Chapter Two

Review of Research

2.0   Introduction

The International Association for the Evaluation of Educational Achievement (IEA) has been conducting studies of school achievement in a number of countries since 1959. These studies have been successful in collecting a substantial body of information that has been used to change educational policy.

The idea of national assessment is new in most countries but in certain countries they have been conducted in the last quarter of the 20th century even before the United Nations Convention on the Rights of the Child (1989) and the World Conference on Education for All (1990). However, these assessments have come to be held on a wider scale after these two important events and have now, to some extent, assumed the status of a standard feature of education systems in several countries.

The purpose of a national assessment is primarily to assess the performance of all or a part of the country's education system. In addition to national assessments, this purpose is also served by independent studies undertaken by interested parties, especially educationists and researchers from universities as well as research organizations.

As a prelude to the National Assessment of Grade 04 Pupils in Sri Lanka, a few of these national assessments drawn from industrial countries, developing countries and Sri Lanka, and a few independent Sri Lankan studies, selected for their significance in the Sri Lankan context, will be reviewed in this chapter.

2.1 The US National Assessment of Educational Progress (NAEP)

The US National Assessment of Educational Progress which has been in existence since 1969 is the most widely reported national assessment model in the literature. It is an ongoing survey mandated by Congress and is designed to measure students' educational achievements at specified ages and grades. It also seeks to examine achievements of sub populations defined by demographic characteristics and specified background experience. Since 1990 voluntary state- level assessments have also been authorized by Congress.

The frequency of assessments and the grade levels targeted by the NAEP have changed over the years. As of 1996 assessments are conducted every second year on samples of students in grades 4, 8 and 12. Eleven instructional areas including reading and writing, mathematics and science, history, geography and civics have been assessed. Data have been reported under each state, gender, ethnicity, type of community and region.

Until 1984 student achievement had been reported as percentages passing the different items. Since 1984 proficiency scales have been developed for each subject area.

Each scale has three achievement levels, basic, proficient and advanced. The basic level or the lowest level denotes partial mastery of the knowledge and skills required at each grade level. The proficient or the middle level denotes competence in the subject matter. The National Assessment Governing Board is of the view that all students should perform well at this level. The advanced or highest level denotes superior performance.

Results have shown that over time achievements on science and mathematics have improved, although these subjects are not very popular with high school students. Performance was also seen to vary by type of school attended, state, gender and level of home support. (Greaney and Kellaghan; 1996, pp. 12-15)

2.2   National Assessment in England and Wales

The history of national assessment in England and Wales has not been smooth or continuous.

In the first phase from 1948 to 1977 large scale national surveys of reading achievement of 9, 11 and 15 year old students were conducted irregularly.

In 1978, partly in response to criticisms about low standards in schools, a more elaborate system of assessment run by the Assessment of Performance Unit of the Department of Education and Science was established. Student achievement was assessed in the areas of language, mathematics and science at age levels 11, 13 and 15. In addition to pencil and paper tests, performance tasks were also administered to small samples of students.

The findings of these assessments contributed to the curriculum reform movement which culminated in the 1988 Education Act which for the first time defined a 'National Curriculum' for England and Wales. A new system of national assessment was introduced in conjunction with the national curriculum. The new assessments were intended to serve a variety of functions,

Formative	:	to be used in planning further instruction;
Diagnostic	:	to identify learning difficulties;
Summative	:	to record the overall achievement of a student in a systematic way; and
Evaluative	:	to provide information for assessing and reporting on

aspects of the work of the school, the Local Education Authority or any other distinct component of the education Service.

In addition to the above functions, the new scheme of assessment was also seen as a 'management device' for it was expected to ensure that the schools did not depart from the curriculum laid down by the central authority.

Under this system all students are assessed at the end of each of the four 'Key Stages' at ages 7, 11, 14 and 16, and student performance is assessed against statements of

attainment prescribed for each stage. Assessments are based on both external tests and teacher judgements.

The teachers initially welcomed the scheme. However, with experience, the negative aspects of the scheme have begun to surface. It has placed a heavy burden on the teachers. The in-service support provided has been found to be largely inadequate and the assessment has turned out to be largely impractical. As a way out, opinion is moving in the direction of making greater use of more conventional centralized written tests and to accord greater priority to the summative function in further assessments. (Greaney and Kellaghan 1996; pp. 15 – 17)

2.3   **National Assessment in Chile**

The national assessment movement in Chile has a chequered history. First commissioned in 1978, the assessment was designed to provide information on the attainment of minimal targets set by the Ministry of Education; to provide feedback to parents, teachers and authorities at the municipal, regional and central levels; and to provide data to planners that would guide the allocation of resources for text book development, curriculum development and in-service teacher training.

All students in grades 4 and 8 were assessed in Spanish (reading and writing), mathematics, and the natural and social sciences. Very small schools and schools in inaccessible locations were excluded.

A new Minister abolished the assessment system in 1984 on senior education officials advising him that the cost was too high. An attempt to revive the system failed in 1986. However, in 1988, under a new Minister, the assessment system was revived under the name of SIMCE with objectives similar to those of the earlier system.

Spanish and Mathematics tests and a writing test were administered to all grade 04 students. Tests in natural science, history and geography were administered to ten percent of the students. A self concept test and a questionnaire of student perceptions

were given to all students. Five teachers in each school were given a teacher questionnaire and a parent questionnaire was administered to parents of all students.

The results showed that students had performed poorly in relation to curriculum objectives. Students in urban schools had performed better than students in rural schools and students in the big schools had performed better than students in small schools. The highest performance came from students in private schools.

The results were reported nationally, by school location and region. Each classroom and school was given a percentile ranking based on other schools in the same socio-economic category as well as a national ranking. Special manuals explained the results and indicated how schools and teachers could use the information to improve achievement levels.

Percentile rank scores came to be dropped in favour of percentages as teachers reported difficulty in interpreting percentile scores. Not much use was made of the self-concept information. Parental information was not used and was not collected after the first year.

A special fund has been created to which low-scoring schools have access enabling them to improve infrastructure, educational resources and pedagogical approaches. Curricular reforms based on the results have also been implemented. The results have provided education administrators with information for planning and authors of instructional materials with information for identifying objectives.
(Greaney and Kellaghen; (1996 pp. 17 – 19)

2.4   Quality of Primary Schooling in India; A Case Study of Madya Pradesh (1993)

The basic concern of this study has been with basic education and assessment of learners that has been limited to the acquisition of the basic skills of literacy and numeracy. To be more specific, learner achievement has been measured in two core subjects of learning at the primary stage, namely Mathematics and Hindi, which is the language taught in the primary schools of Madhya Pradesh.

One of the basic concerns of the study being to understand the quality of primary education provided in five localities in a comparative perspective, performance was analyzed and presented in a comparative framework for the five localities.

The analysis revealed a somewhat disturbing picture. Even after completing five years of schooling the proportions of students who had mastered the basic knowledge and skill components in the two subjects were only 10 percent in Hindi and 5 percent in Mathematics. However, there were very wide variations among learners in the different localities. In both subjects there was a systematic improvement as one moved away from the backward rural localities to the developed urban localities.

The mean scores in rural schools were significantly lower. This was not surprising given the poor level of facilities in these schools. Some schools in rural areas did not have the minimum learning facilities like blackboards, chalk, student benches or desks and any teaching aids or maps. Some students did not possess the text books required.

The statistical analysis indicate a number of possibilities as to the correlates of learners' achievement or the factors that may be causing the above variations. The following factors appeared to be influencing the learning outcomes:

(a)   *School characteristics*

     1.   School infrastructure

          The following four-fold classification of sample schools based on the infrastructure available was used in this analysis.

          (i)   No building: schools without any building.

          (ii)   Poor facility: schools with building but without separate classrooms for the five grades.

          (iii)   Good facility: Schools with separate classrooms but without proper seating arrangements for all the children, and

          (iv)   Very good facility; schools with separate classrooms which are fully equipped for the students to sit and learn.

               A systematic improvement in achievement scores was seen with improvement in infrastructure facilities.

2. The number of teachers in a school

> If the number of teachers in a school is inadequate the school is forced to resort to multigrade teaching. This research shows a statistically significant negative correlation between multigrade teaching and learning outcomes.

(b)   Teachers and teaching context

1. Teacher qualification

> The performance of learners taught by teachers without the prescribed qualification (12 years of schooling) was found to be inferior. Possessing a college degree did not seem to matter but possessing a Master degree seemed to make a big difference.
>
> Teacher training: teachers who had undergone professional training in teaching performed significantly better in terms of learning outcomes of their students.

2. Teacher specialization

> Specialized teachers did make a difference in student achievement.

3. Teaching experience

> Teachers with 6-15 years of experience were found to be relatively more effective.

4. Regularity of homework

> The mean scores of learners who reported that they never did any homework were very low. The difference in the mean scores was significant even between the other two categories, those who did home work 'regularly' and those who did it only 'sometimes'.

5. Textbooks with learners

> Possession of textbooks made a significant difference in learner achievement.

6. Availability of teaching aids and equipment

> Learning levels rose with the availability of aids and equipment. Merely providing some equipment does not help. They must be actually used in the teaching.

(c)   Learner characteristics

1.   Learner sex

Overall, learner sex did not seem to be an important factor in influencing achievement.

2.   Pre-school education

Pre-school education apparently seemed to be an important factor related to performance.

3.   Grade repetition

Non-repeaters had the highest mean with three-time repeaters consigned to the bottom.

4.   Socio-economic background of the learner (based mainly on parental occupation and parental education)

Parental occupation: the performance of students whose fathers followed "tertiary sector based occupations" was much higher than the performance of students whose fathers followed "primary sector based occupations".

Parental education: the scores were systematically and positively associated with the level of fathers' education.

(Govinda and Varghese: (1993 Chapter IX)

2.5   Learning Achievements of Grade 05 Pupils, Sri Lanka, 1994

A national survey was conducted in Sri Lanka in 1994 by the National Institute of Education, Sri Lanka under the guidance of UNICEF and UNESCO, and assisted by the Monitoring Learning Achievement (MLA) Project, with the objective of securing information on the level of achievement at the end of five years of schooling.

Pupils completing the primary cycle of education in 1993 formed the target group of this study. From schools in the island with grade 05 classes, 204 schools were selected for the study. A sample of 4000 students was drawn so as to be representative of all school types (1AB, 1C, Type 02 and 03), the 25 educational districts and schools in both urban and rural locations.

The instruments used included achievement tests in Literacy, Numeracy and Life Skills and questionnaires seeking information on the child's background, the teacher's background and facilities available in the school.

The achievement levels of the students were identified using mean scores and mastery levels. The national mean values were as follows.

Table 2.1 : National Mean Values – Grade 05 Study (1994)

Subject Area	Mean	SD
Literacy	61.8	21.5
Numeracy	45.1	18.3
Life Skills	26.7	9.7

Rural 1C, Rural Type 2 and Urban Type 3 and Urban 1C schools were in the bottom group in performance, demanding attention from administrators and policymakers. (Navaratne, 1995)

2.6   Performance of Grade 03 Students, Sri Lanka (1996)

A study on the learning achievements of grade 03 students in the three areas – Literacy, Numeracy and Life Skills was carried out in 1996 in order to collect sufficient information that could be used in planning remedial measures within the primary cycle. The main focus was to study how each province, each district and each school type had achieved mastery in each subject and to determine what steps should be taken to improve the situation, and to gather information necessary both for quality improvement as well as for new policy inputs.

On account of the security situation that prevailed in the country the study had to be confined only to eight of the nine provinces. A total of 232 schools were selected from these eight provinces considering the proportion of schools of different types (1AB, IC, Type 2 and Type 3) existing within each district. Both urban and rural schools were included in the sample. The total number of students in the sample was 4297 which included 18-20 from each school.

The tests which were for students who studied in grade 03 in 1995 were constructed on the format agreed on by the member countries of the Monitoring Learning Achievement Project, to suit the curriculum followed and the specific needs of Sri Lanka.

The data were analysed for each subject separately on an all-island basis as well as separately for each province, each district, each school type, urban schools and rural schools.

In addition to computing the mean values, the performance of students was categorized as follows:

Mastery : 80 – 100 marks

Near Mastery : 60 – 79 marks

Non Mastery : 00 – 59 marks

This enabled both a comparison as well as a detailed study of the existing situation.

Two significant findings of this study were the lower performance levels displayed by Type 02 and Type 03 schools and a similar disappointing performance by rural schools when compared to the urban schools. The percentage of students falling within the category of non-mastery was very high.

Immediate remedial measures were felt to be necessary both in teaching-learning and in assessment. Administrative action as well as new policy inputs appeared to be necessary to improve the status of Type 02 and Type 03 schools.
(Navaratne, 1998)

2.7 Low Achievement in Mathematics of Students Completing Secondary Education, Sri Lanka, 1996

Sarojini Dias (1993) conducted a research on low achievement in Mathematics of students completing secondary education from year 6 to year 11, aimed at studying

(i) the pattern of achievement in Mathematics by students completing their secondary education in year 11.

(ii) the problems students face in respect of the secondary school curriculum in Mathematics.

(iii) the relationship between the students' attitude towards Mathematics and the way it is taught, and achievement in Mathematics.

(iv) the impact of each of the following factors on achievement in Mathematics :

(a) teacher characteristics

(b) teaching methodology adopted

(c) school/district

(d) school type and

(e) gender of student

The research was conducted using a stratified random sample of 34 schools representing the administrative districts of Colombo, Kandy, Matara and Moneragala. The sample comprised of one year 11 class and its Mathematics teacher, from each of these schools.

Achievement tests in Mathematics, students' attitude test (Mathematics), teachers' interview schedule and (Mathematics) classroom observation schedule were the instruments used in data collection.

The results brought to light the low achievement in Mathematics. The mean score obtained was 26.5 and 68.6% of the students had obtained scores ranging from 0 to 34. The standard attained by students in Algebra and Geometry was poorer. While there were significant differences in achievement between Colombo and Moneragala districts and the Matara and Moneragala districts, there were no significant differences between Colombo and Kandy districts, and Colombo and Matara districts. The proportion of

students obtaining low marks in Colombo district was lower than that of the other three districts. The largest proportion of students obtaining low marks came from Moneragala district.

The performance of students in type 1AB schools was significantly higher than that of type 1C and type 2 schools. However, there was no significant difference between type 1C and type 2 schools. While the highest proportion of students with high scores came from 1AB schools, the majority of students in both 1C and type 2 schools had obtained low scores. There was no difference by the gender of students.

The non-possession of the required tools and equipment by the students, the undifferentiated curriculum, overcrowded classes, deficiencies in textbooks etc. were the obstacles faced by students. An efficient system of within-classroom assessment was also not in operation.

Among the recommendations made were the following:
- (i) assuring an adequate teacher cadre with sufficient knowledge of the subject.
- (ii) improving the standard of both pre-service and in-service professional training of teachers of mathematics.
- (iii) providing within-school remedial teaching.
- (iv) provision of better textbooks and teachers' handbooks.
- (v) encouraging teachers to undertake classroom studies.

2.8   Disparities among schools: Sri Lanka

Most Sri Lankan 'Monitoring Learning Achievement' studies including two studies reviewed here provide evidence of inter-regional and intra-regional disparities in student performance within an almost monopolistic common state school system. These disparities are reflected in the significant differences in achievement between urban schools and rural schools (inter-regional) and between different schools in the same region (intra-regional).

Such disparities may have always existed in some form and at some level. However, they have come to the limelight assuming unconscionable proportions, with attempts to democratise education by expanding access and opportunity, commencing in the 1940s. Evidence in respect of these disparities in achievement among schools in the state system surfaces both at public examinations and in assessments conducted under the 'monitoring learning achievement project'. In addition, independent studies testing students in a particular area of the curriculum also have produced evidence of uneven student achievement in schools. Among the earliest of these independent studies, those undertaken by Chinnaiah (1957) and Rupasinghe (1978) stand foremost.

Chinnaiah who conducted a test on civics concepts with a sample of 300 students whose mean age was 14, drawn from ten English medium schools located within the city of Colombo, found that the arithmetic mean of the achievement scores for the ten schools taken separately, differed and ranged from 52.94 to 27.62.

In the more recent research, Rupasinghe conducted a study using a standardized test of 50 social studies concepts with students sitting the NCGE Examination in 1976. The study was conducted on a sample of 2400 students drawn from 63 schools of six different types, arrived at after a two-stage stratification-three school types, A, B and C from each of the two groups, urban and rural.

The null hypothesis, that there was no significant difference in achievement among students in different school types was tested by a two-way analysis of variance. The F ratio for different school types was significant at the 1 percent level of confidence and the F ratio for urban-rural differences was significant at the .01 level.

Z tests for significance of difference between individual means for the school types turned out to be significant at the 1 percent level suggesting very strongly that student achievement depended on the school type. Urban A recorded the highest mean followed by urban B and Urban C. This pattern was duplicated in the rural sector too.

Urban A schools differed significantly in performance from Rural A schools and Urban B schools from Rural B. However, there was no significant difference between Urban C schools and Rural C schools.

Rupasinghe's 1978 study was the forerunner of a number of studies based on the same pattern. All these studies provide empirical evidence for the existence of significant differences of student achievement based on the school attended.

De Alwis (1980) investigated the performance of 600 students from the Colombo South Education District, in Social Studies at the NCGE Examination, 1975. This study confirmed the existence of significant differences among the three school types A, B and C. The most prestigious and popular type A schools differed significantly from the other two types.

Chandralatha (1983) found significant differences in Geography at the GCE (A. Level) among schools belonging to type 1A, type 1B and type 1C, a classification of schools adopted by the Ministry of Education. She also found significant inter-regional differences.

In another study using Economics concepts with GCE (O/L) students, Jayaratne (1983) was able to establish the existence of significant differences in achievement between urban schools and rural schools in the Kalutara district.

Weerawardane (1983) who also used Civic concepts in the GCE O level syllabus to test achievement of students in the Gampaha district found that significant differences existed among the four school types as classified by the Ministry of Education, namely 1A, 1B, 1C and type 2. IA schools stood significantly ahead of the other types and the school type mattered in achievement.

Rupasinghe (1984) adopting a five-fold classification of schools found a relationship significant at 1 percent level between school environment and student achievement as measured by the average mark scored by the student at three successive examinations

conducted at the circuit/district level. Urban prestigious schools stood well above other school types in achievement while deprived schools in urban slum areas were relegated to the lowest position in the hierarchy of schools. The study also established the existence of a strong link between school environment and the following variables: parental education level, parental occupational category and physical quality of home.

Rupasinghe (1985) investigating the factors associated with achievement at the Grade 5 Scholarship Examination with a sample of 405 students found that there was a strong association between high achievement and school type. Rural schools and non-affluent urban schools in this sample failed to produce a single high achiever.

Rupasinghe and Perera (1987) assessed the academic abilities of 799 students studying in the GCE O level forms in 28 schools categorized in the following six types:

1.   Colombo popular schools
2.   Colombo middle level schools
3.   Colombo non-affluent schools
4.   Suburban schools
5.   Outstation schools
6.   Rural schools

It was clearly established that striking differences in achievement prevailing between schools within each type notwithstanding, significant differences in achievement existed among the six school types.

It is interesting to note that both non-industrial country researches reviewed in this section, Chile and Madhya Pradesh (India) have shown evidence of inter-school differences in achievement.

In conclusion, one may agree with Rupasinghe's (1990) views regarding the conspicuous variation in levels of student achievement among schools in the common state system. The state provides free tuition, free entry to public examinations at the first sitting, free textbooks, free material for one school uniform per year, subsidized bus and train transport and irregularly, free midday meals. In-spite of all these services, the equality of

access and opportunity which we have been seeking has consistently been evading us on account of two main drawbacks, the inter-regional and intra-regional disparities in the provision of facilities. The state school system is not an orderly collection of homogeneous units but a motley hierarchy of heterogeneous units varying in status and attraction. The availability of facilities varies according to the school type which has a very close affinity with the socio-economic status of its clientele. "Educational reforms alone, however, cannot achieve equality of opportunity unless a parallel transformation in the socio-economic status of the downtrodden classes takes place".

2.9 Summary

Studies of school performance have been conducted long before the World Conference on Education for All (1990). The International Association for the Evaluation of Educational Achievement commenced its studies in 1959. The World Conference on Education for All has given a new meaning and a new value to these studies and elevated them to the position of a standard feature of education systems activated at regular intervals.

Performance studies conducted in Sri Lanka as well as in some other developing countries while providing an assessment of the performance of the country's education system or a part of it, have also produced evidence of a more disturbing nature, pertaining to disparities in performance among schools even within a common state system of schools. These disparities in performance arise mainly in the different school types being resourced differently. It has been shown effectively that the different school types are patronised by different segments of society and those schools patronised by the poor and underprivileged segments of society happen to be the most under-resourced, almost always producing an unsatisfactory level of performance.

These glaring anomalies and inequalities should receive the immediate attention of educational authorities. All schools should be assured of a minimum level of resources enabling them to attain a minimum of level of efficient performance. Further the poorest strata of society cry out to be liberated from their present position due to which they cannot afford even free education for their children.

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