruction, and that they could do only a minimum to improve the situation unless more teachers were supplied. However, after having heard from the researcher that there were different approaches to multigrade teaching they expressed their readiness to acquire an awareness of these approaches.

Other than these teachers there were community volunteers who handled teaching in multigrade classes. They were mobilised by the principals to meet the teacher shortages of the schools. They only possessed a pass in the G.C.E.(O/L) examination. These volunteers have had no opportunity to participate in any professional development sessions.

10.2.2 Realities of multigrade practice

Case studies of three schools helped in drawing conclusions regarding multigrade practice, based on observations of teaching and bringing the voice of the teachers in respect of their experiences in the sample schools. The three cases were selected to represent the three prominent categories of the school situations for which multigrade teaching was a necessity as identified in the earlier step of the study (conditions 1, 2, and 3 of Chapter 5, section 5.10.3, pp.156-157). The challenges the teachers had to face in addressing multigrade classes were related to poor facilities, lack of awareness for multigrade teaching and lack of supervision resulting in professional isolation. These were found to be similar to the global situation as given in Chapter 2, section 2.7 (pp.51-53).

In the three case study schools, the teaching approach predominantly adopted by multigrade teachers was to address each grade separately one after the other, which was termed the 'quasi-monograde' teaching approach. This approach to multigrade teaching is not referred to in multigrade literature. This perhaps may be due to the fact that the meaning it connotes is not quite in keeping with the true objectives of multigrade teaching. The adoption of this approach resulted in outcomes such as limited availability of time for teacher-guided learning, high student idle time, low use of curricular material, lack of opportunities for peer learning, and high teacher exhaustion. Neither the professional training they have had nor the in-service support provided at present has been of any help to them in addressing the multigrade classes effectively.

Quasi-monograde teaching came into use mainly because of two reasons. On the one hand, the syllabi were monograde and teachers were unable to adapt them for multigrade teaching; while on the other hand, the teachers were reluctant to combine the grades due to lack of any policy guidelines.

10.2.3 An innovative teaching strategy to address multigrade classes

Planning a systematic strategy for multigrade teaching was one of the main objectives in this study. Without limiting this to a mere fact-finding research, an attempt has been made in this study to progressively present suggestions for experimentation for the uplifting of multigrade teaching.

A curriculum analysis was carried out to recognise the structure of the organisation of content areas across the primary grade span. A lesson planning strategy was evolved to help the teachers adapt the graded curricula for multigrade teaching. The innovative strategy was developed focusing on mathematics. The emphasis of this strategy was to address more than one consecutive grade group in a single lesson on a common topic to suit the curricular objectives of different grades.

10.2.4 Insights resulting from the intervention

The intervention in the action research framework was most important as it included the major contribution of the study to the system. Intervention comprised of two consecutive cycles inclusive of four stages, namely: planning for action, action, monitoring with facilitation, and reflection. They formed sub-cycles of the main action research framework (Chapter 1, figure 1.1, p. 32 described in Chapter 4 sections 4.3 and 4.4, pp. 85-90). The intervention was carried out in collaboration between seventeen teachers from ten schools selected from Phase 1: Step 1 sample.

Intervention efforts were made to improve multigrade teaching through planning and implementing multigrade teaching according to the strategy visualised in the preceding step of the study. During the process of intervention, further restructuring of the innovative strategy was done with the involvement of the teachers.

Important features that facilitated the implementation of the innovative lessons were collaboration between members of the intervention team, and the support

extended through workshops and school visits by facilitators. Collaboration and support were encouraged through open communication, addressing individual difficulties, use of simple language and avoiding technical terms, school-based monitoring and facilitation, and developing friendships and collegueship.

The workshops and the meetings during the intervention served many purposes:

1. Assessing the initial teacher beliefs and practices of multigrade teaching and their subsequent changes.
2. Enabling the group to consistently share the opportunities and challenges of multigrade teaching.
3. Obtaining hands-on experience in innovative multigrade lesson planning strategies in a group in an enjoyable way.
4. Clarifying the problems of mathematics teaching directly by discussions with the curriculum developer.
5. Obtaining feedback and resolving problems on multigrade teaching.
6. Sharing the experiences of the intervention team.
7. Assessing the impact of the intervention through teachers' views.

School-based facilitation by the researcher served the following purposes:

1. The researcher could observe the teachers while in practice and provide the necessary feedback.
2. The researcher was able to obtain firsthand information from the teachers themselves regarding their problems and provide necessary feedback individually for specific problems.
3. The researcher was able to provide necessary feedback between workshops so that the teachers had time to implement the innovative teaching strategy for a considerable number of days before the next workshop of the whole team.
4. The researcher could make arrangements regarding the next workshop in advance to resolve any common problems faced by the teachers.
5. The researcher was able to make negotiations with the principals to facilitate the implementation of the innovation.

During the seven month period of intervention the teachers gradually began to adopt the innovative strategy to plan the lessons for teaching in multigrade classes and address two-grade and three-grade combinations depending on the necessity of the specific school contexts. The intervention cycles 1 and 2 clearly showed that the major issue that arose when adopting the innovative

strategy efficiently was the problem of time consumed in adapting several monograde syllabi to plan multigrade lessons.

All teachers became active participants in the intervention and collaborated in group tasks irrespective of age, experience or professional background. Although the participants greatly depended on facilitation at the beginning, most of the teachers later showed signs of gaining confidence to take responsibility to become reflective practitioners and classroom researchers.

10.2.5 Impact of the intervention on student achievement and teacher satisfaction

The impact of the intervention yielded positive outcomes regarding both student achievement and teacher satisfaction. The outcomes of the 'quasi-experiment' indicated a statistically significant positive influence of the intervention on student achievement. On the average this influence was consistent across the school sample in Grades 4 and 5.

With regard to teachers a major change occurred in teacher beliefs with their participation as members of the intervention team. At the commencement of the intervention almost all teachers had negative beliefs regarding multigrade teaching. However, their beliefs gradually changed, and they began to consider multigrade teaching as a useful strategy, especially in rural contexts where teachers per grade were lacking. By adapting the innovation to multilevel teaching in monograde classes, maintaining teacher diaries and applying their knowledge to other subject areas of the curriculum some of the teachers started to display characteristics of becoming teacher researchers.

Teachers attributed their change to the collaborative work carried out within the team and friendly and consistent support received through workshops and school-based facilitation.

10.3 Implications of the study

This study had an action-orientation. Nevertheless, there is a need to provide a theoretical basis while keeping a focus on action. In an action-oriented study theoretical underpinnings are viewed as moments or aspects interacting with action (Wertsch et al, 1995:61). This section discusses major implications arisen from the study with necessary *post-hoc* theorisations.

10.3.1 Need for policy recognition for multigrade teaching

This study has brought to the surface the hidden realities of the prevalence, the status, the need and the possible strategies for improving multigrade teaching in Sri Lanka. The study points out that the incidence of multigrade teaching cannot be further ignored. This study shows a positive impact on student achievement through systematising multigrade teaching. Through this a strong case for recognising a multigrade teaching strategy for primary education in rural Sri Lanka could be formulated.

A *post hoc* theoretical basis for explaining some of the positive impact on student achievement within multigrade contexts resulting as an outcome of the intervention may be drawn from the Vygotskyian perspective of ‘scaffolding’ or ‘mediating learning’. The concept of ‘co-operative learning’ is a recognised pedagogical practice that promotes learning, higher level thinking, pro-social behaviour and greater understanding of children with diverse learning, social and adjustment needs (Gillies et al., 2003: 13). Within this model, learning between peers is through ‘positive interdependence’, where each child completes his/her work but also ensures others do likewise (Gillies, 2003:37). The ‘quasi-monograde’ approach adopted by multigrade teachers before the intervention did not allow any interaction between students of different grades due to physical separation of grades and separate instruction to different grade groups. In contrast, the innovative multigrade approach adopted in this research permitted students of different grades to function in the same class on the same topic and to talk with each other as they completed their different

tasks. It may be inferred that multigrade innovations should promote peer learning as a positive strategy for achievement.

10.3.2 Multigrade teaching as a strategy for achieving the targets of 'Education for All'

Primary schools are the most widespread educational institutions catering for the rural populations and are found in the most isolated or remote areas (Husen and Postlethwaite, 1994). Most multigrade schools in Sri Lanka are found in rural areas and the majority of them are small schools. Small schools in Sri Lanka have been a target for closure as part of World Bank promoted strategies to rationalise the school system. However, the community response to closure has been negative and the Ministry has been forced to rethink the strategy (Little, 2003).

The goals of education for all involve improvements in both access and pedagogy (Little, 2003: 87). Multigrade teaching may be considered as a possible strategy for achieving both. On the one hand, the study has shown that the small village school is a necessity for isolated village communities lacking resources and facilities to send their children to urban schools. On the other hand, it shows that student achievement could be improved through addressing the quality issues of multigrade teaching. The study has shown how quality of teaching in rural 'small schools' could be improved so that they function as productive units and not get listed for closure.

There are seven conditions recognised by Little (2004) cited in UNESCO (2004: 155) for making multigrade teaching a positive strategy for education quality.

- Teachers and policy makers should be aware of the special needs involved.
- Curricula should be re-organised and adapted.
- Teaching should develop a range of teaching approaches to meet the needs of a multigrade setting, including peer learning, group learning and self-study.
- Adequate supplies of learning materials designed for individual and group learning are essential. Self-study materials cannot be a

- substitute for teachers; however, teachers should use the materials as part of an integrated teaching strategy.
- Learners should be involved in the general classroom management.
 - Pre-service and in-service training should be designed to prepare teachers.
 - Regular, frequent formative assessment by teachers is essential.

10.3.3 The need to address the issues regarding the national curriculum

The study has implications for addressing problems of education in rural contexts as most of them have multigrade situations. Husen and Postlethwaite (1994) have stated that primary schools in the third world with their existing formal education systems have produced only limited results in rural development, and that 'school has become counterproductive' to rural development as no intervention has been made considering the needs of rural school contexts. Nevertheless, the latest idea is that education should promote rural transformation:

The macro-perspective and policies and priorities in education at international and national level must be translated into a local perspective, informed and enriched by an understanding of rural transformation goals (UNESCO INRULED 2001: 18).

UNESCO INRULED (2001: 33) identifies four major challenges for an effective transformation. The first is the general attention and lower level of resources for education in rural areas. The second is the deficiency in respect of learning content and learning materials and teaching aids. The third is the gap between curricular design and its implementation in the classrooms in rural localities. The fourth is the centralised control of curriculum development and state produced textbooks which fail to recognise the reality of diverse rural circumstances.

This study corroborates the above. It has highlighted the shortcomings of the most recent primary curriculum reform. In considering the aspect of curricular design the reform has neglected to address the curricular needs of multigrade situations in spite of having a Key Stage structure enabling a teacher to be with a group of children for two years during the first four years of primary

schooling. This could be considered as a ‘missed opportunity’ for making curriculum considerations for multigrade teaching. Although a KS structure was envisaged the curriculum remained as a one-year graded structure. The curricular revisions were made on a grade by grade basis taking a grade a year which did not allow any opportunity to consider linkages or to seek curricular advantages across the grades within a KS (see Chapter 3, section 3.7, pp.75-76).

The reform has also created more challenges for the already neglected multigrade teaching contexts. The recommendations to separate the classrooms for each grade, and the training of two teachers for each grade of the KS have aggravated the already existing problems in multigrade teaching. The separate classrooms prevented the teachers from working in more than one grade at a time. The two teachers trained for the two grades needed to function as monograde teachers which resulted in neglecting certain other grades in schools with low teacher entitlements.

10.3.4 The need for a revised model for teacher capacity building

The three case studies in Chapter 6 bear evidence of the low quality of teaching in multigrade classes. Neither the training obtained through different modes of initial teacher training nor the continuing teacher training sessions have been of help to teachers when addressing multigrade classes. There is a strong possibility that the quality of teaching in other multigrade contexts could also be more or less similar to the three case study schools, because no support has been extended to improve the capacities of teachers to address the needs for multigrade teaching in Sri Lanka (see Chapter 3 section 3.6.2, pp.71-73).

The study also has contributed to our knowledge of a framework for teacher capacity building. The intervention generated significant changes in teacher knowledge, skills and beliefs. These changes resemble an ‘action learning set’ (McGill and Brockbank, 2004: 13). Action learning is a voluntary and a social process which is recognised as a powerful technique for education,

professional development and training. The key process involved in action learning is the 'interdependence' between facilitator and learners and between learners to result in developing 'independence' in learners as they take responsibility for their own learning. Although development through action learning could be slow it could result in a process of 'transformation' (McGill and Brockbank, 2004).

This model poses implications for the continuing teacher education programmes being conducted through the cascade model and those to be conducted by Teacher Centres (see Chapter 3, sections 3.6.2.6 and 3.6.2.7, p.73).

10.3.5 Repercussions on monograde teaching

The study shows how teachers were able to recognise how students in a range of ability levels benefited through multigrade instruction. Findings pointed towards the need to address the needs of students of a specific grade at a more micro-level. These findings point towards multigrade teaching as a strategy required by all teachers in all classes in all schools in all countries. Such a strategy reflects the multi-levelled nature of monograded as well as multigraded classes in terms of abilities, interests, social background and age (Little, 2001: 494).

10.4 Recommendations for policy

A series of policy recommendations are made for improvement of multigrade teaching in Sri Lanka.

10.4.1 Policy recognition for multigrade teaching

Policymakers need to consider and recognise the contexts in which multigrade is a necessity from which there should be no policy escape. Efforts should be made to give attention to the needs of multigrade contexts which were thus far

neglected. Policy adjustments are needed in two main areas - curriculum and teacher education.

- **Reorganising school curricula**

The findings of the study have implications for national curricula. The National Institute of Education needs to explore the possibilities of reorganising the national primary curricula to address the needs of multigrade teachers. Curriculum specialists of each subject need to work on the reorganisation of the content across the five grades of the primary tier. The process of re-sequencing of the curriculum content by Key Stages and preparing exemplary lesson plans for the mathematics curriculum commenced in 2003 through the project LATIMS (Learning and Teaching in Multigrade Settings). This project is sponsored by DFID, United Kingdom. The sequencing of curricula on other subjects are also scheduled to follow.

- **Teachers and teacher educators**

Capacity building of the different stakeholders is a major issue which needs policy formulation. The steps should be taken to develop a cadre of resource personnel as trainers and facilitators of multigrade teaching to assist in training courses conducted by the Universities, NIE and zonal education offices, as well as in school-based facilitation programmes.

Both initial as well as continuing teacher education policies need to incorporate capacity building of teachers in multigrade teaching. First, a special component of multigrade practice needs to be incorporated into initial teacher education courses especially to be offered for the B.Ed degree and NCOE primary education course. The responsibility for developing this teacher education component lies with the Faculty of Education, University of Colombo.

The following structure is proposed for a modular course for teacher development:

Module 1: Multigrade concept

- Definitions
- Need for multigrade: the global and local scenarios
 - Advantages of multigrade spelled out in terms of student learning needs and outcomes
 - Teacher's role as facilitator of student learning spelled out in terms of multigrade settings
 - Ensuring coherence and continuity in student learning in multigrade settings

Module 2: Experiencing the rural context

- Identification of the concept of 'rurality'
- Knowledge about existing resources
- The key role played by education in rural contexts
- The linkages between school, home and community
- Good practices that could be shared between school and community

Module 3: Managing structural aspects of multigrade settings

- Decisionmaking on grade combinations
- Physical layout patterns - their advantages and disadvantages
- Various grouping strategies - their advantages and disadvantages

Module 4: Managing procedural aspects of multigrade settings

- Curriculum re-sequencing
 - Knowledge and understanding of curriculum content and structure For each grade
 - Learning outcomes for each grade
 - Balancing of time
 - Lesson planning for the combined grades
- Multigrade strategies
 - Adapting suitable strategies for each combined lesson
 - Teachers working as a team in planning and implementing multigrade teaching
- Time Management
 - Preparation of an annual plan for multigrade classes
 - Timetabling for multigrade teaching
- Other Management Strategies, e.g. grouping

Module 5: Learning-teaching Materials Development

- Identification and production of appropriate learning-teaching materials
- Formative and summative assessment materials
 - Promote learner friendliness of materials
 - Materials should suit individual and collaborative use
 - Affordability of material
 - Suitability of material

Module 6: Practice teaching in a multigrade school

Of the six modules, development of Module 1 has been initiated by the researcher.

Second, the Teacher Centres need to facilitate on-going support programmes for multigrade teachers to prevent professional isolation. Multigrade teachers need to periodically meet to share their experiences. When the first step is taken the second could be initiated.

Third, the principals also need to be given training on organizing multigrade teaching. The training should include skills to develop appropriate timetables for specific multigrade teaching needs of the schools, decision-making skills on the suitable grade combinations for multigrade teaching, and leadership skills for functioning as a facilitator to integrate activities and human resources. In order to increase the efficiency of multigrade schools the principal should view the school as one unit and not as different grade groups. With the assistance of the researcher and the SRA some effort is taken by the NIE in this regard to incorporate a small component of multigrade teaching in professional upgrading programmes for the principals of the small schools in Sri Lanka. However, this effort has to be made more systematic and significant.

10.4.2 Adjustment in teacher deployment and retention policies

Teacher deployment is one of the most important variables causing the necessity for multigrade teaching. Several aspects need to be considered in this regard.

First, guidelines on calculating teacher requirements should be worked out at the school level, considering a suitable combination of teachers to be deployed for each school in situations where multigrade teaching is a necessity. Teachers' permanent residence is also a factor that should be considered.

Second, teacher transfer schemes should be regularized. Attempts should be made as far as possible to obtain the consent of teachers when transfers are being carried out. When implementing punishment transfers, care should be taken to see that teaching is not affected.

Third, deployment of English teachers for primary grades has to be regularized. The majority of the multigrade schools in the sample did not have English teachers although they were entitled to such teachers.

Fourth, a scheme of incentives including monetary, residential facilities, and also privileges for teachers' children need to be introduced if teachers are to be retained in difficult schools.

10.4.3 Developing the quality of rural small schools

In addressing the issues of rural transformation small schools need to be developed considering their unique characteristics. No school should be subject to closure due to smallness of the number of students, for these schools could be turned into economically viable units through the introduction of multigrade teaching. This would enable the village communities to have access to better quality education within their village.

The small schools should not be deprived of any material allocations due to their low student numbers. However, no separate classrooms should be provided for schools having fixed needs for multigrade teaching as they pose difficulties for the teachers to teach several grades simultaneously while keeping an eye on all students.

Remote schools should be provided with adequate teacher residential quarters with basic facilities. However, in some schools such quarters are situated in isolation and hence pose problems for residence as most of these areas have low population densities.

10.5 Relevance of this research model for future research

This study has illustrated the feasibility of conducting action research by teacher educators in collaboration with teachers in Sri Lanka. Action research is consistent with recent ideas on modes of policy research for education for all. Thus, action research is considered as a more suitable model to reach the goals of education for all. Its strength is recognised as it serves to improve education directly and to feed outcomes upward in the national policy process (Van Graan et al., 2003 cited in UNESCO, 2004).

The theoretical underpinnings of action research are drawn from socio-cultural and activity theory. This theory seeks relationships between human action and socio-cultural phenomena. Human action may be external as well as internal, and may be carried out by groups both small and large or by individuals. It is the belief that socio-cultural studies should be involved in changing and not just examining human action and the cultural, institutional, and historical settings in which it occurs. Hence, in socio-cultural research 'mediation' is considered to be an active process which 'shapes' human action. (Wertsch et al., 1995; Rogoff, 1995).

There are two basic ideas on tools for mediation. First is mediation through cultural tools or artefacts (Wertsch et al., 1995:22-23). These cultural tools or

artefacts would not be powerless to do anything unless they are effectively used. The second is the mediation through psychological tools such as 'participatory appropriation' and 'guided-participation' to bring about change in people involved in cultural activity. (Rogoff, 1995:142).

In this research the forms of mediation were (i) introducing the innovative multigrade teaching strategy, and (ii) facilitation through collaboration. These 'mediational means' could be considered as a combination of cultural and psychological tools. These forms of mediation enabled the empowerment of the teachers and the students.

In this regard the findings reveal that the teachers in Sri Lanka if given the effective facilitation, have the potential of becoming researchers. This has important implications for teacher development research. The study brought out the following as action steps that could be profitably followed during initial efforts of conducting action research:

1. Preliminary investigations of the existing nature of the situation
2. Preparation of an action plan to address the problem
3. Familiarisation with the situation, which needs improvement
4. Convincing the authorities about the need for improvement
5. Establishing rapport and formation of a group with members who feel the need to develop the situation
6. Planning an intervention
7. Bringing the members of the group together and sharing experiences
8. Introducing innovations and facilitating experimentation.
9. Regular interactions with the participants to encourage, providing support and resolving problems
10. Monitoring progress
11. Reflecting on actions
12. Evaluating impact of the intervention
13. Re-planning the intervention

10.6 Recommendations for future research

Wertsch (1995: 29) outlines two elements of progress of socio-cultural psychology:

- a. The interpretations of human activity, particularly the way in which agents took part in the signification of action.
- b. The knowledge that is built and transformed in action.

These two aspects seem to cover the areas for future research. In considering these aspects it could be concluded that more evaluations on the sustainability of the intervention and further generation of knowledge through research will be necessary before promoting a national scale reform. Areas for research leading from this study are as follows:

- **Effect of teacher qualifications and student gender on achievement resulting from the intervention**

The data on student achievement collected for the quasi-experiment were only analysed to see the effects of the intervention. However, further analysis could be done on this data to gain more insights on the effects of different variables on student achievement within the intervention. The following research questions make suggestions for further analysis:

1. Are there any effects of teacher qualifications and teaching experience on student achievement in both the intervention and control schools? Are there any interaction effects between the intervention and teacher qualifications and experience?
2. Are there any significant gender differences in student achievement in the intervention and control schools? Are there any interaction effects between the intervention and gender of student?

- **Follow-up studies on the intervention**

The intervention was completed in February 2002. In principle, it may be possible to follow up the teachers who participated in the intervention, provided they have remained teaching in the same or another multigrade school. Follow-up studies might examine (i) whether the intervention is sustainable when the facilitation is removed; (ii) further developments in the multigrade teaching approaches; (iii) effectiveness of the lesson material prepared through intervention, (iv) the possibility that the effects observed

derived from the 'Hawthorne effect'; and (v) the ethical issue of denying the intervention to the control schools. More specifically the following research questions could be framed:

1. What are the timetabling practices and what classroom routines have evolved as a result of the intervention?
2. Has the innovative teaching strategy been maintained in mathematics?
3. Has the mathematics teaching strategy been adapted for other subject areas?
4. What multigrade strategies did the teachers develop other than the one introduced through the intervention?
5. How effective would the lesson plans be when implemented in control schools?
6. How do students engage in peer-tutoring during multigrade teaching?
7. Would there be any differences in the impact of peer tutoring during multigrade teaching on different ability groups?

- **Researching Tamil medium multigrade schools**

The intervention in the present study was limited to Sinhala medium schools. Hence, it should be extended to Tamil medium schools as well. The research questions to be addressed are as follows:

1. How feasible is the implementation of the innovative teaching strategy in Tamil medium schools?
2. What is nature of the impact of such an intervention?

- **A database on multigrade prevalence**

A database on the prevalence of multigrade teaching needs to be developed. This could be done through including additional categories of data on the school census schedule. The following research questions would be appropriate:

1. What is the extent of the need for multigrade teaching at the primary level in the country?
2. What is the extent of the need for multigrade teaching at the secondary level in the country?

- **Small-scale action research through Teacher Centres**

Teacher Centres should facilitate small-scale action research on multigrade practice. These studies could be carried out by teachers in collaboration with teacher educators. This type of research would be useful in developing training packages for multigrade teaching. A few research questions could be suggested:

1. What are the most successful multigrade practices for different subjects?
2. What are the effects of class size and different physical arrangements on different multigrade strategies?

- **Focus on multigrade teaching in secondary grades**

This action research element of this study focused only on the multigrade needs of the primary grades. However, the documentary analysis and case study of School 'C' in Phase 1: Step 2 revealed the prevalence of multigrade teaching in the secondary grades. Since it cannot be ignored, studies focused on multigrade teaching in the secondary grades are recommended. A few relevant research questions are as follows:

1. How do the teacher deployment guidelines influence the necessity for multigrade teaching at the secondary level?
2. What are the teachers' perceptions regarding multigrade teaching in the secondary classes?
3. What subjects at the secondary level are mostly needing to be taught through multigrade teaching and why?

- **Efficacy of multilevel teaching**

Teachers who practised multigrade teaching recommended multilevel teaching as more appropriate to address students' diverse needs within both multigrade and monograde classes. It may be useful to probe the following questions:

1. How could multilevel teaching be defined within monograde grade and multigrade classes?
2. How feasible is multilevel teaching within multigrade and monograde classes?
3. How could teachers organise the resources for multilevel teaching?
4. How effective is multilevel teaching in meeting the needs of the individual learner?

- **Pointers to replication and scaling up research**

A few pointers for replication and scaling up research could be made through the findings of the present study.

- similar studies should be replicated both in Sri Lanka and in other countries
- governments might launch pilot projects with a view to scaling up small scale interventions to achieve the targets of EFA.
- research on the effects on teaching and learning of education decentralization and devolution of management and curricular autonomy to teachers and local teacher educators
- multidisciplinary research to develop new partnerships, tools, programmes and community capacity for improving education through multigrade teaching and the quality of rural life more generally .
- dissemination of research findings on practical implications of curriculum reforms towards improving multigrade teaching across regions such as south-Asia, southeast-Asia, sub-Saharan Africa and Latin America.

- introducing distance education methodologies for refresher courses on multigrade teaching.
- role of computers and information technology in rural education

10.7 Relevance of the findings beyond the Sri Lankan rural context

Many of the findings of the study could be extended to rural contexts especially in developing countries. The contextual characteristics of rural Sri Lanka are common to most rural contexts in the developing world. The criteria for identifying rural areas as given by IIEP/UNESCO (2003: 21) apply well to Sri Lanka and elsewhere. They are:

- a space where human settlement and infrastructure occupy only a small share of the landscape
- natural environment dominated by pastures, forests, mountains and deserts
- settlements of low density (about 5,000-10,000 persons)
- places where most people work on farms
- the availability of land at a relatively low cost
- a place where activities are affected by a high transaction cost associated with long distance from cities and poor infrastructure

In addition IIEP/UNESCO (2002, 2003) note a number of challenges that are common to rural and remote rural education contexts in low-income countries.

They are as follows:

- acute problems of access to education
- schools are often underserved by the national school system (in poor repair, poorly equipped, staffed with poorly prepared and poorly paid teachers)
- geographical factors isolating the schools
- may be marginalized from the mainstream by ethnicity, culture, language, or religion
- nutrition and health problems in students
- material poverty
- lack of curricular relevance

Attempts to improve multigrade teaching in rural schools need to consider the above challenges and to adopt a comprehensive social and economic approach to their solution. In addition to the particular challenges identified by

IIEP/UNESCO (2002, 2003) the following, derived from the results of this research should be added:

- high rates of teacher absenteeism and turnover
- teacher isolation and accommodation/family problems
- high rates of student absenteeism
- lack /absence of supervision by education officers
- poorly prepared principals to manage rural schools

But while rural multigrade schools face an array of challenges common to all schools located in rural communities it should also be noted that not all of the challenges facing rural multigrade schools are faced by all rural schools. Not all rural schools are small and not all teachers in rural schools need to transact the national curriculum in a multigraded way. In addition to the general challenges noted above, teachers in rural multigraded schools need to find ways of transacting or delivering a national curriculum designed for monograded classes. This requires professional support and materials design of the kinds outlined already in this research.

IIEP/UNESCO (2003) points out the need for approaches to education which are rurally sensitive, holistic and going beyond the narrow boundaries of the traditional agricultural and training concept. This would bring about a development of new ideas about themselves and the world around them, new attitudes and new hope for the future. The findings obtained from the present study on multigrade teaching in Sri Lanka confirm the suitability of the approach in implementing the national curricula within rural primary school contexts.

10.8 Summary

This chapter presented a summation of the study and directions for the future. This thesis is significant as it makes a constructive contribution in revealing the prevalence of multigrade teaching, problems involved in multigrade teaching, effective strategies that could be adopted, the usefulness of

collaboration with teachers in an intervention to improve multigrade teaching, and also presents the impact of the intervention.

The implications of the study cover a wide range of educational issues, such as achieving the targets of education for all, capacity building in if teacher educators and teachers, teacher deployment, curriculum reorganisation, school rationalisation, development of curricular material and feasibility of collaborative action research with teachers in Sri Lanka. This suggests that this research has very wide implications for the whole gamut of education

The study is original in two aspects. First, it is the first doctoral study in education in Sri Lanka to be completed as an action research. Hence, this study is a pilot lesson for future action researchers in the country. Second, it is a pioneer work on improving teaching and learning in multigrade classes through a systematic intervention. Therefore, it is hoped that the study will particularly serve some useful purpose as a guide for future attempts at uplifting multigrade teaching and generally in policy formulation for curriculum and teacher development.

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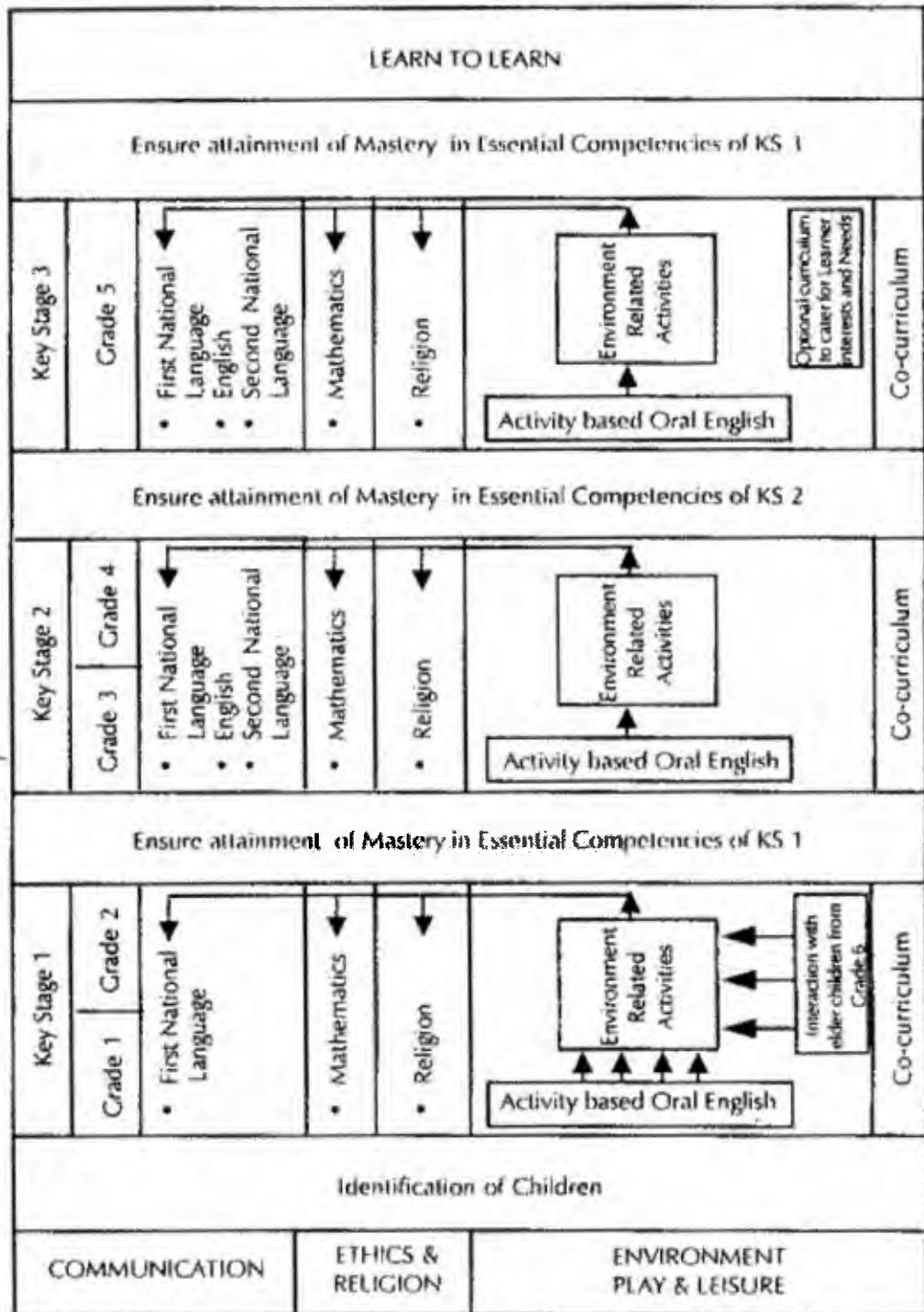
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Appendix 1

The framework of the primary education span



Appendix 2

Map of Sri Lanka indicating the province and the district where sample area is located



Appendix 3

Field guide for conducting condensed fieldwork/ case studies on multigrade teaching

Part I – School information

School Name:	Type:
Education Zone:	Education Division:
Date of visit:	
Time of arrival:	Departure time:

For the data items of Part I the source of information should be indicated (Whether through direct observation, interviews with principal/teachers/ community/students), through school documents. If the information was cross checked through several sources indicate that as well.

I. Location, topography and access

- Distance from main town:
- Travel time:
- Road conditions:
- Availability/frequency of public transport service:
- Distance from public transport
- Other information on accessibility:
- Researchers first observations and impressions on the school

2. General information

- Inception of the school
- Category of difficulty according to zonal classification
- Extent of the feeder area (the no. of families in the village)
- Popularity of the school (whether the community sends all the children to this school/not)
- The distance to the closest primary and secondary schools
- Effect of school rationalisation
- Any major problems faced by the school

Field guide continued.....

3. Physical resources

Nature of school buildings:

- General structure : location and environment, permanent/temporary, the number of buildings, partitioning, maintenance
- (a) classrooms
- (b) teacher quarters

- Adequacy of space
- Adequacy of furniture: adequate /inadequate
- Availability of electricity/telephone/ water
- Any aid received from development projects
- Use of space (Sketch diagramme)

Curricular materials

- Availability of Student textbooks and work books, teacher guides, syllabi
- Availability of other quality inputs

4. Human resources

A. Students

- No. of students by grade
- Average distance from the students' homes to school
- Information on enrolment and enrolment trends
- Rates of absenteeism
- Information on drop outs and non school goers
- Information on achievement

B. Teachers

- No. of teachers and their particulars (qualifications, age, residence, travel to school)
- Any explanations/reasons for the status of number of teachers
- Assignment of classes
- Willingness to serve in this school
- Absenteeism
- Teacher numbers during the past five years

Field guide continued...

C. Principal

- Personal information (gender, age, residence)
- Qualifications
- Experience (in this school and previous)
- Willingness to serve in this school

D. Other staff (Voluntary teachers)

- Number of members
- Qualifications
- Their work allocations

E. Community

- Population
- Major occupations
- Specific characteristics (migration, demographical, housing ..)
- General levels of health and nutrition
- Nature of support to the school

5. Multigrade teaching

- How many of the teachers have to teach more than one grade at a time?
- What grades are taught simultaneously by one teachers?
- Why are the grades clustered in these combinations?
- How is this combination facilitated by the school timetable?
- How long has this situation prevailed?
- What are reasons for this situation to arise?
- What are possibilities that this situation would exist in the future?

Field guide continued....

Part II –Multigrade teacher interview schedule
(open interview)

Personal Information

- Age
- Gender
- Ethnicity
- Current residence
- Permanent residence
- Family

Professional information

- No. of years in this school
- Educational and professional qualifications
- Nature of appointment
- Total teaching experience
- Reasons for serving in this school
- Any difficulties encountered in serving this school
- Future expectations

Multigrade teaching

- What are the grade groups assigned to you?
- What are the current responsibilities regarding the grade groups assigned?
- What strategies adopted in addressing the grade groups ?
- What are the grade groups do you teach simultaneously?
- How long have this situation prevailed?
- How do you find teaching more than one grade at a time?
- What is your general approach to teaching more than one grade?
- How different your approach is in teaching different subjects?
- How did you get the knowledge to plan this way of teaching?
- What are the problems that you encounter in this way of teaching?
- What are the effects of this way of teaching on the students?
- Have you heard about multigrade teaching ? If yes from where and what?
- If provided how useful would be a training on multigrade teaching?

Field guide continued....

Part III - Observations on multigrade classes and teaching

- Grades combined and student numbers :
- Multigrade teacher
- Physical arrangement: (Sketch diagramme)

(Grade group seating arrangements (same building/ different building or same classroom /separate classrooms, nature of groups whether grade-wise/ mixed)

- The period according to the timetable
- Instruction strategy

(a) Subject/s taught

- (1) Teaches same subject to all grade groups
If yes what is the subject?
- (2) Teach different subjects to different grade groups
If yes what are the subjects?
- (3). Teach one grade group a subject are while the other group/s are given a holding activity

(b) Management of grade groups

- (1) Teacher instructs one class while seat work is given to others
- (2) Teacher instructs one or more classes seat work is given to others
- (3) Different grade groups engage in doing assignments put on blackboard or worksheet and the teachers checks the work
- (4) Teacher instruct all the grade groups with some general instruction and assigns work according to grade levels.
- (5) Each grade group is taught one after the other.
- (6) Other

- Is there a lesson plan available?
- What are the resources used?

Field guide continued...

- What teaching methods were used?
- Structure of the lesson
 - Introduction
 - Lesson development
 - Activities
 - Assessment
- Are the students in different grade groups engage in same/ different activities?
- How well do students engage in assignments?
- What is the arrangement once the assigned work is completed?
- What is the nature of interaction between teacher and students?

Appendix 4

Time allocation for each subject of the primary curriculum across the grade span

3.1 Time Table

The time allocated for each subject area and other school activity is given below. Teachers are allowed some flexibility in planning their daily programme within the time allocated. Teachers are encouraged to be creative in planning their activities.

Subject Area/Item	No. of Hours Per Week					
	Key Stage 1		Key Stage 2		Key Stage 3	
	Hrs.	Mins.	Hrs.	Mins.	Hrs.	Mins.
First language	5	00	5	00	5	00
English	-	-	3	00	3	30
Second national language	-	-	1	00	1	00
Mathematics	3	30	5	00	5	00
Environment related activities	6	00	6	00	7	30
Religion	1	15	2	00	2	00
Co-curriculum	0	30	0	30	0	30
Optional curriculum	-	-	-	-	0	30
Total instructional time	16	15	22	30	25	00
Intervals	1	15	2	30	2	30
Assembly & religious practices	1	15	1	15	1	15
Physical health activities	1	15	1	15	1	15
Total school time	20	00	27	30	30	00

Significant characteristics of this distribution of time are:

- i. Allocation of more time for first language than for mathematics in Key Stage 1
- ii. Allocation of time for co-curricular and optional activities
- iii. Allocation of an interval of 30 minutes each day for Key Stages 2 and 3

3.2 School Hours

Key Stage 1	Key Stage 2	Key Stage 3
8.00 a.m. - 12 noon	8.00 a.m. - 1.30 p.m.	8.00 a.m. - 2.00 p.m.

Source: Primary Education Planning Project, Ministry of Education and Higher Education, 2000

Appendix 5

A sample of objectives for some selected topics in the mathematics across the grade span

Theme	Topic	Key Stage				
		Grade 1	Grade 2	Grade 3	Grade 4	
Number	Number Concepts	Understanding and use of numbers from 1 - 9. Reading the numerals. Writing the numerals.	Understanding and use of numbers from 1 - 100. Ordering any three numbers less than 100. Reading the numerals. Writing the numerals. Place value of 2 digit numbers.	Understanding and use of numbers from 1 - 1 000. Reading the numerals. Writing the numerals. Understanding of place values up to hundred's place. Ordering three numbers less than 100.	Understanding and use of numbers from 1 - 10 000. Reading the numerals. Writing the numerals. Understanding of place values up to thousand's place.	
		Mathematical Operation	Addition	Adding of two numbers, without carrying over, sum not exceeding 100.	Addition of two or three numbers, of not more than two digits (with carrying over from unit's place).	Addition of two or three numbers, of not more than three digits, sum not exceeding 1000, with carrying over from ten's place.
	Subtraction		Subtraction using objects and figures (quantity not exceeding 19). Subtracting a number not greater than 9 from another number not greater than 9.	Subtraction without bringing forward, of numbers not greater than 99.	Subtraction with bringing forward in one occasion (numbers of not more than three digits).	Subtraction with bringing forward in two occasions (numbers of not more than four digits).
	Multiplication			Multiplication of numbers not exceeding two digits by 2, 3, 4, 5 and 10, without carrying over.	Multiplication of numbers not exceeding two digits by numbers from 2 to 10.	Consolidating multiplication of two digit numbers by numbers from 2 to 10.

Source: PMP curricular materials, National Institute of Education, 1999

Appendix 6

A lesson plan from Grade 3 teacher guide

Week 12: Addition by counting and recording groups of objects to a maximum of 20

Objectives

Pupils will be able to count the number of objects in small groups and add three of these numbers to find the total using practical methods with counters.

Resources

For the introduction you will need three shopping bags and up to 20 items of shopping such as packets, boxes, cans, fruits, etc.

For the group activity, each group will need a dice or number spinner from 1 to 6 and 18 counters (such as bottle caps, buttons, ekel sticks or large seeds).

Whole Class Introduction (10 minutes)

1. Tell the pupils that you have been shopping.
2. Show them three shopping bags full of packets, tins and boxes.
3. Ask them to help you find out how many things you have bought altogether.
4. First tip out the contents of bag number one and ask a volunteer to come and count the number of items.
5. Write the number on the board.
6. Repeat this for each of the other two bags, writing the numbers one under another.
7. Make a big pile of all the items and ask your volunteer to pick up each item in turn and place it to one side while the rest of the class helps to keep count of the total.
8. Write the total under the column of numbers. For example:

Bag 1	7
Bag 2	5
Bag 3	6
Total number of items	18

9. Ask the volunteer to repack the bags, but putting different numbers of items into each bag.
10. Then ask for a second volunteer to unpack the bags and count the number of items in each.
11. Count and record the totals just as before.
12. Repeat this several times, removing some of the items from the total so that different combinations of items and totals will be found.

Group Activity (10 to 15 minutes)

1. Organise the class into groups of 3 or 4.
2. Explain that each person in a group should take it in turns to spin the spinner or throw the dice three times.
3. Each time they should take the number of counters shown by the spinner or dice.
4. They must write down the three numbers and then put all the counters together to count the total.

For example:

throw 1	5
throw 2	3
throw 3	4
<u>total</u>	<u>12</u>

5. Ask them what is the smallest number that they could get with 3 throws or three spins. The answer is three 1s, a total of 3.
6. Ask them what is the highest number they could get. The answer is three 6s, a total of 18.
7. Explain that the winner of the game is the child who manages to get every total from 3 to 18.
8. Where pupils are showing some difficulty in playing the game, tell them to throw the dice or spin the number spinner only twice. In this case, the winner will be the child who manages to throw every combination of scores from 2 to 12.

Conclusion

- While the pupils are playing the game, check each group to be sure that they are counting the totals correctly.
- When the game has gone on long enough ask some of the groups to show the others some of their totals.
- There are many different ways in which some of the totals can be made. For example, 10 can be made from $8 + 1 + 1$, $7 + 2 + 1$, $6 + 3 + 1$, $6 + 2 + 2$, $5 + 4 + 1$, $4 + 4 + 2$ and $4 + 3 + 3$. Ask what numbers the pupils found that made the total of 9 and 12 and 15, for example.

Source: PMP curricular materials, National Institute of Education, 1999

Appendix 7

The sequence of topics of mathematics of Grades 2 and 3 of the first 12 weeks of the year

Week	Grade 2	Grade 3
1	Sorting objects into sets by size, shape, colour, texture etc.	Revision of number and place value to 99.
2	Introducing three dimensional shapes.	Telling the time in hours
3	Ordering objects by size, shade of colour, texture etc.	Addition using 1 and 2 digit numbers; introducing carrying forward
4	Revision of numbers to 9 counting and recording accurately	Revision of subtraction from 2 digit numbers
5	Introducing relationships	Introducing standard measurement of length using meters
6	Revision of repeating patterns of colour, shape and size	Revision of number patterns
7	Simple addition and subtraction up to 9	Using coins in simple transactions
8	Introducing two-dimensional shapes	Introducing division
9	Introducing place value and zero	Introducing the fraction 'half'
10	Sorting objects into groups of 10 with remaining units	Beginning multiplication
11	Introducing measurement of length using arbitrary units	Two and three dimensional shapes
12	Addition to 20	Assessment of ELC's

Source: Grade 2 and 3 teacher guides 1999, 2000, NIE.

Appendix 8

Some of the Lesson plans prepared in groups during Cycle 2

Lesson Plan I

Grade combination; 1 and 2

Lesson: Money

No. of periods: 2

Objectives: Grade 1- Do transactions using a single coin

Grade 2- Express the price of a few items

Add the cost of two items

Do transactions

Resources; Coins in circulation, a vessel to put coins, and fake coins

Vocabulary; rupee, two rupees, five rupees, value, price, list

Introduction:

- Teacher recites a poem shaking the coins in a till, Teacher asks what is there in the till. Students answer guessing from the sound.
- Teacher empties the till onto teacher's table.
- Students examine the rupee coins.

Group activities:

- Divide into two groups according to grade. Students examine the coins. Students who can are asked to help others.
- Items brought from home by the students are placed on the table.
- Students in Grade 2 tell the price of the items and a price list is prepared.
- Get a Grade 2 student to act as the shop keeper and ask the students to engage in business transactions.
- Teacher observes.

Individual work:

Grade 1: Assignment cards are given with matching the diagrammes of coins with values.

Grade 2: Finding the cost of two items.

Lesson Plan 2

Grade combination: 4 and 5

Lesson; Money

Number of periods: 2

Objectives: Grade 4- Additions and subtracting amounts not exceeding Rs. 1000/=

Grade 5- Finding cost of less than 10 items where total cost does not exceed Rs. 1000/=

Resources: bills (paid), price lists, price tags

Vocabulary: notes, coins, transactions, market, trader, addition, total cost

Introduction:

Asking a few oral questions. Eg. What is the cost of two school bags if one bag is Rs. 100/=

Lesson development:

Individual students are asked to come in front of the class and asked questions based on bills.

Example;

Step 1- “Come here Amitha. Please take any two items from here (labels and tags) and write their prices on the board.

Step 2- “Amitha, can you now find how much money you need to buy these items? What have we to do?”

Step 3- “Now if you give the Rs 500/= note to the shop keeper, how do you calculate the balance he has to give you?

(First consolidate the addition and give an activity to Grade 4 and then proceed with the Step3)

Several opportunities are given to students to come forward and engage in the activity.

Step 4- Individual assignments to be written in books

Lesson Plan 3

Grade combination: 2 and 3

Lesson: Time

No. of periods; 1

Objectives: Grade 2: Consolidate about time associated with
daily activities

Grade 3- Know the number of days in each month

Vocabulary: minutes, hour, days, clock, calendar.

Introduction:

Students are made to sing and act a song about a clock. They are asked questions on the content of the song. Cards with the words of the song are given to the students. Questions are posed.

A brief discussion about the daily routine.

Examples: Coming to school at the seven in the morning

Closure of school in the afternoon.

Having dinner at seven in the evening.

Group activities:

Grade 2: Students are led to write the times in a table giving events closely associated with their life.

Grade 3- Divide the students into groups and ask to find the number of days in each month and record.

Lesson Plan 4

Grade combination: 4 and 5

Lesson; Division

Number of periods; 1

Objective for both grades: Division of three digit numbers by two, three using practical ways.

Resources; ekels (bundles of 10), straws, cubes

Vocabulary: Division

Introduction:

1. Tell the students that there are 50 mangoes in a bag. Ask students for how many could be given if you give two each.
2. Give 10 bundles of ekels and get a student to count a bundle.
3. Ask students the total in 10 bundles.
4. Ask students what total in 5 bundles.
5. Students are shown that it could be written as $100 \div 2 = 50$

Group activities:

Grade 4: Divide the students into pairs. Distribute adequate amount of above material. Give assignment cards. Get the students to write in their books.

$$120 \div 2 = \quad 88 \div 2 = \dots\dots\dots$$

Grade 5: Assignments from text books

* For slow learners get them to do more activities using material.

Appendix 9

Instruments used to collect contextual data of control schools

(I) Interview schedule for Principals

1. Location of the school and background data

- Distance to the closest town centre
- Details about access to the schools/ public transport
- Distance to the closest schools
- Drinking water facilities
- Electricity
- Number of families in the village

2. Students

- Number of students enrolled by grade, by gender and number of drop outs

Grade	No. enrolled		Dropouts
1	Girls	Boys	
2			

- Reasons for dropping out

1.....
2.....

- Do primary children in the village attend other schools? Yes/No
If yes, why?

- What distances do children travel to come to this school?
- Number of applications received for Grade 1 for 2002?

3. Principal

- Gender
- Residence:

- Training received:

- Experience:

- Do you engage in teaching?
Give reasons for your answer.

4. Teacher availability

- Number of teachers (government and volunteer):
- Qualifications:
- Work allocations

5. Availability of Curricular material

- Syllabi cum teacher guide for Grade 1, 2, 3, 4 and 5
- Source Book for Grade 1 and 2
- Student textbooks

6. Availability of teacher residential quarters

- Are there staff quarters in the school?
- Is there a teacher/principal occupying it?
- If no, give reasons.....

7. Visits by the ISA/Education officer

- How many time the ISA visit your school.
- Did any other officer visit the school during this year?
- If yes, please give details.....

II. Interview schedule for teachers

School No..... Teacher No.....

- Training
- Period of service (total as well as in this school)
- Grades teaching at present
- Residence
- Model of transport to school
- Were you able to complete the syllabus of work for this year?
- Do you teach same subject to more than one grade within a timetabled period?
- How do you address the situation?
- How long have you been teaching two or several classes at the same time?
- What are your views about it?

III. School observation

School No.

- What are the activities that were taking place when visited the school?
- Sketch diagramme of the structure of classes/grades arranged in the school
- The attendance of Principal, teachers and students on the day of the visit:
- School timetable (Availability, the problems/)
- Other information:

Appendix 10

Objectives of mathematics topics included in the student
Achievement test instruments

<i>Topic</i>	<i>Objectives of mathematics expected to be achieved at entry/ (Question number of the paper)</i>		
	<i>Grade 3 at entry</i>	<i>Grade 4 at entry</i>	<i>Grade 5 at entry</i>
Sorting	Separating pictures in a given set by one sub property (Q.1, one sum)	—	—
Ordering	Ordering same kind of pictures in a sequence (Q.2, one sum)	—	—
Number	*Counting from 1-10 and 10-20. Writing the numerals (Q.3, two sums)	—	—
Addition	*Addition of figures with sum not exceeding 10 (Q.4, one sum) * Addition of two numbers without carrying over sum not exceeding 20 horizontal and vertical. (Q.6, five sums)	*Addition of two numbers of not more than three digits without carrying over (Q.1, one sum) * Addition of two numbers with two or and three digits with carrying over from unit's place. (Q. 1, two sums)	*Addition of two numbers of not more than three digits without carrying over (Q.1, one sum) * Addition of two numbers with two and three digits with carrying over from ten's place. (Q. 1, one sum) *Addition of two numbers with two and three digits with carrying over from unit's and ten's place. (Q. 1, one sum)
Subtraction	*Subtraction using figures quantity not exceeding 10 . (Q.5, one sum) * Subtraction using a number not greater 9 from another number not greater than 9	* Subtraction of two digit numbers without bringing forward of numbers not greater than 10 and 100. (Q. 2, two sums) * Subtraction of two digit numbers	* Subtraction of two digit numbers without bringing forward of numbers not greater than 10 and 100. (Q. 2, one sum) * Subtraction of

	horizontal and vertical (<i>Q. 7, five sums</i>)	with bringing forward in numbers not greater than 100. (<i>Q.2, one sum</i>)	two digit numbers with bringing forward in numbers not greater than 100. (<i>Q.2, one sum</i>) *Subtraction of three digit numbers with bringing forward. (<i>Q.2, two sum</i>)
Multiplication	—	*Multiplication of numbers not exceeding two digits by 2 and 5. (<i>Q.3, two sums</i>)	*Multiplication of numbers not exceeding three digits by 2. (<i>Q.3, one sum</i>)
Division	—	*Division by 2, one digit number and two digit number with zero without remainder. (<i>Q.4, two sums</i>)	*Division by 2 and 10, two digit number and two digit number with zero without remainder. (<i>Q.4, two sums</i>)
Problem solving	—	*Solving word problems involving one mathematical operation in each sum (<i>Q.5 to Q8, four sums</i>)	*Solving word problems involving one mathematical operation in each sum (<i>Q.5, 6, 8, 9 and 10 Q8, five sums</i>) *Solving word problems involving more than one mathematical operation. (<i>Q. 7, and 11, two sums</i>)
Graphs	—	*Reading information from graphs. (<i>Q.9, three readings</i>)	*Reading information from graphs. (<i>Q.12, three readings</i>)

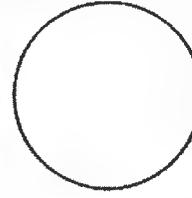
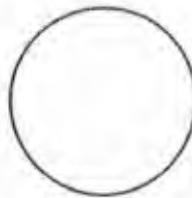
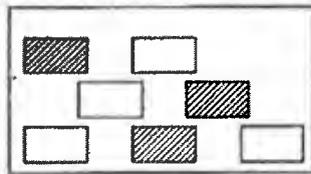
Mathematics papers prepared for the pre-test of the quasi-experiment

3 වන ශ්‍රේණිය Grade 3
ගණිතය

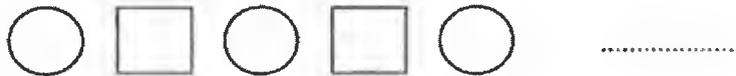
නම : Name

පාසල : School

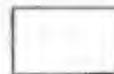
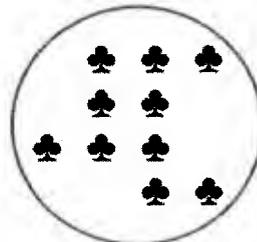
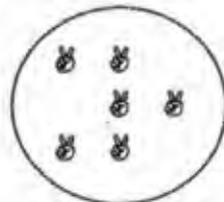
1. ගොඩවල් දෙකකට වෙන් කර අඳින්න. Sort into two groups and draw.



2. රචාවේ රළඟට එන රූපය අඳින්න. Draw the next figure in the pattern



3. 'රූප ගණන හිස් කොටුව තුළ ලියන්න. Count and write the answer



4. එකතු කරන්න. **Add**

$$\begin{array}{c} \text{✿} \text{ ✿} \text{ ✿} \text{ ✿} \text{ ✿} \\ \text{○} \end{array} + \begin{array}{c} \text{✿} \text{ ✿} \text{ ✿} \\ \text{○} \end{array} = \boxed{}$$

5. අඩු කරන්න. **Subtract**

$$\begin{array}{c} \text{★} \text{ ★} \text{ ★} \text{ ★} \text{ ★} \text{ ★} \text{ ★} \\ \text{○} \end{array} - \begin{array}{c} \text{★} \text{ ★} \text{ ★} \text{ ★} \\ \text{○} \end{array} = \boxed{}$$

6. එකතු කරන්න. **Add**

$$\begin{array}{r} 3 \\ + 2 \\ \hline \hline \end{array} \qquad \begin{array}{r} 1 \\ + 7 \\ \hline \hline \end{array} \qquad \begin{array}{r} 8 \\ + 2 \\ \hline \hline \end{array}$$

$$3 + 6 = \underline{\quad} \qquad 4 + 4 = \underline{\quad}$$

7. අඩු කරන්න. **Subtract**

$$\begin{array}{r} 8 \\ - 7 \\ \hline \hline \end{array} \qquad \begin{array}{r} 6 \\ - 6 \\ \hline \hline \end{array} \qquad \begin{array}{r} 9 \\ - 1 \\ \hline \hline \end{array}$$

$$4 - 2 = \underline{\quad} \qquad 6 - 5 = \underline{\quad}$$

4 වන ශ්‍රේණිය Grade 4
ගණිතය

නම :

පාසල :

1. එකතු කරන්න. **Add**

25	163	476
$+ 61$	$+ 135$	$+ 17$
$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$
$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$

2. අඩු කරන්න. **Subtract**

8	59	82
$- 2$	$- 32$	$- 38$
$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$
$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$	$\underline{\hspace{1cm}}$

3. ගුණ කරන්න. **Multiply**

$7 \times 5 = \dots\dots\dots$

$32 \times 2 = \dots\dots\dots$

4. බෙදන්න. **Divide**

$8 \div 2 = \dots\dots\dots$

$20 \div 2 = \dots\dots\dots$

5. එක් ශෝනියක අඹ 246 ක් තිබුණි. තවත් ශෝනියක අඹ 202 ක් තිබුණි. ශෝනි දෙකේම ඇති අඹ ගණන කිය ද?

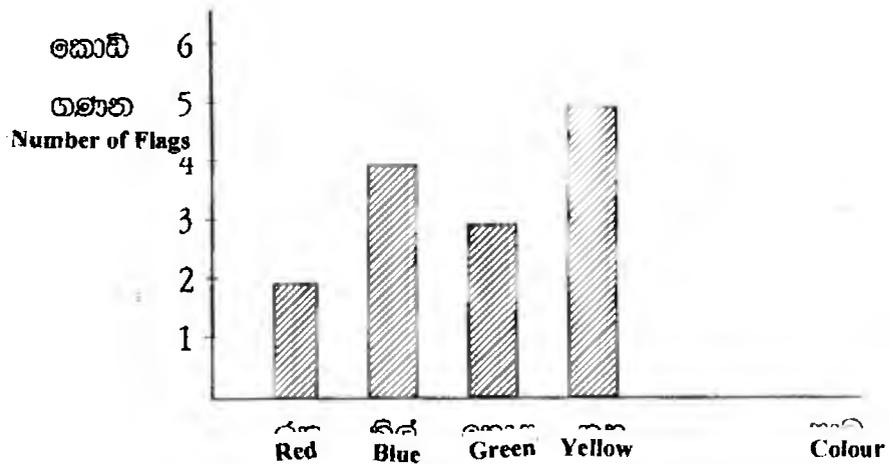
There were 246 mangoes in a bag and 202 in another bag. How many were there in both bags?

6. වසයක මගීහු 80 ක් සිටියහ. එයින් 39 ක් බැස ගියහ. වසයේ ඉතිරි වූ මගීන් සංඛ්‍යාව කීය ද? **There were 80 passengers in a bus. 39 got down. How many passengers were left in the bus?**

7. පොතක මිල රුපියල් 25කි. එවැනි පොත් 5 ක් ගැනීමට කොපමණ මුදල අවශ්‍ය ද? **A book cost Rs. 25/=. How much you need to buy 5 books?**

8. වෙරළ ගෙඩි 18 ක් ප්‍රමාණයෙන් දෙදෙනෙකු අතරේ සමසේ බෙදනු ලැබේ. එක් ප්‍රමාණයකට වෙරළ කීයක් ලැබේ ද? **18 olives were divided among two children. How many did each get?**

9. ප්‍රස්තාරය බැලී **Look at the graph and answer the following questions.**



වැඩියෙන්ම ඇති කොඩිය? **What colour is the most number of flags?**
 How many of flags are yellow coloured?
 රතු කොඩිවලට වඩා නිල් කොඩිවලට කීයක් වැඩියෙන් ඇත? **How many more blue flags than red flags do you find?.....**

5 වන ශ්‍රේණිය **Grade 5**
ගණිතය

නම : Name

පාසල : School

1. එකතු කරන්න. **Add**

416	252	476
+ 582	+ 261	+ 135
_____	_____	_____

2. අඩු කරන්න. **Subtract**

89	76	595	804
- 63	- 38	- 196	- 219
_____	_____	_____	_____

3. ගුණ කරන්න. **Multiply**

246 × 2 =

4. බෙදන්න. **Divide**

$$2 \overline{) 28}$$

$$10 \overline{) 60}$$

5. වෙළෙන්දෙක් එක් අයකුගෙන් පොල් ගෙඩි 125 ක් ද, තවත් අයකුගෙන් පොල් ගෙඩි 375 ක් ද මිලට ගත්තේය. ඔහුගේ මුළු පොල් ගෙඩි ගණන කීය.
A trader bought 125 coconuts from one person and 375 coconuts from another person. What is the total number of coconuts the trader bought?

6. ගෝනියක පුවක් ගෙඩි 504 ක් තිබේ. මෙයින් 219 ක් විකුණූ පසු ඉතිරි වන ගෝනියක පුවක් ගෙඩි කීය?
There are 504 arecanuts in a bag. If 219 arecanuts were sold, how many do you find in the bag?

7. පාසලකට පුදු 200 ක් ලැබුණි. ඉන් 60ක් 2 වන ශ්‍රේණියට ද, 25ක් 3 වන ශ්‍රේණියට ද ඉතිරි 4 වන ශ්‍රේණියට ද බෙදා දුනි. 4 වන ශ්‍රේණියට ලැබුණු පුදු සංඛ්‍යාව සොයන්න.

A school got 200 chairs, of which 60 were given to Grade 2, 25 to Grade 3 and the remainder to the Grade 4. How many chairs did Grade 4 get?

8. මල්ලක ෭෧෦ ගෙඩි 10ක් තිබේ. එවැනි මල්ල 8ක ෭෧෦ ගෙඩි තිබේ ද?

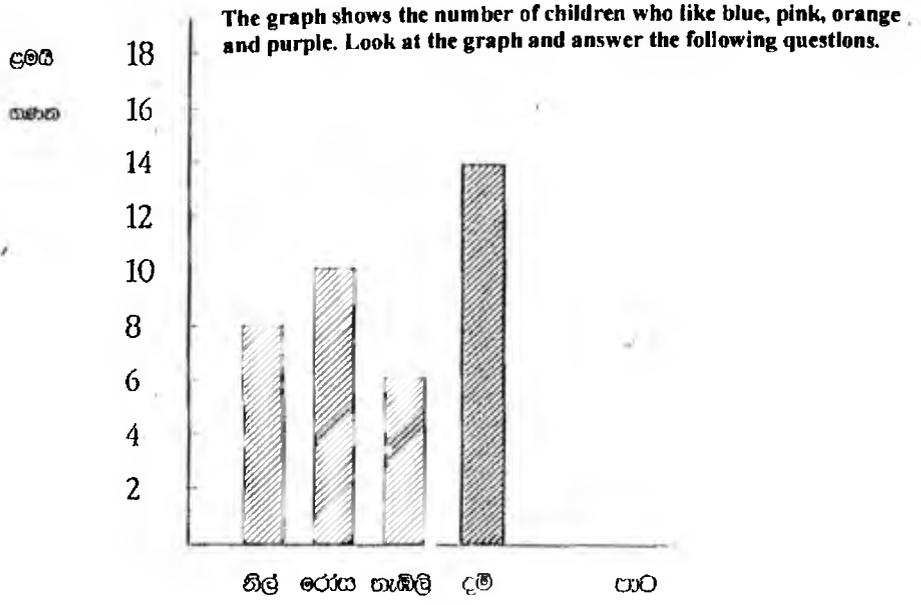
A bag contains 10 mangoes. How many mangoes do you find in 8 such bags?

9. කම්කරුවකුගේ දිනක වැටුප රුපියල් 120 කි. ඔහුට දින 3ක ඒ ලැබෙන මුදල කීය ද? A worker is paid Rs. 120/= per day. How much does he get for 3 days?

10. ටොෆික් රුපියල් 2 නම රුපියල් 84ට මොරි කීයක් මිල දී ගත හැකි ද? If a toffee is Rs 2/=, how many toffees can you buy for Rs. 84/=

11. රාජා වෙරළ 12 ක් ද, සරත් වෙරළ 4 ක් ද, සීතා වෙරළ 14 ක් ද, අනුලන ලදී. ඔවුන් සියලු දෙනාම ඇතුලු වෙරළ එක ගොඩකට දමා පහළි සමාන ගොඩවල් 2 කට බෙදා දී එකිනෙකාගේ වෙරළ ගැන විස්තර කළහ. කීය ද?
- Raja picked up 12 olives, Sarath 4 olives and Seetha 14 olives. All olives were put together and they divided into two equal heaps. How many olives were there in one heap?

12. නිල්, රෝස, හැඹිලි, හා දම් පාටවලට කැමති ළමයින් සංඛ්‍යාව ප්‍රස්තාරයේ දැක්වේ. ප්‍රස්තාරය බලා ප්‍රශ්නවලට පිළිතුරු ලියන්න.



- වැඩිම දෙනෙක් කැමති පාට ද? Which colour is liked by the most number of children?
- හැඹිලි පාටට වඩා නිල් පාටට ප්‍රමාණය කී දෙනෙක්? How many children prefer blue to orange?
- නිල් පාට සහ රෝස පාට යන පාටවලට ප්‍රමාණය කී දෙනෙක් කැමති ද?.....
- Give the total number of children who like blue and pink.

Appendix 12

Grade 5 mathematics paper prepared for the post-test of the experiment

5 වන ශ්‍රේණිය Grade 5
ගණිතය

නම :
පාසල :

1. එකතු කරන්න. Add

$$\begin{array}{r} 416 \\ + 523 \\ \hline \end{array} \qquad \begin{array}{r} 252 \\ + 276 \\ \hline \end{array} \qquad \begin{array}{r} 476 \\ + 148 \\ \hline \end{array}$$

2. අඩු කරන්න Subtract

$$\begin{array}{r} 89 \\ - 54 \\ \hline \end{array} \qquad \begin{array}{r} 76 \\ - 49 \\ \hline \end{array} \qquad \begin{array}{r} 385 \\ - 196 \\ \hline \end{array} \qquad \begin{array}{r} 504 \\ - 219 \\ \hline \end{array}$$

3. ගුණ කරන්න Multiply

$236 \times 2 = \dots\dots\dots$

4. බෙදන්න. Divide

$$2 \overline{) 68}$$

$$10 \overline{) 90}$$

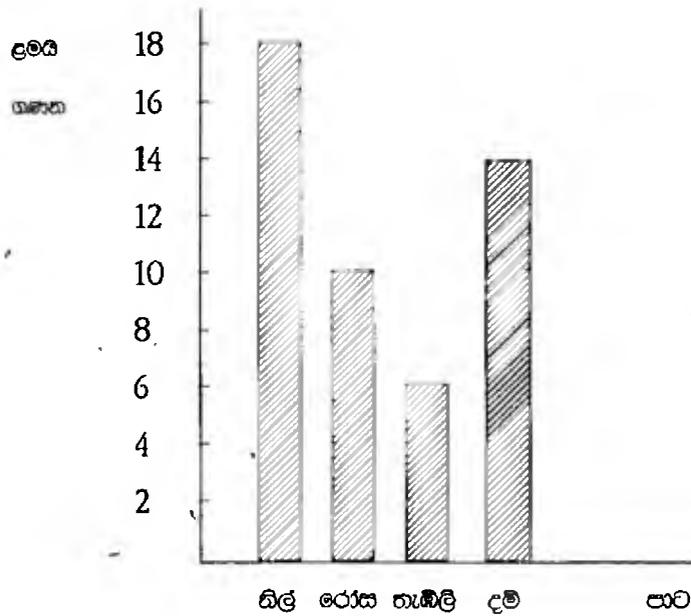
5. වෙළෙඳුන්ගේ එක් අයකුගෙන් පොල් ගෙඩි 125 ක් ද, තවත් අයකුගෙන් පොල් ගෙඩි 275 ක් ද ගෙන ගොනු කළේය. මෙම ගොනුවේ පොල් ගෙඩි කීය ද?
A trader bought 125 coconuts from one person and 275 coconuts from another person. What is the total number of coconuts the trader bought?

6. ගෝඨික පුවක් ගෙඩි 504 ක් තිබේ. මෙයින් 219 ක් විකුණූ පසු ඉතිරි වන සංඛ්‍යා **There are 504 arecanuts in a bag. If 219 arecanuts were sold, how many do you find in the bag?**
7. පාසලකට පුවු 100 ක් ලැබුණි. ඉන් 40ක් 2 වන ශ්‍රේණියට ද, 25ක් 3 වන ශ්‍රේණියට ද, ඉතිරිය 4 වන ශ්‍රේණියට ද බෙදා දුනි. 4 වන ශ්‍රේණියට ලැබුණු පුවු සංඛ්‍යා **A school got 100 chairs, of which 40 were given to Grade 2, 25 to Grade 3 and the remainder to the Grade 4. How many chairs did Grade 4 get?**
8. මල්ලක අඹ ගෙඩි 10ක් තිබේ. එවැනි මල 7ක පඹ කීයක් තිබේ ද? **A bag contains 10 mangoes. How many mangoes do you find in 7 such bags?**
9. කම්කරුවකුගේ දිනක වැටුප රුපියල් 120 කි. ඔහුට දින 3ක දී ලැබෙන මුදල කීය ද? **A worker is paid Rs. 120/= per day. How much does he get for 3 days?**
10. පොපියක් රුපියල් 2 නම් රුපියල් 84ට පොපි කීයක් මිල දී ගත හැකි ද? **If a toffee is Rs 2/=, how many toffees can you buy for Rs. 84/=**

11. රාජා වෙරළ 12 ක් ද සරත් වෙරළ 4 ක් ද සීතා වෙරළ 14 ක් ද අහුලන ලදී. ඔවුන් සියලු දෙනාම ඇහුලූ වෙරළ එක ගොඩකට දමා පසුව සමාන ගොඩවල් 2 කට බෙදන ලදී. එවිට එක ගොඩක ඇති වෙරළ සංඛ්‍යාව කීය ද?

Raja picked up 12 olives, Sarath 4 olives and Seetha 14 olives. All olives were put together and they divided into two equal heaps. How many olives were there in one heap?

12. නිල්, රෝස, කහ, තැඹිලි සහ දම් වැනි වර්ණ සඳහා ළමුන්ගේ ප්‍රියතාවයන් පෙන්වන ප්‍රතිලිඛන රූපයක් ඇත. එහි දී ඇති ප්‍රතිලිඛන රූපය බලා සිටිනු ලබන ප්‍රශ්නවලට පිළිතුරු සපයන්න.



වැඩිම දෙනෙක් කැමති වර්ණය කුමක්ද? Which colour is liked by the most number of children?

රෝස වර්ණයට වඩා නිල් වර්ණයට ප්‍රමුඛයන් කී දෙනෙක්? How many prefer blue to pink?

නිල් වර්ණයට සහ තැඹිලි වර්ණයට යන වර්ණවලට ප්‍රමුඛයන් කී දෙනෙක්?

කැමති ද?..... Give the total number of children who like blue and orange.

