

SACMEQ Educational Policy Research Series

The SACMEQ II Project in Uganda:
A Study of the Conditions of Schooling
and the Quality of Education.

Uganda
Working Report

by

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Foreword

The origins of the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) date back to 1991, the year when several Ministries of Education in Eastern and Southern Africa started working closely with UNESCO's International Institute for Educational Planning (IIEP) on the implementation of integrated educational policy research and training programmes.

In 1995 these Ministries of Education formalized their collaboration by establishing a network that is widely known as SACMEQ. Fifteen Ministries are now members of SACMEQ: Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania (Mainland), Tanzania (Zanzibar), Uganda, Zambia, and Zimbabwe.

SACMEQ is registered in Zimbabwe as an Independent Intergovernmental Non-profit Organization. Its Coordination Centre is located within UNESCO's Harare Cluster Office and is managed by a Director who works under the guidance of a six-member Managing Committee. SACMEQ's Assembly of Ministers meets every two years and provides overall policy guidance concerning SACMEQ's mission and programmes.

The focus of SACMEQ's capacity building programmes has been on building the capacity of Ministries of Education to monitor and evaluate the quality of their basic education systems. SACMEQ employs innovative training approaches that include a combination of face-to-face training, hands-on experience, computer laboratory sessions, and on-line support via the Internet. SACMEQ also encourages a unique form of collaboration among SACMEQ National Research Coordinators in the fifteen member countries as they share and exchange skills and successful experiences.

In September 2004 SACMEQ was awarded the Comenius Medal for its innovative approaches to delivering cross-national educational research and training programmes.

This report provides a description of the results of the SACMEQ II Project - SACMEQ's second major educational policy research project. The results of the SACMEQ I Project were reported in seven national reports for Kenya, Malawi, Mauritius, Namibia, Zambia, Zimbabwe, and Tanzania (Zanzibar).

The SACMEQ Data Archive was launched in June 2004. This valuable information resource contains data, data collection instruments, manuals, technical papers, and related publications from both SACMEQ projects. Copies of the archive may be obtained by completing the registration form on the SACMEQ Website (www.sacmeq.org).

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Contents

Chapter 1	The National Context	1
Chapter 2	The Conduct of the Study	13
Chapter 3	Pupils' Characteristics and their Learning Environment	45
Chapter 4	Teachers' Characteristics	75
Chapter 5	School Heads' Characteristics and their Opinions	118
Chapter 6	Equity in the Allocation of Human and Material Resources	143
Chapter 7	Achievement Levels of Standard 6 Pupils	152
Chapter 8	From Policy Suggestions to an Agenda for Action	176
References		191
Appendices		195

Chapter 1

The National Context

Introduction

Uganda is a land locked country located to the eastern part of the African continent, having a total surface area of 241,039 square kilometres. It is bordered by Sudan to the north, Kenya to the east, Tanzania to the south, Rwanda to the southwest and the Democratic Republic of Congo to the west. It lies 200m above sea level between latitudes 4°12' to the north and 1°9' to the south of the equator and between longitudes 29°34' and 35°0' to the east of the Greenwich Meridian.

As a result of its location and altitude, Uganda's climate is characterized by two alternating climatic seasons, namely, the wet and dry part of the year. Central, eastern and western parts of the country have two rainy seasons a year, with the March May one being heavy rains and the September – December one being light rains. As one heads towards the northern part of the country, the rains decrease with one rainy season being experienced a year.

The variations in soil fertility between the country's regions causes the vegetation cover also to vary between these regions. The central and western axes of the country have more fertile soils and thus have mainly the tropical rain forest vegetation, while eastern and northern parts have Savannah Woodlands and Semi-Desert type of vegetation.

These geographical factors condition the socio-economic potential and population carrying capacities of the various regions within Uganda. This has direct implications on the financing of education. The ragged terrain of areas like Karamoja in North Eastern area, Sebei in Eastern area and Kisoro, Kabale and other such mountainous areas in Western Uganda impairs accessibility to education facilities.

The political economy and demography

Uganda attained her independence from the British on the 9th Of October 1962, and since then Uganda has witnessed dramatic changes in her political system.

The changes in political policies were accompanied by changes in socio- economic policy framework. However the political turmoil of 1971-1985 negatively impacted on the Ugandan economy leading to a decline in GDP, decline in agricultural and industrial output, a deterioration in export performance, high rates of inflation, widespread poverty and poor health services.

This decline was closely associated with the managerial vacuum created by the expulsion of Asians in 1972, economic mismanagement of the 70s and 80s and the ensuing civil unrest.

Soon after the National Resistance Movement (NRM) government came to power in 1986, and in concert with the International Monetary Fund (IMF), the World Bank, United Nations Development Programme (UNDP) and other development partners, it embarked on the process of extricating Uganda's economy from institutional poverty and reverse the process of retrogression. The government executed a number of reformist programmes including the Structural Adjustment Programs (SAPS), the Decentralisation, the Poverty Eradication Action Plan (PEAP), the Poverty Alleviation Fund (PAF), the civil service reform, and Universal Primary Education (UPE).

According to the 2002 housing and population census, Uganda's total population in 2002 was 24.7 million people Demographic statistics in Uganda have been derived from population censuses in the period 1948 to 2002. From 1948 to 2002 Uganda's population increased nearly five times as shown in Table 1.1.

Table 1.1. Selected Demographic Indicators, for Population Censuses (1948-2002).

Indicator	Census year					
	1948	1959	1969	1980	1991	2002
Population (millions)	5.0	6.5	9.5	12.6	16.7	24.7
Population increase (millions)	NA	1.5	3.0	3.1	4.1	8.0
Sex ratio	100.2	100.9	101.	98.2	96.5	96.0
Intercensal growth rate	NA	2.5	9	2.7	2.5	3.4
Average annual increase('000)	NA	143	3.9	282	367	686
Crude birth rate	42.0	44.0	300	50.0	52.0	47.3
Total fertility	5.9	5.9	50.0	7.2	7.1	6.9
Crude death rate	25.0	20.0	7.1	NA	17.0	15.0
Infant mortality rate	200.0	160.0	19.0	NA	122.0	160.0
Density (population/ sq. km)	25.2	33.2	120.	64.4	85.0	126.0
			0			
			48.4			

Source: Demographic and Health Survey - Uganda (December 2001) and Uganda Bureau of Statistics 2002 Population and Housing Census Provisional Results November 2002

Note: N.A means 'Not Applicable' or 'Not Available'

It can be inferred from the Table 1.1 that the annual population growth rate between 1948 and 2002 was 3.3 percent. This high growth rate was brought about by high fertility and declining mortality levels, thus increasing school enrolments.

Until the late 1960s there were more males than females in Uganda. This was mainly due to large numbers of male immigrants who came to the country to work at factories and plantations. In the mid 1970s these immigrants left because of the deteriorating economic situation in the country. Since then the number of females has exceeded that of males. Overall, in 2002 there were 12.1 million males and 12.6 million females, yielding a sex ratio of 96.0 males per 100 females.

However, females continued to be under-represented in school enrolments (92 percent males and 83 percent females after UPE), and this has serious equity implications. Similarly, the spatial distribution of the population has a direct bearing on costs of

providing education. It is easier to provide education to the densely populated urban areas more cost effectively than in the sparsely populated rural settings.

Uganda: The structure of the education system

Uganda's current structure of education system is a four-tier model, and it has been in existence since the publication of the Castle Commission report (1963). It consists of seven years of primary education, followed by a four-year cycle of lower secondary, a two-year cycle of upper secondary (7-4-2), after which there is two to five years of tertiary education. There is also a two-year pre- primary stage of education attended by three to five year olds before joining primary school. The education structure and the opportunities for progression have been shown in *Table 1.2*.

Table 1.2 The structure of Uganda's education system

Education level	Cycle	Award	Progress opportunities
Pre- Primary	2 Years	-	➤ Primary Education
Primary Education	7 Years	Primary Leaving Examination (PLE)	➤ Lower Secondary (O' Level) ➤ Technical school
Lower Secondary (Ordinary Level)	4 Years	Uganda Certificate of Education (UCE)	➤ Upper Secondary (A' Level) ➤ Primary Teachers College ➤ Technical Institute ➤ Other Departmental Training Institutes.
Technical School	3 Years	Certificate	➤ Technical Institute
Upper Secondary (Advanced Level)	2 Years	Uganda Advanced Certificate of Education (UACE)	➤ University ➤ Uganda College Of Commerce ➤ National Teachers College ➤ Uganda Technical College ➤ Other Departmental Training Institutes
Primary Teachers College	2 Years	Certificate	➤ National Teachers College
Technical Institute	2 Years	Certificate	➤ Uganda Technical College
Uganda College of Commerce	2/3 Years	Diploma	➤ University
National Teachers College	2 Years	Diploma	➤ University
Uganda Technical College	2 Years	Diploma	➤ University
University	3/5 Years	Diploma/Degree	➤ Post Graduate Studies

Note: The Examining Body is Uganda National Examination Board (UNEB).

Source: Ministry of Education and Sports (Government White Paper on Education).

This structure of Uganda's education system has been illustrated in Figure 1. Selection and certification occur at the end of the primary education level, at the Ordinary level of

secondary school and at the Advanced level of secondary school by means of national examinations. These respectively include the primary school leaving examination, the Uganda Certificate of education and the Uganda Advanced Certificate of education. Alternative technical certificates also exist for students choosing the technical education track, including the Uganda Junior Technical Certificates, which is taken at the end of 3-year post primary technical farm programs, and the Uganda Advanced Technical Certificate, which is taken at the end of post secondary technical programs.

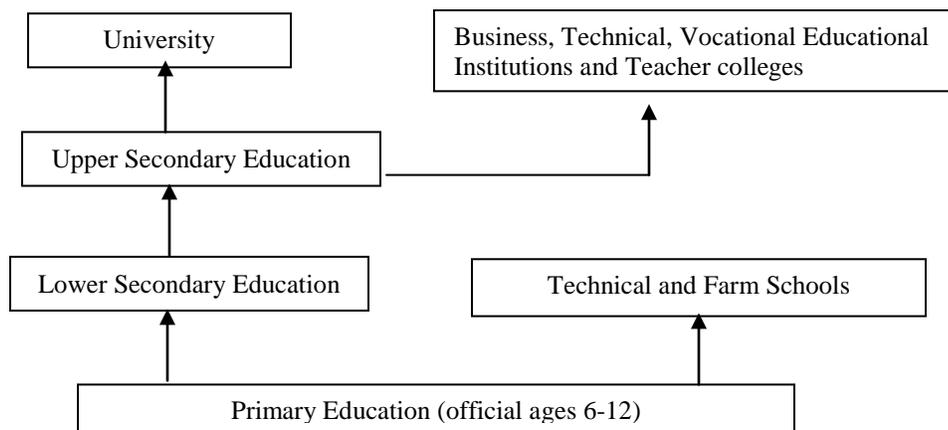


Figure 1. Uganda: Structure of the education system

The administration of school education in Uganda

The civil service structure in Uganda has been transformed from being a highly centralized traditional civil service model, into a decentralized structure with most of the authority and resources now being devolved to the districts. This provides for a more accountable and responsive provision of basic services to the population, including education.

The management and provision of basic education is now largely in the hands of the district administration, while the centre remains responsible for policy control and maintenance of standards through control of teacher education, curriculum and examinations. This enhances flexibility, transparency & accountability. It can also allow

local administrators to be creative in seeking solutions to problems that are unique to their localities.

The overall responsibility for development in the education sector lies with the Ministry of Education and Sports (MoES), under the leadership of a full Minister of Education assisted by 3 Ministers of State responsible for Primary Education, Higher Education and Sports respectively.

The MoES has seven technical departments headed by Commissioners. All Commissioners, except that of Education Planning, are supervised by and answerable to the Director of Education. The departments are:

- a) Pre-primary and Primary Education
- b) Secondary Education
- c) Technical, Vocational and Business Education
- d) Higher Education
- e) Special Education and Career Guidance
- f) Teacher Education
- g) Education Planning

In addition, there are support sections operating under the leadership of the Under Secretary Finance and Administration who reports directly to the Permanent Secretary. The sections include Accounts, Personnel and Administration. There are also semi- or fully autonomous institutions under the Ministry. These are the National Curriculum Development Centre (NCDC), the Uganda National Examinations Board (UNEBC), the Education Standards Agency (ESA), Makerere University, the Education Service Commission (ESC), Mbarara University of Science and Technology (MUST), Gulu University, Kyambogo University and the National Health Service Training Colleges.

The Director of Education, the Under Secretary and the Commissioner of Education Planning, report to the Permanent Secretary who is the accounting officer and overall supervisor of the education sector.

Education policy and recent reforms

The basic objectives of the education sector in the Financial Year 2000/2001 have been derived from the Education Strategic Investment Plan (ESIP) (1998 – 2003) framework that forms the basis for planning investment over the medium term. The ESIP policies and strategies are consistent with broader national policies as spelled out in the Government White Paper on Education (1992), Uganda Vision 2025 and the Poverty Eradication Action Plan (PEAP) 1997.

The ESIP broad policy priorities are:

(i) *Expanding access*

- Achieving universal enrolment of primary school-aged children by the year 2003.
- Ensuring that post-primary vocational opportunities are in place for primary school leavers.
- Achieving and maintaining high transition rates from primary to secondary schools.

(ii) *Quality enhancement*

- Enhancing the quality and relevance of instruction through procurement of relevant instructional materials and training of teachers.

(iii) *Increasing equity*

- Continuing the shift in public expenditure allocation in favour of broader access to basic educational opportunities.
- Directing special incentives to the disadvantaged groups to attract them to school.

(iv) *Public-private sector Partnership*

- Creating a financial framework for sustained and equitable educational provision with appropriate levels of contribution from public sector, private sector and household community partnerships especially at post-primary level.

(v) *The role of central government*

- Strengthening the capacity of Central Government to formulate sectoral policy and broadly direct financial resources in response to evolving priorities and needs.

(vi) *Enhancing the capacity of the districts and local government*

- Promotion of greater participation and responsibility by local authorities and communities in the development of education at all levels.

To achieve these goals (outputs) in the medium term, the education sector developed a Medium Term Budget Framework (MTBF) as an operational tool. The MTBF is a three-year annual rolling budget plan with resources derived from a Medium Term Expenditure Framework (MTEF), which is in turn designed by the Ministry of Finance, Planning and Economic Development (MoFPED). The MTBF is an outcome/output-based instrument,

which highlights the most cost-efficient strategies, and expenditure plans. The MTBF has particularly been an important tool in relating the ESIP to the available resources and in restructuring priorities and phasing expenditure.

This explains why the ESIP target for the period FY 1998/99-2003/04 remained fairly fixed at 31 percent of the total Government discretionary recurrent spending with indicative target sub-sector shares defined as follows: primary education (68.5 percent), Secondary Education (15 percent), Business Technical Vocational Educational Training (3.8 percent), tertiary (9.9 percent), and others at 2.9 percent. These shares correspond to Government undertakings for education sector support funding.

Emphasis is also directed towards the evolvement of relevant curriculum. The mission of the Uganda National Curriculum Development (NCDC) center is to initiate develop, monitor and evaluate existing and new curricula for the pre-primary, primary, secondary, business, technical, vocational and tertiary levels of education. Among other things, NCDC:

- (i) investigates and evaluates the need for syllabus revision and curriculum reform at primary, secondary and tertiary education levels;
- (ii) Initiates new syllabi, revises existing ones, carries out curriculum reform, research, testing and evaluation, up-dates the curriculum and improves syllabuses for school and college courses;
- (iii) drafts teaching schemes, textbooks, teachers' manuals, examinations, and syllabuses in consultation with the teaching institutions and examining bodies;
- (iv) devises, tests and evaluates examination questions and methods of examining students in consultation with teaching institutions and examining bodies; and
- (v) organizes and conducts courses in the objectives and methods of curriculum development for persons required to participate in curriculum development.

Above all, the provision of an adequate supply of relevantly qualified teaching personnel is an essential pre-condition for the success of any education programme.

The proportion of trained teachers for primary schools increased from 52 percent in 1990 to 75 percent by 1998 and that of trained female teachers from about 30 percent in 1990 to 35 percent in 1999. Through the Teacher Development and Management Systems (TDMS) network of the 18 Core Primary Teachers' Colleges (PTCs) and the 539 Coordinating Centres that are fully operational, 10,145 teachers have received in-service training and more will continue to benefit from both pre- and in-service training programmes. Teacher output from the PTCs for academic year 1998/99 was 11,183 while that for National Teachers' Colleges (NTCs) was 4,436. A Teacher Development Management Plan (TDMP) has been finalized and it addresses all issues related to development and management of primary school teachers.

Due to these and other impressive sets of sector-wide and sub-sectoral reforms, the imperative of strengthening the monitoring and evaluation function of the MoES became more obvious than ever before. Accordingly, UNEB initiated the Continuous Assessment (CA) and the National Assessment of Progress in Education (NAPE) modalities of monitoring public learning achievement. Continuous assessment is used mainly to determine the progress of an individual pupil for the purpose of making immediate instructional decisions. NAPE on the other hand, aims at monitoring the performance of a system or sub-system as reflected by the proficiency levels of the pupils. The SACMEQ logic is founded on NAPE's holistic approach to performance monitoring.

Perceived benefits of Uganda's participation in SACMEQ

The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) is a group of Sub-Saharan African Education Ministries co-operating in educational research aimed at improving the quality of education in the participating

countries. Uganda did not participate in SACMEQ I and it therefore had no research findings reported then.

The decision to incorporate Uganda into SACMEQ II was made in 1998 when the Minister of Education entered into an agreement committing Uganda's participation. This is thus Uganda's first SACMEQ report. Generally, the SACMEQ II Project has two main objectives: 1) to provide comparative information concerning changes in the quality of education that have occurred since the SACMEQ I Project in 1995; and 2) to generate research-based policy advice that will guide decisions on improving the quality of education. For Uganda, SACMEQ II will generate important baseline data required for monitoring and evaluating the quality of primary education and the conditions of schooling.

It was propitious for Uganda that the target grade for SACMEQ's initial educational policy research project was Primary 6 because it is the penultimate grade of primary school. Furthermore, reading, which was one of the subjects selected for this investigation was of strategic importance in Uganda because it is an essential prerequisite for successful learning in other subjects and subsequent learning at higher levels.

Chapter 2

The Conduct of the Study

In this chapter several crucial issues about the conduct of the study have been described. These are the planning of the study, instrument construction, sampling, data collection, data entry, cleaning and merging, data analysis and the writing up of the results. A much more detailed account of the conduct of the studies in SACMEQ II can be seen on the SACMEQ website (www.sacmeq.org).

Planning of the study

The very first step was to identify the major policy concerns that were of interest to the ministries of education in the fourteen countries actively participating in SACMEQ II. These policy concerns and the specific research questions emanating from them had to be identified before the study could begin. In each of the countries the SACMEQ National Research Coordinators (NRCs) were responsible for discussing with the senior members in their ministries of education about the high-priority policy concerns associated with their education systems. The responses were then analysed in order to identify groups of ‘General Policy Concerns’. In all, there were twenty general policy concerns, which can be summarised under five themes:

- Learners’ characteristics and their learning environments.
- Teachers’ characteristics and their views about teaching, classroom resources, professional support, and job satisfaction.
- School head’s characteristics and their views about educational infrastructure, the organisation and operation of schools, and problems with learners and staff.
- Equity in the allocation of human and material resources among regions and among schools within regions.
- The reading and mathematics achievement levels of learners and their teachers.

Each of the general policy concerns for the SACMEQ II study has been presented below under the respective themes:

Theme A: *Learners' Characteristics and Their Learning Environments*

General Policy Concern 1: What were the personal characteristics (for example, age and gender) and home background characteristics (for example, parent education, regularity of meals, home language, etc.) of Primary 6 learners that might have implications for monitoring equity, and/or that might impact upon teaching and learning?

General Policy Concern 2: What were the school context factors experienced by Primary 6 learners (such as location, absenteeism (regularity and reasons) grade repetition, and homework (frequency, amount, correction, and family involvement)) that might impact upon teaching and learning and the general functioning of schools?

General Policy Concern 3: Did Primary 6 learners have sufficient access to classroom materials (for example, textbooks, readers, and stationery) in order to participate fully in their lessons?

General Policy Concern 4: Did Primary 6 learners have access to library books within their schools, and (if they did have access) was the use of these books being maximised by allowing learners to take them home to read?

General Policy Concern 5: Has the practice of Primary 6 learners receiving extra lessons in school subjects outside school hours become widespread, and have these been paid lessons?

Theme B: *Teachers' Characteristics and their Viewpoints on Teaching, Classroom Resources, Professional Support, and Job Satisfaction*

General Policy Concern 6: What were the personal characteristics of Primary 6 teachers (for example, age, gender, and socio-economic level), and what was the condition of their housing?

General Policy Concern 7: What were the professional characteristics of Primary 6 teachers (in terms of academic, professional, and in-service training), and did they consider in-service training to be effective in improving their teaching?

General Policy Concern 8: How did Primary 6 teachers allocate their time among responsibilities concerned with teaching, preparing lessons, and marking?

General Policy Concern 9: What were Primary 6 teachers' viewpoints on (a) learner activities within the classroom (for example, reading aloud, pronouncing, etc.), (b) teaching goals (for example, making learning enjoyable, word attack skills, etc.), (c) teaching approaches/strategies (for example, questioning, whole class teaching, etc.), (d) assessment procedures, and (e) meeting and communicating with parents?

General Policy Concern 10: What was the availability of classroom furniture (for example, sitting/writing places, teacher table, teacher chair, and bookshelves) and classroom equipment (for example, chalkboard, dictionary, maps, book corner, and teacher guides) in Primary 6 classrooms?

General Policy Concern 11: What professional support (in terms of education resource centres, inspections, advisory visits, and school head inputs) was given to Primary 6 teachers?

General Policy Concern 12: What factors had the most impact upon teacher job satisfaction?

Theme C: *School Heads' Characteristics and their Viewpoints on Educational Infrastructure, the Organisation and Operation of Schools, and Problems with Learners and Staff*

General Policy Concern 13: What were the personal characteristics of school heads (for example, age and gender)?

General Policy Concern 14: What were the professional characteristics of school heads (in terms of academic, professional, experience, and specialised training)?

General Policy Concern 15: What were the school heads' viewpoints on general school infrastructure (for example, electrical and other equipment, water, and basic sanitation) and the condition of school buildings?

General Policy Concern 16: What were the school heads' viewpoints on (a) daily activities (for example, teaching, school-community relations, and monitoring learner progress), (b) organisational policies (for example school magazine, open days, and formal debates), (c) inspections, (d) community input, (e) problems with learners and staff (for example, learner lateness, teacher absenteeism, and lost days of school)?

Theme D: *Equity in the Allocation of Human and Material Resources Among Regions and Among Schools Within Regions*

General Policy Concern 17: Have human resources (for example, qualified and experienced teachers and school heads) been allocated in an equitable fashion among regions and among schools within regions?

General Policy Concern 18: Have material resources (for example, classroom teaching materials and school facilities) been allocated in an equitable fashion among regions and among schools within regions?

Theme E: *The Reading and Mathematics Achievement Levels of Learners and Their Teachers*

General Policy Concern 19: What were the levels (according to descriptive levels of competence) and variations (among schools and regions) in the achievement levels of Primary 6 learners and their teachers in reading and mathematics – for Uganda and for all other SACMEQ countries?

General Policy Concern 20: What were the reading and mathematics achievement levels of important sub-groups of Primary 6 learners and their teachers (for example, learners and teachers of different genders, socio-economic levels, and locations)?

For each of the twenty general policy concerns specific research questions were developed. For each specific research question a dummy table (blank table) was developed. In Chapters 3 to 7 in this report the results have been presented in a series of tables. The blank versions of these tables were the dummy tables. The main reasons for producing the dummy tables were that this process forced the NRCs to (a) check that the data collection instruments covered all information needs, (b) ensure close linkages between the specific research questions and the questions on the data collection instruments, (c) reach agreement on the selection of variables and the types of data analyses to be applied, and (d) design and justify the data tabulation templates to be used in reporting the data analyses. It is important to note that this meant that the study was based solely on what the participating ministries had deemed to be important general policy concerns. In all, there were 20 general policy concerns that encompassed 75 specific research questions that resulted in around 150 dummy tables.

Instrument construction

Each of the 150 dummy tables included the names of variables to be used as well as the form in which they would be analysed. These variables were listed. Most of them could

be regarded as variables for which information would be required from learners, teachers, or school heads using questionnaires. A few of the variables required information to be collected from learners and teachers using tests.

Questionnaire construction

The variables in the dummy tables were listed and for each variable a decision had to be made about the number of questions that would be required to construct each variable. In some cases (e.g. learner gender) only one question was needed. For another variable (e.g. school enrolment) two questions had to be added together (boys' enrolment and girls' enrolment). In yet other cases, several variables had to be formed into a construct (e.g. 'possessions in the home', 'quality of home' and 'parental education' to form a construct known as 'home background'). Since many of the variables were to be used for examining change over time, then it was important to use, as far as possible, the same questions as had been used in SACMEQ I.

Questions were developed for each variable or each sub-part of a variable required. These were then trialled in the pilot study and, where necessary, revised.

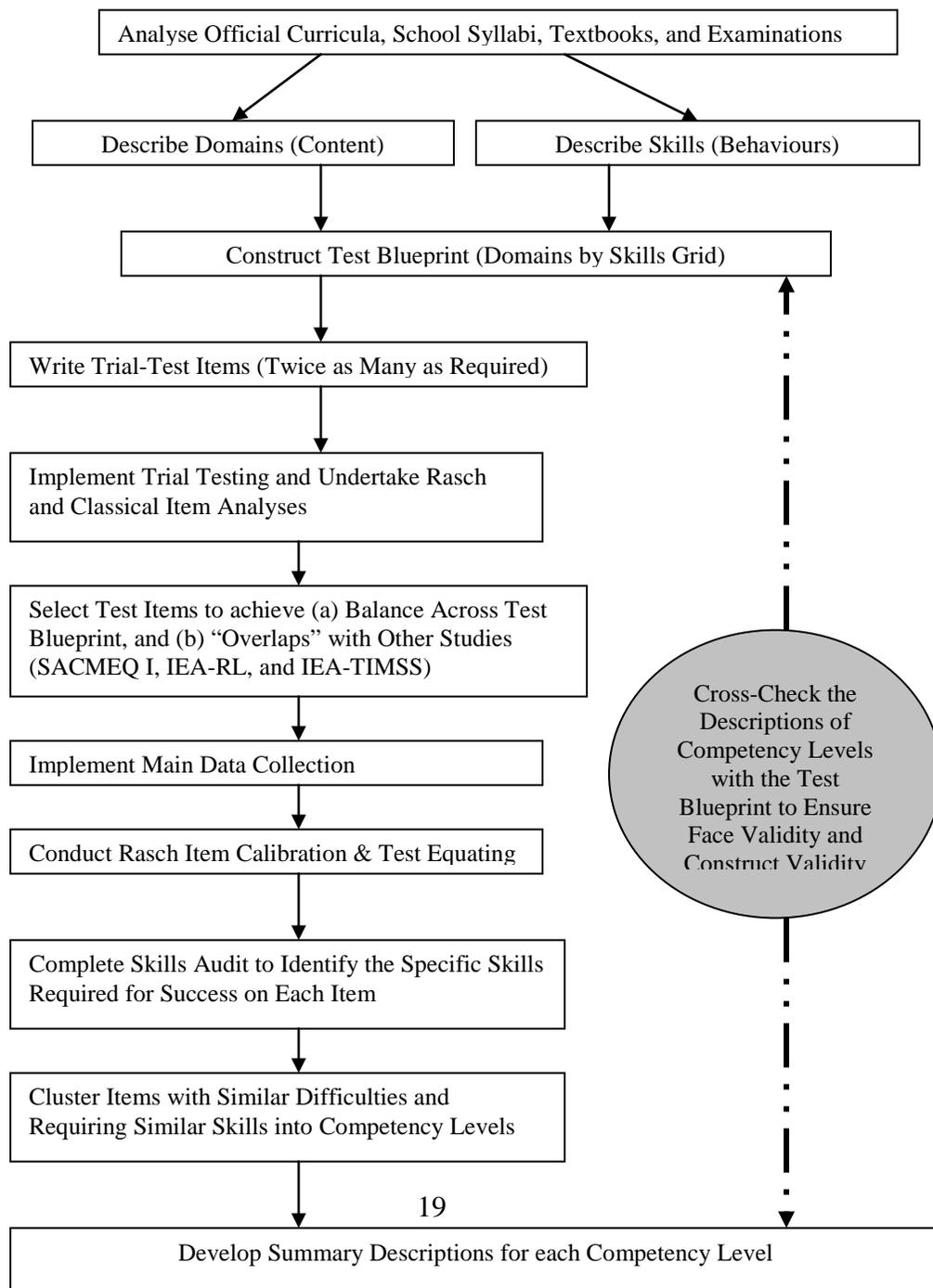
Test construction

Tests had to be constructed in reading and mathematics both for learners and for teachers. The two sets of tests (for learners and teachers) had to be calibrated so as to be on the same scale. For the learner tests there was also the wish to be able to compare reading scores with the International Association for the Evaluation of Educational Achievement (IEA) Reading Literacy study and mathematics scores with the IEA's Third International Mathematics and Science Study (TIMSS). Hence there had to be common items with these tests from the other studies. Most importantly, however, the structure of the learner tests was congruent with the content (domains) and behaviours (skills) derived from detailed analyses of the curricula, syllabi, exams, and textbooks used in the SACMEQ countries. The selection of teacher test items had to cover the full range of

learner item difficulties – but did not contain too many easy learner test items. In addition, in order not to antagonize teachers with an extended testing session, the teacher tests had a much smaller number of test items than the learner tests.

Main Steps Involved in Test Construction for the SACMEQ II Project

The main steps in constructing any test have been given in the self-explanatory diagram below.



The reading tests

“Reading literacy” was defined as “the ability to understand and use those written language forms required by society and/or valued by the individual.” This was the definition that had been used in SACMEQ I and also in the IEA Reading Literacy Study.

The reading domains that were agreed were:

Narrative prose: Continuous texts in which the writer aims to tell a story – whether this be fact or fiction.

Expository prose: Continuous text in which the writer aims to describe, explain, or otherwise convey factual information or opinion to the reader.

Documents: Structured information organised by the writer in a manner that requires the reader to search, locate, and process selected facts, rather than to read every word of a continuous text.

At the same time a hierarchy of skills was proposed (a dimension of increasing competence) that could be applied to both of the SACMEQ studies.

A blueprint of the test in terms of items and domains by hierarchy has been presented below:

Test Blue print for SACMEQ II Reading test

	Narrative	Expository	Documents	
Level 1	Word/picture association involving positional or directional prepositions requiring the linkage of a picture to a position or a direction in order to answer the question	Word/picture association involving positional or directional prepositions requiring the linkage of a picture to a position or a direction in order to answer the question	Word / picture association involving positional or directional prepositions requiring the linkage of a picture to a position or a direction in order to answer the question	
Items	2	2	2	6
Level 2	Recognising the meaning of a single word and being able to express it as a synonym in order to answer the question	Recognising the meaning of a single word and being able to express it as a synonym in order to answer the question	Linking simple piece of information to item or instruction	
Items	7	6	9	22
Level 3	Linking information portrayed in sequences of ideas and content, when reading forward	Linking information portrayed in sequences of ideas and content, when reading forward	Systematic search for information when reading forward	
Items	8	10	8	26
Level 4	Seeking and confirming information when reading backwards through text	Seeking and confirming information when reading backwards through text	Linking more than one piece of information in different parts of a document	
Items	9	5	4	18
Level 5	Linking ideas from different parts of text. Making inferences from text or beyond text, to infer author's values and beliefs	Linking ideas from different parts of text. Making inferences from text or beyond text.	Use of embedded lists and even subtle advertisements where the message is not explicitly stated	
Items	6	3	2	11
Total Items	32	26	25	83

In the final version of the SACMEQ II reading test there was a total of 83 test items, with (a) 32, 26, and 25 items allocated to the narrative, expository, and documents domains, respectively; and (b) 6, 22, 26, 18, and 11 items set at skill levels 1 to 5, respectively.

Skills Competence Levels for Reading

As a result of the item analysis using Rasch it was possible to identify clusters of items according to their difficulty levels. These clusters were examined by specialists who then

were able to describe the thinking behind the items in a cluster. Each cluster formed a level from easy to difficult. These levels have been described below and examples of the thinking on the test items given.

Level 1: Pre Reading (Linked with Level 1 in the Test Blueprint)

(a) Skills: Matches words and pictures involving concrete concepts and everyday objects. Follows short simple written instructions.

(b) Example Test Items

- locate familiar words in a short (one line) text
- match words to pictures
- follow short and familiar instructions

Level 2: Emergent Reading (Linked with Level 2 in the Test Blueprint)

(a) Skills: Matches words and pictures involving prepositions and abstract concepts; uses cuing systems (by sounding out, using simple sentence structure, and familiar words) to interpret phrases by reading on.

(b) Example Test Items

- read familiar words and identify some new words
- use simple and familiar prepositions and verbs to interpret new words
- match words and very simple phrases

Level 3: Basic Reading (Linked with Level 3 in the Test Blueprint)

(a) Skills: Interprets meaning (by matching words and phrases, completing a sentence, or matching adjacent words) in a short and simple text by reading on or reading back.

(b) Example Test Items

- use context and simple sentence structure to match words and short phrases
- use phrases within sentences as units of meaning
- locate adjacent words and information in a sentence

Level 4: Reading for Meaning (Linked with Level 4 in the Test Blueprint)

(a) Skills: Reads on or reads back in order to link and interpret information located in various parts of the text.

(b) Example Test Items

- interpret sentence and paragraph level texts
- match phrases across sentences
- read forwards and backwards in order to locate information in longer texts

Level 5: Interpretative Reading (Linked with Level 5 in the Test Blueprint)

(a) Skills: Reads on and reads back in order to combine and interpret information from various parts of the text in association with external information (based on recalled factual knowledge) that “completes” and contextualizes meaning.

(b) Example Test Items

- Locate, interpret, and read forward to join two pieces of adjacent information
- Use multiple pieces of information to interpret general purpose of a document
- Paraphrase and interpret a single non-adjacent piece of information

Level 6: Inferential Reading (Linked with Level 5 in the Test Blueprint)

(a) Skills: Reads on and reads back through longer texts (narrative, document or expository) in order to combine information from various parts of the text so as to infer the writer's purpose.

(b) Example Test Items

- Interpret, and make inferences from, different types of texts by reading backwards and forwards to confirm links between widely separated information pieces
- Extract information from a non-traditional (left to right) document
- Make judgements about an author's intentions or purpose beyond the text content

Level 7: Analytical Reading (Linked with Level 5 in the Test Blueprint)

(a) Skills: Locates information in longer texts (narrative, document or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices, and/or biases).

(b) Example Test Items

- Combine several pieces of information from a range of locations in complex and lexically dense text or documents
- Analyse detailed text or extended documents for an underlying message
- Identify meaning from different styles of writing

Level 8: Critical Reading (A New Level Generated from the Skills Audit)

(a) Skills: Locates information in a longer texts (narrative, document or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer and evaluate what the writer has assumed about both the topic and the characteristics of the reader – such as age, knowledge, and personal beliefs (value systems, prejudices, and/or biases).

(b) Example Test Items

- Use text structure and organisation to identify an author's assumptions and purposes
- Identify an author's motives, biases, beliefs in order to understand the main theme
- Link text to establish multiple meanings including analogy and allegory

The Mathematics test

For mathematics a similar exercise was undertaken except this time there had been no SACMEQ I test in mathematics. The resultant domains were:

Number: Operations and number line, square roots, rounding and place value, significant figures, fractions, percentages, and ratios.

Measurement: Measurements related to distance, length, area, capacity, money, and time.

Space-Data: Geometric shapes, charts (bar, pie, and line), and tables of data.

The proposed blueprint with levels and items has been presented below:

SACMEQ II Mathematics Test Blue print

Skill Level	Mathematics Domain			
	Number	Measurement	Space-Data	
Level 1	Recognise numbers. Link patterns to numbers.			
Items	6	0	0	6
Level 2	Apply single operations to two digit numbers or simple fractions.	Recognise units of measurement. Apply basic calculations using simple measurement units.	Link patterns and graphs to single digits. Recognise and name basic shapes.	
Items	8	8	4	20
Level 3	Extend and complete number patterns.	Convert measurement units when undertaking one-step operations.	Translate shapes and patterns. Identify data in tabular form.	
Items	6	4	7	17
Level 4	Combine arithmetic operations in order to link information from tables and charts when performing calculations.	Apply two and three-step arithmetic operations to numbers. Use and convert measurement units.	Combine arithmetic operations in order to link information from tables and charts.	
Items	4	4	4	12
Level 5	Combine operations in order to make calculations involving several steps and a mixture of operations using combinations of fractions, decimals, and whole numbers.	Combine operations in order to make calculations involving several steps and a mixture of operations using a translation of units.	Link data from tables and graphs in order to make calculations involving several steps and a mixture of operations.	
Items	3	2	3	8
Total Items	27	18	18	63

Skills Competence Levels For Mathematics

The levels derived from the item analyses were as follows.

Level 1: Pre Numeracy (Linked with Level 1 in the Test Blueprint)

(a) Skills: Applies single step addition or subtraction operations. Recognises simple shapes. Matches numbers and pictures. Counts in whole numbers.

(b) Example Test Items

- Count illustrated objects
- Recognise basic numbers and shapes
- Carry out simple single operations of addition and subtraction

Level 2: Emergent Numeracy (Linked with Level 1 in the Test Blueprint)

(a) Skills: Applies a two-step addition or subtraction operation involving carrying, checking (through very basic estimation), or conversion of pictures to numbers. Estimates the length of familiar objects. Recognises common two-dimensional shapes.

(b) Example Test Items

- link simple verbal, graphic, and number forms with single arithmetic operations on whole numbers up to two digits
- recognise common shapes or figures in two dimensions
- estimate accurately lengths of simple shapes

Level 3: Basic Numeracy (Linked with Level 2 in the Test Blueprint)

(a) Skills: Translates verbal information presented in a sentence, simple graph or table using one arithmetic operation in several repeated steps. Translates graphical information into fractions. Interprets place value of whole numbers up to thousands. Interprets simple common everyday units of measurement.

(b) Example Test Items

- Recognise three-dimensional shapes and number units
- Use a single arithmetic operation in two or more steps
- Convert in single step units using division

Level 4: Beginning Numeracy (Linked with Level 3 in the Test Blueprint)

(a) Skills: Translates verbal or graphic information into simple arithmetic problems. Uses multiple different arithmetic operations (in the correct order) on whole numbers, fractions, and/or decimals.

(b) Example Test Items

- Convert units in two steps and count tabulated data
- Analyse a visual prompt and interpret triangular shapes
- Translate verbal to arithmetic form using two operations on fractions

Level 5: Competent Numeracy (Linked with Level 3 in the Test Blueprint)

(a) Skills: Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem. Solves multiple-operation problems (using the correct order of arithmetic operations) involving everyday units of measurement and/or whole and mixed numbers. Converts basic measurement units from one level of measurement to another (for example, metres to centimetres).

(b) Example Test Items

- convert basic measurement units
- understand the order of magnitude of simple fractions
- conduct multiple steps with a range of basic operations in a strict sequence using an analysis of a short verbal or visual prompt

Level 6: Mathematically Skilled (Linked with Level 4 in the Test Blueprint)

(a) Skills: Solves multiple-operation problems (using the correct order of arithmetic operations) involving fractions, ratios, and decimals. Translates verbal and graphic representation information into symbolic, algebraic, and equation form in order to solve a given mathematical problem. Checks and

estimates answers using external knowledge (not provided within the problem).

(b) Example Test Items

- perform complex and detailed mathematical tasks (involving considerable abstraction of verbal, visual, and tabular information into symbolic forms and algebraic solutions) using knowledge not supplied with the task
- use of an extended verbal or graphic prompt (involving an analysis of steps) to identify the correct sequence of calculations
- convert, and operate on, units of measurement (time, distance, and weight)

Level 7: Problem Solving (Linked with Level 5 in the Test Blueprint)

(a) Skills: Extracts and converts (for example, with respect to measurement units) information from tables, charts, visual and symbolic presentations in order to identify, and then solves multi-step problems.

(b) Example Test Items

- use multiple verbal order of steps with conversion of time units
- translate verbal to arithmetic form, apply units conversion with long division
- convert from mixed number fractions to decimals

Level 8: Abstract Problem Solving (A New Level Generated from the Skills Audit)

(a) Skills: Identifies the nature of an unstated mathematical problem embedded within verbal or graphic information, and then translate this into symbolic, algebraic, or equation form in order to solve the problem.

(b) Example Test Items

- Identify the nature of a problem, translate the information given into a mathematical approach, and then identify the correct mathematical strategies to obtain a solution

In the final version of the SACMEQ II learner mathematics test there was a total of 63 test items, with 27, 18, and 18 items allocated to the number, measurement, and space-data domains, respectively, and 6, 20, 17, 12, and 8 items set at skill levels 1 to 5, respectively.

Immediately after the test blueprints had been developed the NRCs worked in teams to either select or write all of the required test items for the SACMEQ II tests. As items were prepared they were classified according to the cells in the test blueprints. For each cell *twice* as many items as required were prepared so that the rejection of poor items after the trial testing did not result in a shortage of items in some cells. Most test items were in multiple-choice format with four options per item. The item pools were then sent to all countries for review by panels of curriculum specialists. This resulted in editorial changes to the items and recommendations for additional items by the panel members who made sure that the items met the requirements of the respective national curricula. In Uganda, English and Mathematics curriculum/subject specialists from the National Curriculum Development Centre (NCDC) assisted by experienced Primary 6 teachers reviewed the test items and ascertained that they were in harmony with the Ugandan Primary 6 curricula.

The main challenge in the construction of the reading and mathematics tests for teachers was to “fine-tune” the difficulty range of test items so that it would suit the higher levels of competence that were expected of teachers. At the same time it was important to ensure that there was sufficient “item overlap” with the learner tests to permit the performance of teachers and learners to be measured on the same scale.

In the reading test for teachers, several passages were selected because of the more subtle nature of the messages that they conveyed, and the less-visible underlying assumptions

of the writers. For example, one passage on the topic of “smoking” required the teachers to identify the unstated values and beliefs of the writer. Another passage on the topic of “effective thinking” required the teachers to identify assumptions made by the writer about the readers and their knowledge of the topic. These kinds of skills were far beyond the competencies that had been identified from the analyses of Primary 6 curricula.

The “extra” reading and mathematics items for teachers were expected to assess the higher competence levels of teachers – but not to be so difficult that the teachers would be daunted by the challenge. In addition, the selection of easier test items that “overlapped” with the learner tests had to be made with extreme care because the teachers may have felt degraded if these items were ridiculously easy or if they were concerned with issues that would only interest young children.

In the teacher reading test the extended levels of competence mainly focussed on expository texts – rather than on documents or narratives. It was felt that the use of narratives and documents at this level would have required very complex and long texts that would have generally extended the time required to complete the test.

In the teacher mathematics test the extended levels of competence mainly emphasised problem solving strategies that required the extraction of information from verbal, graphic, or tabular presentations. For these items, the teachers were expected to follow three steps: to identify the nature of the problem, to transform the problem into mathematical language, and to solve the problem. In some cases this required the rearrangement of information, and in others it meant translating the problem into one or more equations and then solving the equations.

The tests (and questionnaires) were piloted in all countries. In Uganda the pilot study was conducted in 32 schools selected from regions, comprising 640 learners. The pilot study took place in August 1999. The pilot study also provided an opportunity for the training of the first 10 data collection team leaders, who took part in the main study at the

end of September 2000. The data were returned to a central data processing centre at IIEP in Paris.

Three kinds of scores

It was decided to derive and use three kinds of scores from the tests. These have been described below.

The calculation of scale scores (Rasch)

The data from the trial-testing phase were subjected to Rasch and classical item analysis in order to detect items that did not “fit” the relevant scales, or that were “behaving differently” across subgroups of respondents defined by gender and country. The poor quality test items were rejected – keeping in mind the need to prepare a “balanced” test across skill levels and domains. The Rasch and classical item analyses were also undertaken a second time after the main testing.

In the case of the measurement of reading performance, there were three groups of respondents: the SACMEQ I learners, the SACMEQ II learners, and the SACMEQ II teachers. Each group completed a reading test that was “different but overlapped”. That is, each group completed a reading test that contained some unique test items and some items that also appeared on one or both of the other two tests. In the case of numeracy measurement, the tests were also “different but overlapped”, however there were only two groups of respondents: the SACMEQ II learners and SACMEQ II teachers.

Although data were gathered at different time points for the SACMEQ I (1995-1997) and SACMEQ II (2000-2002) projects, it is possible to think of the reading and mathematics tests used in the projects as two “artificial” or “composite” tests of 148 different reading items and 91 mathematics items, respectively. This conceptualisation of the tests implies that the three sets of reading test respondents and the two sets of mathematics test

respondents can each represent a single group of respondents for the purposes of undertaking “concurrent” scaling of the tests using the Rasch Model.

For the 148-item “composite” reading test there were 36 items that came only from the SACMEQ I learner reading test, 52 test items that came only from the SACMEQ II learner reading test, and 26 items that came only from the SACMEQ II teacher reading test. An additional 34 items were located in more than one test, with 9 of these items being located in all three tests, and 3 sets of items associated with pairs of tests. For the 91-item “composite” mathematics test described in Figure A2.11 (in the appendices) there were 50 items that came only from the SACMEQ II learner mathematics test, and 28 items that came only from the SACMEQ II teacher mathematics test. An additional 13 items were located in both tests.

Both the reading and mathematics data matrices were analysed using computer software that applied the Rasch Model of measurement (Andrich and Luo, 2000). The first step was to calibrate the test items by calculating the Rasch difficulty values for each item within the 148-item reading test and the 91-item mathematics test. The results of the calibration were then used to calculate reading and mathematics scores for all learners and teachers in all countries.

The mean for all SACMEQ countries was set at 500 and the standard deviation at 100. For Uganda, the mean learner score for reading was 482.5. The mean teacher reading score for all SACMEQ countries was 733, while the mean for Ugandan teachers was 695.4. This meant that in reading, both Ugandan learners and teachers scored below the SACMEQ means. Details regarding pupils’ and teachers’ achievement levels have been presented in Chapter 7.

The identification of ‘derived’ skill competence levels

For each set of tests (learner and teacher for reading and learner and teacher for mathematics) the items were first arranged in order of difficulty, and then examined

item-by-item in order to describe the specific skills required to provide correct responses. When items had been linked to specific skills, they were placed into groups or clusters of test items such that the items in each group had similar difficulty values and shared a common “theme” with respect to the underpinning competencies required to provide correct responses.

The three tasks of defining specific skills for each test item, identifying groups of items with similar difficulties, and then naming the “theme” (or competency level) linked to each group were extremely difficult because it required the NRCs to first reach agreement on how the respondents arrived at correct solutions, and to then name the competency required. This required the NRCs to use their practical knowledge of the ways in which learners solve problems, and then to portray this with a meaningful description of the thought processes that had been applied. The skills audit for the reading and mathematics tests resulted in the identification of eight levels of competence for each test. This was more than had been proposed in the test blueprints. For both tests there was a strong correspondence between the descriptions of the five blueprint levels and most of the derived levels arising from the skills audit – which suggested that the three “extra” levels were defining more detail on the same reading and mathematics scales.

The skill levels with examples of items characterising each level have been presented earlier in this chapter. An abbreviated version has been presented in Table 2.1. It will be seen that the levels are hierarchical. It is then possible to calculate the percentage of learners reaching any one level. These have been presented in Chapter 7 in this report. These can be regarded as being more meaningful than other scores because the competency levels indicate exactly what learners can and cannot do.

Table 2.1: The final skill levels for the SACMEQ reading and mathematics tests

Level	Reading	Mathematics
1	Pre-reading: Matches words and pictures involving concrete concepts and everyday objects. Follows short simple written instructions	Pre-numeracy: Applies single step addition or subtraction operations. Recognises simple shapes. Matches numbers and pictures. Counts in whole numbers.
2	Emergent reading: Matches words and pictures involving prepositions and abstract concepts; uses cueing systems (by sounding out, using simple sentence structure, and familiar words) to interpret phrases by reading on.	Emergent numeracy: Applies a two-step addition or subtraction operation involving carrying, checking (through very basic estimation), or conversion of pictures to numbers. Estimates the length of familiar objects. Recognises common two-dimensional shapes.
3	Basic reading: Interprets meaning (by matching words and phrases, completing a sentence, or matching adjacent words) in a short and simple text by reading on or reading back.	Basic numeracy: Translates verbal information presented in a sentence, simple graph or table, using one arithmetic operation in several repeated steps. Translates graphical information into fractions. Interprets place value of whole numbers up to thousands. Interprets simple common everyday units of measurement.
4	Reading for meaning: Reads on or reads back in order to link and interpret information located in various parts of the text.	Beginning numeracy: Translates verbal or graphic information into simple arithmetic problems. Uses multiple different arithmetic operations (in the correct order) on whole numbers, fractions, and/or decimals.
5	Interpretive reading: reads on and reads back in order to combine and interpret information from various parts of the text in association with external information (based on recalled factual knowledge) that 'completes' and contextualizes meaning.	Competent numeracy: Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem. Solves multiple-operation problems (using the correct order of arithmetic operations) involving everyday units of measurement and/or whole and mixed numbers. Converts basic measurement units from one level of measurement to another (for example, metres to centimetres)
6	Inferential reading: Reads on and reads back through longer texts (narrative, document, or expository) in order to combine information from various parts of the text so as to infer the writer's purpose.	Mathematically skilled: Solves multiple-operation problems (using the correct order of arithmetic operations) involving fractions, ratios, and decimals. Translates verbal and graphic representation information into symbolic, algebraic, and equation form in order to solve a given mathematical problem. Checks and estimates answers using external knowledge (not provided within the problem).
7	Analytical reading: Locates information in longer texts (narrative, document, or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices, and/or biases).	Problem solving: Extracts and converts (for example, with respect to measurement units) information from tables, charts, visual and symbolic presentations in order to identify, and then solve multi-step problems.
8	Critical reading: Locates information in longer texts (narrative, document, and expository) by reading on and reading back in order to combine information from various parts of the text so as to infer and evaluate what the writer has assumed about the topic and the characteristics of the reader – such as age, knowledge, and personal beliefs (values systems, prejudices, and/or biases)	Abstract Problem Solving: Identifies the nature of an unstated mathematical problem embedded within verbal or graphic information, and then translate this into symbolic, algebraic, or equation form in order to solve the problem.

The specification of minimum and desirable levels of reading

In SACMEQ I each of the Ministries of Education established expert national committees that included inspectors, teacher leaders, and teachers. Uganda did not participate in SACMEQ I, but selected a committee which consisted of curriculum specialists, subject panelist/advisory teachers and experienced teachers. The committee was asked to identify the reading performances that they would expect from a learner who (a) would *barely survive* during the next year of schooling (the “Minimum” level), and (b) was *guaranteed to succeed* during the next year of schooling (the “Desirable” level). It was the average cut-off levels that were established in SACMEQ I that were used in SACMEQ II. This was only for reading because this was the only subject matter tested in the SACMEQ I Project. It was thought that this would be one further indicator of importance for policy-makers.

Sampling

The “best” sample design for a particular project is one that provides levels of sampling accuracy that are acceptable in terms of the main aims of the project, while simultaneously limiting cost, logistic, and procedural demands to manageable levels. The major constraints that were established prior to the preparation of the sample designs for the SACMEQ II Project have been listed below.

Target Population: The target population definitions should focus on Primary 6 learners attending registered mainstream government or non-government schools. In addition, the defined target population should be constructed by excluding no more than 5 percent of learners from the desired target population.

Bias Control: The sampling should conform to the accepted rules of scientific probability sampling. That is, the members of the defined target population should have a known and non-zero probability of selection into the sample so that any potential for bias in

sample estimates due to variations from “epsem sampling” (equal probability of selection method) could be addressed through the use of appropriate sampling weights.

Sampling Errors: The sample estimates for the main criterion variables should conform to the sampling accuracy requirements that the standard error of sampling for the learner tests should be of a magnitude that is equal to, or smaller than, what would be achieved by employing a simple random sample of 400 learners.

Response Rates: Each SACMEQ country should aim to achieve an overall response rate for learners of 80 percent. This figure was based on the wish to achieve or exceed a response rate of 90 percent for schools and a response rate of 90 percent for learners within schools.

Administrative and Financial Costs: The number of schools selected in each country should recognise limitations in the administrative and financial resources available for data collection.

Other Constraints: The number of learners selected to participate in the data collection in each selected school should be set at a level that will maximise validity of the within-school data collection for the learner reading and mathematics tests.

The Specification of the Target Population

For Uganda, the desired target population was all learners enrolled in Primary 6 in the ninth month of the school year (i.e. in September 2000). In addition, a decision was taken to exclude small schools based on the definition of having less than either 15 or 20 pupils in the desired target population. Small schools were excluded because it was known that they represented a very small component of the total population of pupils, and were known to be mostly located in very isolated areas that were associated with high data collection costs. In Uganda, Schools in areas affected by serious military conflicts and

special schools were excluded. The details of the desired, defined and excluded populations for Uganda have been presented in Table 2.2.

Table 2.2: The desired, defined and excluded of Grade 6 population for Uganda

Stratum (Region)	Desired		Defined		Excluded			
	Schools	Pupils	Schools	Pupils	Schools		Pupils	
	No.	No.	No.	No.	No.	%	No.	%
Central	2785	135982	2314	130366	471	17	5616	4
Eastern	2466	150130	2238	147190	228	9	2940	2
Northern	1664	108751	1523	105356	141	8	3395	3
Southwestern	1634	67968	1384	63673	250	15	4295	6
Western	1139	55030	966	52542	173	15	2488	5
Uganda	9688	517861	8425	499127	1263	13	18734	4

Therefore, for Uganda, the desired schools and pupils were 9,688 and 517,861 respectively and the defined schools and pupils were 8,425 and 4,919,127 respectively. This resulted in 1,263 schools and 18,734 pupils being excluded which was 4 percent of pupils. This is less than 5 percent, which satisfied the technical requirement that had been set down for the SACMEQ II sampling procedures.

The final sampling figures for Uganda have been presented in Table 2.3.

Table 2.3: The planned sample, achieved sample and response rates of schools and pupils for Uganda

Region	Planned		Achieved		Percent Response rate	
	Schools	Pupils	Schools	Pupils	Schools	Pupils
Central	45	900	44	695	98	77
Eastern	45	900	45	744	100	83
Northern	31	620	31	509	100	82
South Western	19	380	19	312	100	82
Western	24	480	24	382	100	80
Uganda	164	3280	163	2642	99	81

As can be seen from Table 2.3, there were 164 schools that should have been in the sample and in fact there were 163. However there should have been 3280 pupils in the

sample and only 2642 were included. This was a response rate for pupils of 81 percent. This was mainly due to pupil absenteeism on the days of testing.

The main data collection

The main data collection took place in September 2000. Data collection manuals had been written indicating what the data collectors had to do from when they entered a school to when they returned the package of instruments to the regional office. A team of 10 data collection team leaders were centrally trained to ensure uniformity in data collection throughout the country. The training of data collectors included going through the data collection manual, followed by actual data collection in a few Kampala schools that were not included in the SACMEQ II sample. The training was repeated in the regions for data collectors to be more familiar with the data collection manual and for the benefit of the assistant data collectors. The schools were notified about the data collection several weeks in advance. When the data collectors arrived at the school, they had to meet with the school head to verify the details of the school and what was required. They had to ensure that a testing room with 20 well placed sitting and writing places was available. They then had to further ensure that the class registers were available and that the selected learners were present.

Data were collected on two consecutive days. On the first day, data collectors administered the learner questionnaire and reading test in addition to the school head questionnaire as well as the teacher questionnaire and teacher tests. Upon leaving the school, data collectors had to check all the information collected, before returning to the school the following day for the administration of the learner mathematics test.

Data entry and data cleaning

Data preparation commenced soon after the main data collection was completed. The NRCs had to organize the safe return of all materials to the Ministry of Education and Sports where the data collection instruments could be checked, entered into computers,

and then “cleaned” to remove errors prior to data analysis. The data checking involved the “hand editing” of data collection instruments by a team of trained staff. They were required to check that: (i) all questionnaires, tests, and forms had arrived back from the sample schools, (ii) the identification numbers on all instruments were complete and accurate, and (iii) certain logical linkages between questions made sense (for example, the two questions to school heads concerning “Do you have a school library?” and “How many books do you have in your school library?”).

The next step was the entry of data into computers using the WINDEM software. A team of 5-10 staff normally undertook this work. In some cases the data were “double entered” in order to monitor accuracy.

There was a great deal of variation in the delivery dates for the initial versions of the computer-stored SACMEQ II data files. This occurred because of different testing dates and also because of different amounts of time required to complete entry of data into computers. The dates associated with the initial delivery of SACMEQ II data for cleaning and the cycles to be gone through have been presented in the second column of Table 2.4.

Table 2.4 Number of Cycles and Amount of Time Required for the Completion of SACMEQ II Data Cleaning

School System	Date When Data Arrived	Date When Cleaning Finished	Number of Cleaning Cycles	Number of Months
Botswana	8-Feb-01	5-Dec-01	15	10
Kenya	20-Jun-01	23-Oct-02	24	16
Lesotho	20-Mar-01	25-Jan-02	15	10
Malawi	15-Dec-02	5-May-03	13	5
Mauritius	9-Oct-01	15-Apr-03	11	18
Mozambique	8-Feb-01	27-Jan-03	23	24
Namibia	2-May-01	25-Jan-02	9	9
Seychelles	15-Feb-01	13-Jun-01	5	4
South Africa	9-Mar-01	26-Aug-02	22	18
Swaziland	7-Jun-01	27-Sep-02	14	16
Tanzania	26-Mar-01	19-Nov-02	25	20
Uganda	26-Feb-01	22-Jan-03	31	23
Zambia	23-Jan-01	29-Nov-02	25	22
Zanzibar	15-Jun-01	23-Apr-03	27	22

The NRCs received written instructions and follow-up support from IIEP staff in the basic steps of data cleaning using the WINDEM software. This permitted the NRCs to (i) identify major errors in the sequence of identification numbers, (ii) cross-check identification numbers across files (for example, to ensure that all pupils were linked with their own reading and mathematics teachers), (iii) ensure that all schools listed on the original sampling frame also had valid data collection instruments and vice-versa, (iv) check for “wild codes” that occurred when some variables had values that fell outside pre-specified reasonable limits, and (v) validate that variables used as linkage devices in later file merges were available and accurate.

A second phase of data preparation directed efforts towards the identification and correction of “wild codes” (which refer to data values that that fall outside credible limits), and “inconsistencies” (which refer to different responses to the same, or related, questions). There were also some errors in the identification codes for teachers that needed to be corrected before data could be merged.

During 2002 a supplementary training programme was prepared and delivered to all countries via the Internet. This training led each SACMEQ Research Team step-by-step through the required data cleaning procedures – with the NRCs supervising “hands-on” data cleaning activities and IIEP staff occasionally using advanced software systems to validate the quality of the work involved in each data-cleaning step.

This resulted in a “cyclical” process whereby data files were cleaned by the NRC and then emailed to the IIEP for checking and then emailed back to the NRC for further cleaning. The figures presented in the final two columns of Table 2.1 show the number of cleaning “cycles” (that is the number of times that SACMEQ II data were sent from a country to the IIEP for detailed checking and then returned to the country for further cleaning) and the total amount of time in months required to complete the data cleaning for each country.

The number of cycles required to complete all of the data cleaning ranged from lows of 5 and 9 cycles in the Seychelles and Namibia, respectively, to highs of 27 and 31 cycles in Zanzibar and Uganda, respectively. The time required to complete the all of the data cleaning took from lows of 4 and 9 months in the Seychelles and Namibia, respectively, to highs of 23 and 24 months in Uganda and Mozambique, respectively. From the data presented in Table 2.4, it can be seen that in Uganda the data cleaning process covered many cycles over a considerable period of time compared to other countries. Ensuring accurate data entry and efficient data cleaning is a major challenge in subsequent studies. Furthermore, this situation highlights the importance of ensuring that the Ministry as a whole collects and uses clean data.

Merging and Weighting

As each NRC finalized the cleaning of the SACMEQ II data for his/her country, the data from all sources within a country were merged and weighted.

The merging process required the construction of a single data file for each school system in which pupils were the units of analysis. This was achieved by “disaggregating” the teacher and school head data over the pupil data. That is, each record of the final data file for a country consisted of the following four components: (a) the questionnaire and test data for an individual pupil, (b) the questionnaire and test data for his/her mathematics and reading teacher, (c) the questionnaire data for his/her school head, and (d) school and pupil “tracking forms” that were required for data cleaning purposes.

The merged file enabled linkages to be made among pupils, teachers, and school heads at the “between-pupil” level of analysis. To illustrate, with the merged file it was possible to examine questions of the following kind: “What are the average reading and mathematics test scores (based on information taken from the pupil tests) for groups of pupils who attend urban or rural schools (based on information taken from the school head questionnaire), and who are taught by male or female teachers (based on information taken from the teacher questionnaire)?”

The calculation of sampling weights could only be conducted after all files had been cleaned and merged. Sampling weights were used to adjust for missing data and for variations in probabilities of selection that arose from the application of stratified multi-stage sample designs. There were also certain country-specific aspects of the sampling procedures, and these had to be reflected in the calculation of sampling weights.

Two forms of sampling weights were prepared for the SACMEQ II Project. The first sampling weight was the inverse of the probability of selecting a pupil into the sample. These “raising factors” were equal to the number of pupils in the defined target population that were “represented by a single pupil” in the sample. The second sampling weight was obtained by multiplying the raising factors by a constant so that the sum of the sampling weights was equal to the achieved sample size.

Conclusion

This chapter has described the procedures undertaken in order to conduct the SACMEQ II study. Detailed explanations were given of the development of instrumentation and the fieldwork operations. Most of this section described aspects of the SACMEQ II project research programme that were common across countries. However, the reporting and interpreting of the research results were undertaken on a country-by-country basis.

Chapter 3

Pupils Characteristics and their Learning Environments

Introduction

The aim of this chapter is to document information on some of the characteristics of pupils and their homes. The information not only serves as a basis for providing a baseline against which future survey results can be compared, but also provides a context for the more accurate interpretation of the results of the survey. More specifically, the home background variables will be used to construct a socio-economic status scale which forms an important construct in educational research.

A note on the interpretation of the data analysis

Before presenting the results, three points should be stressed. The first is that the variables presented in this chapter represent a small subset of the larger number of variables for which data were collected. The Ministry will make a separate publication containing descriptive statistics for all variables in the study available to interested readers.

The second point to take note of is that, in interpreting the values in Tables 3.1(a) and (b) and other tables throughout this report, it is important to remember that the percentages and means have been presented in terms of learners. That is, learners were the units of analysis - even though some variables in this report referred to teachers or schools. Where a percentage for a variable that describes teachers has been presented, this percentage should be interpreted as 'the stated percentage of learners who were in schools with teachers having the particular characteristic'. Similarly, a percentage for a variable that describes schools should be interpreted as 'the stated percentage of learners who were in schools with the particular characteristic.'

The third and last point to note is that for each statistic presented in this study, the corresponding standard error (SE) associated with it has also been presented alongside it. Providing the reader with standard errors of sampling is important because the results presented are based on a sample of Primary 6 pupils, not on the entire population. In the case of Uganda, the sample estimate of the population percentage would have a standard error of ± 2.5 percent. This sampling accuracy implies that, 95 percent of the time, we are sure that the population value lies within ± 5 percent of the sample estimate. In other words, the limit is two standard errors of sampling. This level of accuracy also applies to the sampling errors for means presented in this study. Using figures presented in Table 3.1 for illustration purposes, it can be noticed that the mean age for pupils in Central Region was 164.5 months, and the standard error was 1.52. This means that, 19 times out of 20, we can be sure that the mean age of Uganda's Primary 6 pupils is $164.5 \pm 2(1.52)$ months, that is, it lies between 161.46 months and 167.54 months.

General and specific policy questions related to educational inputs

As a starting point, in order to guide the data analyses, the very broad educational policy question posed in the title to this chapter was divided into five general policy concerns. These in turn were further subdivided into a set of specific questions. The five areas of general concern were:

1. What were the personal characteristics (for example, age and gender) and home background characteristics (for example, parent education, regularity of meals, home language, etc.) of Primary 6 learners that might have implications for monitoring equity, and/or that might impact upon teaching and learning?
2. What were the school context factors experienced by Primary 6 learners (such as location, absenteeism, (regularity and reasons), grade repetition, and homework (frequency, amount, correction, and family involvement) that might impact upon teaching/learning and the general functioning of schools?

3. Did Primary 6 learners have sufficient access to classroom materials (for example, textbooks, readers, and stationery) in order to participate fully in their lessons?
4. Did Primary 6 learners have access to library books within their schools, and (if they did have access) was the use of these books being maximised by allowing learners to take them home to read?
5. Has the practice of Primary 6 learners receiving extra lessons in school subjects outside school hours become widespread, and have these been paid lessons?

Each of these five general policy concerns has been taken up in the next section.

General Policy Concern 1: What were the personal and home background characteristics of Primary 6 pupils that have implications for monitoring equity, and /or that might impact upon teaching and learning?

A wide range of information concerning the average age of Primary 6 pupils, the number of books in the home, parental education, the frequency with which learners speak English outside school, the place where pupil's reside, meals for the pupils and an indication of the wealth status of the households was collected. These home characteristics help create enabling conditions for learning. Specific questions were therefore asked to obtain data on personal characteristics of learners and their homes.

What was the age distribution of Primary 6 pupils?

In the first column of figures in Table 3.1 the average age of the Primary 6 pupils has been presented by region.

Table 3.1: Means, percentages and sampling errors for the pupil age, sex and home-related characteristics

Region	Age (months)		Sex (female)		Books at home (number)		Possessions at home Max = 13 (index)		Meals (index)		Parent education	
	Mean	SE	Percent	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	164.5	1.52	53.8	2.88	30.2	5.41	4.5	0.23	10.2	0.22	3.5	0.13
Eastern	171.7	1.49	41.0	2.95	29.6	4.35	3.4	0.14	9.8	0.19	3.1	0.09
Northern	176.8	2.74	34.9	2.32	21.5	4.24	2.6	0.19	9.6	0.25	3.0	0.10
South West	174.7	2.91	49.8	5.09	43.8	8.02	2.8	0.37	10.5	0.26	3.1	0.19
Western	172.8	3.00	41.4	5.67	38.9	9.26	3.2	0.33	9.8	0.33	3.1	0.17
Uganda	171.4	0.93	44.5	1.63	31.6	2.62	3.4	0.11	9.9	0.11	3.2	0.06

At the national level the mean age of Primary 6 pupils was 171.4 months (14 years and 3 months). If all pupils had entered school at the official age of entry and there had been no repeating of a class, then the expected age would have been 132 months (11 years). Pupils enter school in January if they have turned 6 years by 31 December of the previous year. That is, on average Primary 6 pupils were around 3 years older than might have been expected. The youngest Primary 6 pupils on average were located in the Central Region, where the average age was 164.5 months. In contrast, the oldest Primary 6 pupils were found in the Northern region where the average Primary 6 pupils were 176.8 months old.

There were several reasons why there were many “over age” children in Uganda’s Primary 6 classes.

First, there was the problem of late entry to primary schooling that occurred because of the Universal Primary Education that was introduced in 1997. Because of free entry, all children who had dropped out of school earlier on account of school fees returned to school. Secondly, there was a problem of high repetition rates in Primary 6. Thirdly, because of many constraints, there were often many over-age pupils in rural and pastoral areas such as the Karamoja and Sembabule regions. In these areas, schools are sparsely distributed and this results in long walking distances. This, together with the poverty of

the communities in those areas, acts as a powerful disincentive against access to schooling.

Conversely, children in the Central Region largely start Primary 1 at the appropriate age (6 years) because the schools are relatively close to one another and the parents in this region are relatively well-to-do and can afford to get their children to school.

Policy suggestion 3.1: The Director of Education should ensure that the official school entrance age of 6 years should be strictly enforced in order to reduce the percentage of over-age pupils. Complementary centres should be introduced for those who are over-aged.

What was the gender distribution of pupils?

In the second column of the data in Table 3.1 the percentages of female pupils for Uganda as a whole and by region have been presented. On the whole, 44.5 percent of the pupils in Primary 6 were females. This is still below the EFA gender parity target of 0.5. The Northern Region had the lowest number of females (34.9 percent) in Primary 6 and Central had the highest (53.8 percent). The reason why the Northern Region had the lowest percentage of girls is probably because of insecurity in the region where girls have to stay at home in order to look after the younger children. In addition, the practice of early marriages especially in the Northern, Eastern and Western Regions of Uganda undermines the survival of the girl child at school.

Policy suggestion 3.2: Gender parity is one of EFA and MDG goals to be achieved by 2005 in primary schools. The Commissioner for Primary Education should address the issue of persistent gender disparities in primary school enrolment by strengthening multi-media campaigns to sensitize parents to send girls to school and keep them in school.

What was the level of the parents' education?

The third set of data presented in Table 3.1 concerns the education of the parents of the Primary 6 pupils. It is to be expected that parents with more education will provide a home atmosphere that is more conducive to learning than parents with lower levels of education and will help their children in many ways with their learning.

Separate questions were designed for the mother and father, and the results were scored on a 6-point scale and the values obtained were summed and then divided by 2. The national average was found to be 3.2.

The largest percentage of well educated parents was found in the Central Region where the mean was 3.5. The other regions had their means ranging from 3.0 to 3.1. A value of 3 indicates that the parents had completed primary school. However, since literacy and adult education programmes have been introduced and are running in all rural areas of Uganda, it is expected that the level of parents' educational attainment will improve.

How regularly did pupils eat meals?

Obviously the health and nutritional condition of pupils can affect their learning. Accordingly, a question was asked about how many times in a week the Primary 6 pupils had a morning meal, a midday meal and an evening meal. A score of 3 meant that they did not eat at all while a score of 12 indicated that they ate every meal each day.

From Table 3.1 it can be seen that all pupils in Uganda had an average of 9.9 meals per week with the highest number being in the Southern regions (10.5) and the lowest number being in the Northern area (9.6). This result indicates that, overall, the pupils of Primary 6 generally had access to meals regularly, and should be generally well-nourished.

How many books were there in pupils' homes?

The availability of books and other reading materials in the home can offer additional opportunities for pupils to learn. Pupils were therefore asked to indicate how many books were found in their homes, and the results have been presented in the fourth column of Table 3.1.

From the figures presented in Table 3.1, it can be seen that pupils had just over 30 books in their homes. The pupils in the Northern region were the most disadvantaged with only 21.5 books at home. This is partly attributable to the insurgency in the North. Indeed, a government circular of January 2003 to the districts that directed all government schools to allow pupils to be taking textbooks home may help in redressing book deficits within the households. With a mean of just over 31 books in their homes, it can be concluded that most pupils had access to sufficient additional reading materials in their homes.

What other reading materials and electronic media did pupils have at home?

It is known that pupils from homes that tend to have fewer possessions are more disadvantaged than those from homes where a variety of possessions offer more opportunities for learning. Access to newspapers, radio and television, for example, can create a whole range of additional learning opportunities for children. It was therefore important to ask pupils to indicate the possessions they had in their homes. The possessions included in the list were: daily newspaper, weekly or monthly magazine, radio, TV set, video cassette recorder (VCR), cassette player, telephone, car, motorcycle, bicycle, piped water, electricity (mains, generator, solar), and a table to write on. The number of possessions owned in the home was summed for each pupil. The lowest score possible was zero and the highest was 13.0. The scores obtained have been presented in the fifth column of Table 3.1.

At the national level, the average number of possessions was 3.4 items. The highest number possessions owned was in the Central region with an average of 4.5 items and

lowest was in the Northern Region where the average was 2.6 items. This difference was mainly due to the fact that in urban areas items such as a telephone, TV sets, and refrigerators were more common because people living here had access to electricity.

Where do pupils reside during the school week?

Some areas in Uganda have low population density and there are therefore a number of children who do not have a school within walking distance. In such cases, there is need for pupils to be provided with boarding facilities. In other cases, pupils' family circumstances may force them to stay with relatives or, in the case of child-headed households, to stay alone or with other children. Information was therefore collected on the pupils' place of abode during the school week, and the responses obtained have been presented in Table 3.2.

Table 3.2 Place where pupils stay during the school week

Region	Parent / Guardian		Relatives / Family		Hostel / Board		Self/ Children	
	%	SE	%	SE	%	SE	%	SE
Central	68.4	3.89	18.3	3.24	9.4	2.08	3.9	0.89
Eastern	78.4	2.69	12.9	2.17	6.1	1.46	2.5	0.72
Northern	70.5	4.27	11.8	1.78	12.1	3.34	5.7	2.13
South Western	73.5	4.64	12.7	2.65	8.3	2.89	5.4	1.41
Western	68.1	5.17	18.6	4.05	7.9	2.88	5.4	1.86
Uganda	72.6	1.73	14.6	1.26	8.6	1.06	4.2	0.57

About 73 percent of all Primary 6 pupils stayed with their parents or guardians in 2001, while about 15 percent stayed with relatives or another family, nine percent in a hostel, and four percent on their own or with other children. The results showed considerable variation among the regions. Those pupils who stay with relatives, alone or with other children comprising nearly a quarter of the total, might not receive as much support as they may require with their school work. The most disadvantage, however, are the 4.2 percent who stay alone or with other children.

What was the socio-economic status of pupils' parents in terms of material possessions, housing conditions and livestock?

Various criteria can be used as measures of socio-economic status. These include material household possessions, housing, parental education, type of lighting at home, availability of books and other study materials at home .

The type of lighting in pupils' home is important not only as a measure of the relative wealth of their parents, but also because lighting may be required when pupils do homework at night. Information concerning the type of lighting used in pupils' homes was therefore collected and the results have been presented in Table 3.3 below:

Table 3.3. Percentages and sampling errors for the lighting in pupils' homes

Region	No light		Candle / Oil lamp		Gas lamp		Electric lighting	
	%	SE	%	SE	%	SE	%	SE
Central	4.8	1.26	71.1	5.16	2.7	0.76	21.4	5.16
Eastern	10.5	3.02	79.6	3.67	3.5	1.48	6.5	1.80
Northern	14.9	2.49	78.5	3.27	3.6	1.08	3.0	1.06
South Western	19.9	5.22	61.2	6.71	5.2	1.40	13.6	6.74
Western	18.3	4.32	68.0	5.58	4.3	1.77	9.4	3.50
Uganda	12.2	1.42	73.1	2.20	3.7	0.59	11.0	1.83

From the information presented in Table 3.3, it can be seen that 12.2 percent of pupil's had no provision for lighting at their homes, 73.1 percent used candle/oil lamp, 3.7 percent used gas lamps and 11.0 percent relied on electric lighting. The households in the Central Region had the best provision for lighting while the other regions had relatively poor network of electricity supply. Those pupils with no lighting at all are likely to find it difficult to do any schoolwork assigned when it gets dark. This is a problem that requires a holistic response as it is likely to be associated with general conditions of poverty. It might be interesting to find out which pupils fall into this category so that a more targeted response can be provided for them. In some cases, it might require the provision of time for the completion of written homework before the pupils leave school.

As a further indication of the home background and context of pupils, pupils were asked about the quality of the home building where they lived. First they were asked about the floors in their homes. The information collected has been summarized in Table 3.4.

Table 3.4. Percentages and sampling errors for structure of floors in pupils' homes

Region	Not sealed		Wood		Cement		Carpet/ Tiles	
	%	SE	%	SE	%	SE	%	SE
Central	36.5	4.41	5.5	1.27	47.5	4.29	10.5	1.84
Eastern	62.5	3.57	7.3	1.70	27.3	2.60	2.9	0.90
Northern	61.6	4.21	10.4	2.18	24.6	4.08	3.4	1.06
South Western	54.3	6.84	9.7	3.80	27.7	4.57	8.3	2.42
Western	61.1	7.71	9.4	2.36	25.0	5.70	4.5	1.92
Uganda	54.4	2.25	8.0	0.96	31.7	1.84	5.9	0.73

It can be seen from Table 3.4 that, nationwide 54.4 percent of the pupils indicated that the floors in their homes were not sealed. Once again, Central Region had the lowest percentage of pupils (36.5%) reporting that the houses they lived in were made of unsealed floors.

Similarly, information concerning structures of walls in pupil's homes has been presented in Table 3.5.

Table 3.5. Percentages and sampling errors for structure of walls in pupils' homes

Region	Not sealed		Stones		Sheets / Wood		Cut stone / Bricks	
	%	SE	%	SE	%	SE	%	SE
Central	24.2	3.44	21.9	2.84	16.2	2.12	37.6	5.42
Eastern	32.6	3.82	35.5	4.48	13.0	2.02	18.9	3.43
Northern	37.4	4.05	39.2	5.11	8.8	2.38	14.6	3.74
South Western	54.5	6.83	18.2	4.07	17.1	3.97	10.2	3.97
Western	44.6	7.82	26.0	4.51	13.3	3.17	16.1	4.28
Uganda	36.0	2.17	29.1	2.04	13.7	1.16	21.2	2.05

From the information presented in Table 3.5, it can be seen that, nationally 36.0 percent of the pupils indicated that the structure of the walls in their homes were not sealed while 29.1 percent said that they were made of stones. Regional variations reflected differences in the socio-economic status of the respective communities.

The data concerning the structure of roofs in pupil's homes have similarly been summarized in Table 3.6.

Table 3.6. Percentages and sampling errors for structure of roofs in pupils' homes

Region	Not sealed		Metal /Asbestos		Cement concrete		Tiles	
	%	SE	%	SE	%	SE	%	SE
Central	22.8	3.89	64.1	3.93	8.4	1.47	4.7	1.12
Eastern	46.5	4.11	47.5	4.00	4.4	1.04	1.7	0.65
Northern	65.4	5.67	27.5	6.46	5.5	1.48	1.6	0.79
South Western	22.2	4.41	72.2	6.14	4.0	1.73	1.6	0.93
Western	39.9	5.84	47.1	6.42	8.8	2.46	4.2	1.47
Uganda	39.5	2.16	51.8	2.31	6.0	0.68	2.7	0.43

From Table 3.6 it can be seen that, on the whole, the majority of the pupils (51.8 percent) had metal/asbestos roofing in their homes, 39.5 percent had unsealed roofs, 6.0 percent had cement concrete roofing and 2.7 percent had tiled roofs.

Status of learners' parents in terms of livestock

The wealth component of a home has to do with how much money is available. In Uganda and other African countries, it is highly unlikely that Primary 6 pupils would know the amount of income, in financial terms, their parents get over a specified period. It is therefore more practical to use proxy methods of assessing the wealth of a home. One indicator is the number of livestock they possess in the home. The data relating to the number of livestock at pupil's homes is as presented in Table 3.7

Table 3.7. Means and sampling errors for the amount of livestock at pupils' homes

Region	Cattle		Sheep		Goats		Horses / Donkeys		Pigs		Chickens	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	4.8	1.03	1.3	0.28	3.3	0.57	0.6	0.18	1.3	0.18	11.6	1.97
Eastern	4.3	0.52	1.5	0.33	4.8	0.56	0.6	0.19	1.6	0.28	11.3	1.66
Northern	7.2	1.80	4.5	1.76	8.6	1.84	1.8	0.68	3.3	1.29	10.7	1.71
South	4.6	1.04	2.3	0.63	4.4	0.64	0.6	0.38	1.5	0.62	6.5	0.90
Western												
Western	4.9	1.03	3.6	1.17	4.5	0.58	1.3	0.61	2.0	0.32	9.6	1.20
Uganda	5.1	0.49	2.4	0.39	5.0	0.43	0.9	0.17	1.9	0.28	10.4	0.79

From Table 3.7 it can be seen that generally each primary 6 pupil's home had about 5 head of cattle with Northern region having the highest number (7.2) and South Western region with the lowest (4.6). In addition each home possessed an average of 5.0 goats and 10.4 chickens. Sheep, pigs and horses or donkeys were far fewer in pupils' homes.

Policy Suggestion 3.3: The Director of Education should map out in greater detail the needy areas for targeted support programmes such as the feeding programmes in primary schools.

General Policy Concern 2: What were the school context factors experienced by Primary 6 pupils that might impact upon teaching/learning and the general functioning of schools?

A wide variety of factors have an impact on learning, among them the distribution of pupils' by school location, absenteeism, repetition rates, frequency with which homework in reading and mathematics is given and marked and monitoring of pupil's work by family members. In this section, some of these factors have been examined.

What was the pattern of school location?

Two questions were asked of the school heads about their schools. The first was if the school was in an isolated area, a rural area, a small town, or a large city. The first two categories were combined into the category “rural” and the last two were similarly put together to form the category “urban”. A second question sought to establish how many kilometres the school was from each of the following amenities: a health clinic, a tarmac road, a public library, a bookshop and a secondary school. These distances were summed and then divided by 5 in order to provide an index of the average number of kilometres from such amenities. The results have been presented in Table 3.8.

Table 3.8 Percentage of pupils in schools by location

Region	Urban		Distance (km)	
	Percent	SE	Mean	SE
Central	28.3	7.65	15.6	2.26
Eastern	19.1	5.80	22.4	3.41
Northern	14.0	6.84	25.0	5.14
South Western	24.3	10.81	20.5	3.50
Western	10.7	5.92	23.9	4.84
Uganda	20.3	3.38	21.0	1.66

As it can be noted, Table 3.3, only 20.3 percent of the pupil’s countrywide were in schools located in urban areas. The region with the highest percentage of pupils located in urban areas was Central Region (28.3%). The Western Region had the lowest percentage of pupils in urban schools (10.7%). The average distance from home to selected amenities was 21km, and this distance tended to be greater in the more rural Northern, Eastern, Western and South Western regions. As was expected, the distance was shortest in Central Region which is also the most urbanised.

What percentage of pupils spoke the language of the test at home?

One aspect of the home that was of interest is the extent to which the pupils spoke English at home. The percentages of pupils who spoke English while at home have been

presented in Table 3.9. It can be seen that 82.4 percent of pupils countrywide spoke English at home, at least sometimes.

The largest percentage (90.6%) of primary 6 pupils who sometimes spoke English at home were located in the Northern Region. The probable reason for the Northerners' reliance on the use of English language at home may have something to do with the continuing insecurity in that area. Since many of them live in camps and are therefore have to use a language that is common to all of them, and they frequently resort to the use of English. In contrast, the smallest percentage of Primary 6 pupils who spoke English was located in the Western Region where the average was 64.3 percent.

How many days were pupils recorded absent in the previous month, and what were the reasons for their absence?

It is a matter of common sense that, when pupils frequently miss lessons because they do not attend school regularly, they also miss an important opportunity for learning. Pupils were therefore asked to indicate the number of days they were absent from school during the month preceding the data collection, and their responses have been presented in the second column of Table 3.9.

Table 3.9: Percentages, mean, and sampling errors for the pupils speaking English language, days absent, and repetition

Region	Speak English		Days Absent		Repetition	
	%	SE	Mean	SE	%	SE
Central	85.0	4.04	1.9	0.14	43.6	3.21
Eastern	86.9	2.77	2.0	0.15	52.0	3.71
Northern	90.6	2.12	1.7	0.17	54.3	4.37
South Western	73.2	4.59	1.8	0.25	66.3	5.05
Western	64.3	9.92	2.1	0.16	55.3	3.24
Uganda	82.4	1.97	1.9	0.08	52.9	1.86

It can be seen from Table 3.9 that pupils were, on average, absent from school for 1.9 days in the month in question.

There were several reasons why pupils missed school on some days. Four possible reasons were presented, and pupils were asked to indicate the reasons for absence that applied to them.

Table 3.10. Percentages and sampling errors for reasons of pupils absenteeism (SACMEQ II)

Region	Illness		Family reasons		Fees		Work	
	%	SE	%	SE	%	SE	%	SE
Central	60.2	4.25	29.4	2.99	18.5	4.14	15.1	2.69
Eastern	49.4	3.18	25.9	3.67	11.6	2.00	24.8	3.19
Northern	63.1	5.47	14.9	2.65	9.1	2.39	17.9	2.00
South Western	50.8	6.25	20.4	3.96	14.4	3.27	17.6	2.51
Western	68.0	5.60	20.5	3.69	15.4	3.76	19.3	5.70
Uganda	56.8	2.08	23.3	1.63	13.7	1.42	19.5	1.48

By far the most common reason for absenteeism was illness (56.8%) followed by “family reasons (23.3%) that may include, among other reasons, the need for some children to take care of sick parents or siblings. Although pupils were absent from school for an average of only 2 days, it should be a matter of concern that illness is the primary cause of absence. In some areas of Uganda, malaria and HIV were prevalent, and could be the causes of illness among pupils and/or their parents or siblings. A smaller but significant percentage of pupils were absent from school due to failure by their parents to pay school fees.

Policy suggestion 3.4: The Director of Education should commission a investigation into the reason for absenteeism. The study should, in particular, assess the impact of illness on attendance and put forward concrete recommendations on how this problem can be addressed.

**How many pupils had repeated a class and were they currently repeating
Primary six?**

From Table 3.9 it can be seen that nearly 53 percent of pupils had repeated Primary 6 once or more. Pupil repetition rates were disturbingly high in all the five regions, and particularly in South Western Region where, on average, 66.3 percent percent of the pupils had repeated a grade at least once. Pupils were not asked to state the reasons for repeating, but it is presumed that some of the reasons why pupils repeated Primary 6 were associated with absenteeism due to sickness, poor academic performance, domestic work and premature sexual distractions.

Policy suggestion 3.5: The Ministry of Education must conduct a study to establish the reasons for the high rates of repetition and recommend strategies for reducing it. In particular, the Ministry has to closely monitor the policy of automatic promotion to ensure that it is fully implemented.

How frequently did pupils receive homework in reading and mathematics?

Information was sought about the extent to which parents or other family members ensured that homework was done. There is evidence from a study conducted in the Central Region to suggest that pupils who regularly do homework achieve more than pupils who do not receive any homework. Furthermore when the homework is marked by the teachers and worked through with the pupils, such pupils again more than those who do homework, which remains unmarked. Pupils were therefore asked to indicate whether they received homework regularly, and whether their work was marked by the teacher. The responses have been presented in Table 3.11.

Table 3.11. Percentages and sampling errors for the frequency of homework given most days

Region	Reading homework		Mathematics homework	
	%	SE	%	SE
Central	44.9	4.63	47.7	4.64
Eastern	42.7	3.89	42.6	4.77
Northern	40.6	3.26	43.3	3.95
South Western	43.9	5.79	53.0	5.93
Western	36.3	6.46	35.9	7.31
Uganda	42.3	2.09	44.8	2.34

The picture that emerges from the table above is that, at the national level, about 42 percent of pupils were given homework in reading most days and about 45 percent received mathematics homework most of the days. The lowest percentage was recorded in the Western Region (36.3 percent) and the highest in the central region (44.9 percent). All in all less than half of the pupils received homework most days.

Did the teachers correct the assigned homework?

It has already been pointed out that, where the homework given was corrected by the teacher, pupils tended to learn more. Information on how frequently the teachers corrected the homework in reading has been presented in Table 3.12.

Table 3.12. Percentages and sampling errors for the frequency of reading homework being corrected by teacher

Region	Never corrected		Sometimes corrected		Mostly/always corrected	
	%	SE	%	SE	%	SE
Central	9.6	3.44	29.4	4.33	61.0	4.78
Eastern	8.5	3.38	25.2	4.19	66.3	5.15
Northern	7.3	3.04	32.4	4.39	60.3	5.07
South Western	12.9	3.10	28.5	4.74	58.7	6.13
Western	11.7	3.63	25.4	5.19	62.9	6.84
Uganda	9.5	1.58	28.1	2.05	62.4	2.47

It is clear from the Table 3.12 that 62.4 percent of pupils had their homework always or mostly corrected, 28 percent had it ‘sometimes corrected’, and 9.5 percent revealed that teachers never corrected their homework.

Similar information relating to mathematics has been presented in Table 3.13.

Table 3.13. Percentages and sampling errors for the frequency of mathematics homework being corrected by teacher (SACMEQ II)

Region	Never corrected		Sometimes corrected		Mostly/always corrected	
	%	SE	%	SE	%	SE
Central	8.4	2.72	22.8	3.72	68.8	4.75
Eastern	5.3	2.00	22.0	3.99	72.7	4.81
Northern	10.5	3.01	30.7	4.00	58.9	4.70
South Western	10.4	2.56	26.9	4.70	62.7	5.89
Western	10.7	3.39	20.4	4.22	68.9	6.49
Uganda	8.4	1.20	24.3	1.89	67.3	2.38

It can be seen in Table 3.13, that homework in mathematics was given and marked more frequently than homework in reading, although the difference was not very big. Overall, just over 67 percent of the pupils indicated that their work was corrected mostly or always, with the highest percentage recorded in Eastern Region where the percentage was 72.7. Nearly a quarter indicated that it was corrected sometimes. Only 8.4 percent said it was never corrected, with the eastern also recording the lowest percentage in this regard.

Policy suggestion 3.6: The Ministry of Education must draw up and distribute to all schools guidelines for teachers on the frequency of giving homework and on correcting such homework. Provisions in these guidelines should be integrated into pre- service and in-service training programs.

To what extent did family members help children with their schoolwork?

The home can play an important role in motivating children and supporting them in their school work. A question was therefore asked to establish whether parents and other family members perceived their children's education as a joint responsibility between themselves and the school. In particular, pupils were asked to indicate whether their parents ensured that homework was done, whether their parents helped them with homework, and whether their parents looked at the work they had done. The results have been presented in Table 3.14.

Table 3.14. Home assistance ‘most of the time’ with school related work

Region	Ensure homework is done		Help with the homework		Look at school work done	
	%	SE	%	SE	%	SE
Central	37.7	3.85	27.0	4.15	33.7	3.63
Eastern	25.2	3.22	17.3	2.38	27.8	2.70
Northern	28.4	2.85	21.1	3.00	32.9	4.37
South Western	35.5	5.80	27.0	4.57	26.4	3.10
Western	33.9	7.64	19.7	4.74	29.9	5.00
Uganda	31.5	1.92	22.2	1.64	30.2	1.62

On the whole, about 31 percent of the Primary 6 pupils had parents who ensured that their children did the homework. The highest percentage of such parents is found in the Central Region with 37.6 percent while the Eastern Region had the lowest with 25.2 percent. A relatively small percentage of pupils (22.2%) had parents who helped with homework, and a similarly small percentage (30.2%) actually looked at the school work once it had been completed.

Another way in which parents or other people in the home can support children’s learning is by asking them (children) to read to them (parents) and to ask the child questions about on their reading work at school. The information on this has been presented in Table 3.15

Table 3.15 Home assistance ‘most of the time’ with reading work

Region	Ask to read		Questions on school reading work	
	%	SE	%	SE
Central	29.2	3.33	33.0	3.96
Eastern	24.7	3.28	28.2	3.46
Northern	29.1	3.17	33.2	4.54
South Western	23.9	4.82	22.2	3.42
Western	30.2	4.82	26.1	4.92
Uganda	27.1	1.68	29.1	1.84

An analysis of the data above reveals that at national level, just over 27 percent of the children had parents who asked their children to read to them. A similar percentage (29.1%) had parents who asked the children questions about school reading work. Both

percentages were low, and the situation could be improved, perhaps starting with the South Western Region whose percentages were the lowest for both aspects.

In Table 3.16 information on the proportion of parents who often helped their children with mathematical calculations and who asked questions about the school work being done in mathematics has been summarised.

Table 3.16. Home assistance ‘most of the time’ with math schoolwork

Region	Do mathematical calculations		Questions on school Mathematics work	
	percent	SE	percent	SE
Central	23.3	2.98	27.5	2.50
Eastern	21.4	2.88	21.9	3.22
Northern	24.6	3.41	33.4	3.58
South Western	25.1	2.63	31.0	3.64
Western	26.3	5.00	29.3	5.04
Uganda	23.6	1.46	27.6	1.55

From the results presented in Table 3.15, it can be seen that 23.6 percent of the Primary 6 pupils countrywide were assisted in doing mathematics calculations and about 28 percent asked questions on school mathematics work. There was not much variation between the regions.

Policy suggestion 3.7: The Director of Education must design ways of motivating parents to actively support their children’s schooling. These could include massive awareness campaigns on the importance of home support for children’s school work.

General Policy Concern 3: Did primary 6 pupils have sufficient access to classroom materials that would enable them to participate fully in their lessons?

The provision of educational materials is an issue of critical concern in Uganda especially as the resources available within the Ministry’s Mid-Term Budget Framework are subject to many competing demands. Information was collected on the number of pupils who had reading and mathematics textbooks, and pupils who had adequate supplies of other

basic classroom requirement and materials such as exercise books, notebooks, pencils, pens, rulers and erasers.

What percentage of pupil's had reading and mathematics textbooks?

While it is possible for pupils to learn when sharing a textbook, there is less flexibility in the use of the textbook when, for example, the textbook is required in order to do some work at home. It is therefore desirable that every child should have a textbook to himself or herself. Pupils were therefore asked to indicate whether they had reading and mathematics textbooks to themselves, and the results have been presented in Table 3.17.

Table 3.16. Percentages and sampling errors for pupils having own reading and mathematics textbook

Region	Own reading textbook		Own mathematics textbook	
	%	SE	%	SE
Central	14.3	1.95	13.7	2.41
Eastern	13.3	2.86	9.1	1.67
Northern	16.6	3.03	12.1	2.81
South Western	14.5	2.6	15.7	3.36
Western	16.4	3.63	12.6	2.87
Uganda	14.7	1.26	12.2	1.11

From Table 3.16, it is clear that a very small percentage of pupils had own reading and mathematics textbooks (14.7% and 12.2% respectively). This really means that the vast majority of pupils, comprising more than four fifths, share textbooks, and this should certainly have an adverse affect on pupils' learning.

Policy suggestion 3.8: The Director of Education must ensure the provision of adequate textbooks for use by pupils in all schools by (a) giving appropriate priority to the purchase of textbooks in the Ministry Mid-Term Budget Framework, (b) designing and implementing measures for equitable distribution of textbooks to schools, and (c) taking effective measures to ensure that textbooks are well looked after and given to pupil's to take home.

What percentage of pupils had adequate supply of basic classroom items such as; exercise books, notebooks, pencil, pen, ruling and erasing etc?

In order to learn effectively, pupils must have some basic materials to perform tasks such as writing, recording, calculating, measuring, and others. The pupils were therefore asked questions about their possession of basic classroom materials such as exercise books, notebooks, pencils, erasers, pens, and rulers, all of which are needed to perform key reading and mathematics tasks. The data generated have been summarized in Tables 3.18(a) and 3.18(b).

Table 3.18(a). Percentages and sampling errors for shortages of basic classroom materials: Exercise books, notebook, and pencil

Region	Exercise books		Notebook		Pencil	
	%	SE	%	SE	%	SE
Central	7.2	1.53	28.9	4.01	15.1	2.60
Eastern	5.7	1.50	44.2	3.65	13.2	1.86
Northern	13.2	4.16	40.4	4.20	26.3	4.03
South Western	9.6	2.56	33.9	6.26	17.0	4.01
Western	17.1	3.57	58.5	6.41	30.3	6.09
Uganda	9.3	1.11	39.7	2.13	18.5	1.49

Table 3.18(b). Percentages and sampling errors for shortages of basic classroom materials: Eraser, pen, and ruler.

Region	Eraser		Pen		Ruler	
	%	SE	%	SE	%	SE
Central	47.2	4.79	19.3	3.63	24.9	4.44
Eastern	40.3	3.99	16.3	2.17	20.3	3.05
Northern	53.3	3.38	29.3	4.75	34.3	4.14
South Western	43.8	5.55	20.7	4.63	21.6	5.08
Western	58.8	5.53	28.5	5.55	40.5	6.19
Uganda	47.0	2.11	21.5	1.71	26.5	1.97

The results of the analyses summarized in Tables 3.18(a) and (b) show that nationwide 9.3 percent of the pupils did *not* have exercise books; 39.7 percent did *not* have notebooks and 18.5 percent had *no* pencils. Furthermore, 47 percent had no eraser, 21.5 percent had no pen, and 26.5 percent had no ruler. The Western Region was worst hit with 17.1 percent having no exercise books, 58.5 percent having no notebooks, 58.8

percent having no erasers, 40.5 percent having no rulers, 30.3 percent lacking pencils, and 28.5 percent having no pens,

Policy suggestion 3.9: The Director of Education must ensure the adequate supply of various items of stationery for pupils in all schools by giving these items priority in the Ministry Mid-Term Budget Framework and by ensuring their equitable distribution to schools.

General Policy Concern 4: Did Primary 6 pupils have access to library books within their schools, and was the use of these books being maximized by allowing pupils to take them home?

The library is one of the most important assets in the school. A library that is well stocked with appropriate books and other reading materials, and that offers access to pupils and allows them to take books home to read, can be a big boost to learning. On the other hand, the lack of library facilities can often be a major reason for low educational quality. Pupils were requested to indicate to what extent they had access to library facilities and whether they were permitted to take library books home. Information about this is given in Tables 19 and 20.

What percentage of pupils had access to library facilities?

In the first column of Table 3.19 the proportion of pupils who reported that they had access to library facilities have been presented alongside the percentage of pupils whose school head gave this same answer.

Table 3.19 Percentages and sampling errors for pupils who had access to a school library

Region	Pupil		School Head	
	Percent	SE	Percent	SE
Central	88.6	6.57	88.6	6.57
Eastern	89.8	4.45	89.7	4.49
Northern	84.2	9.04	84.2	9.04
South Western	92.1	6.07	92.1	6.07
Western	88.9	11.19	88.8	11.23
Uganda	88.8	3.06	88.7	3.07

It must be pointed out that there was a very high level of corroboration between pupils' responses and the school heads' responses. At the national level 88.8 percent of the pupils said they had access to the library books. There was no considerable variation across the regions except South Western region, which had the highest tally (92.1 percent). Overall, more than four fifths of pupils has access to the library, and this was a good thing. Attention must therefore be on the small percentage that does not have such access.

General Policy Concern 5: Has the practice of Primary 6 pupils receiving extra lessons outside school hours become widespread, and have these been paid lessons?

To what extent did pupils have extra tuition and how was it paid for?

The provision of extra tuition has become a tradition in Uganda's schools. Extra tuition takes many forms. It may be offered by the same teacher who normally teaches the class participating in extra tuition, or pupils may take extra lessons offered by a teacher other than their own. Extra tuition may take place within the school, but after the normal hours, or it may take place at some other venue outside the school. While in some cases extra tuition may be offered free of charge, under normal circumstances the teachers who provide such tuition ordinarily expect the pupils to pay for it. The whole issue of extra

tuition, nevertheless, has sparked off some controversies with some supporting it and others opposing it. It was considered important to assess the prevalence of extra tuition as a practice, and to establish whether pupils paid for it or not. Primary 6 pupils' responses concerning their attendance of extra lessons outside school hours have been presented in Table 3.20.

Table 3.20. Percentages and sampling errors for primary 6 pupils receiving extra lessons subjects outside school hours

Region	Receiving extra lessons Outside school hours	
	Percent	SE
Central	86.8	3.81
Eastern	83.2	4.43
Northern	81.6	5.47
South Western	78.8	6.04
Western	71.3	10.69
Uganda	81.8	2.45

As can be seen from Table 3.20, nearly 82 percent of the pupils reported that they participated in extra lessons, with the highest number being in Central Region (86.8%). The region with the lowest percentage of pupils who participated in extra tuition was Western Region (71.5%).

Since extra tuition normally takes place outside normal school hours, the other contentious issue is the one relating to payment for the extra tuition. Payment for participation in it has been justified on the grounds that the teacher was investing additional time into teaching. There have been fears in some circles, however, that the whole phenomenon of extra tuition may reflect teachers' incompetence when they fail to accomplish their tasks within the time allocated, and may also reflect some teacher's unchecked desire to earn extra income. Pupils were asked to indicate whether they paid for the extra tuition they received.

Table 3.21. Percentages and sampling errors for the payment of extra lessons taken by pupils outside school hours

Region	There is payment		There is no payment		Don't know	
	Percent	SE	Percent	SE	Percent	SE
Central	61.1	3.40	23.0	3.40	15.9	2.46
Eastern	45.6	3.59	42.5	3.70	11.9	2.02
Northern	37.7	3.76	39.9	3.73	22.4	4.41
South Western	57.3	4.18	31.6	5.01	11.1	3.10
Western	59.8	6.10	25.7	5.11	14.5	2.73
National	51.4	1.84	33.6	1.90	15.0	1.29

The results in Table 3.21 show that the majority of pupils who took part in extra tuition (51.4%) paid for it while close to 34 percent were not paying and 15 percent did not know whether they paid for it or not. The fact that more than half of the pupils paid for extra tuition implies that such payment could be a barrier to participation by some pupils, with the result that such pupils are likely to be disadvantaged.

Policy suggestion 3.10: The Ministry of Education and Sports ought to ensure compliance with the existing policy recommendations concerning the structure of school fees and extra tuition.

Conclusion

A striking feature of Uganda's Primary 6 school population is the very wide age spread mainly associated with high-grade repetition rates and significant age differentials at the time of entry or re-entry to school. The average age of pupils countrywide was 171.4 months, which is over three years above the expected age of 132 months. The percentage of females enrolled in Primary 6 ranged between 53.8 percent in the Central and 34.9 percent in the Northern Region, but with the overall percentage of girls being 44.5 percent of the total pupil population, there was under-representation of girls in the education system as a whole.

Uganda's children were generally took meals regularly, with the average pupil having not less than two meals a day. On the whole, pupils came from homes that were relatively well endowed with reading materials (with a mean of 31 books), although the urban children were at a bigger advantage in this regard as well as in regard to the availability of other reading and other electronic materials that offered them more opportunities for learning. Most pupils (72.6%) lived with their parents or guardians, and the rest lived with relatives, alone or with other children. Concern should be over the 4.2 percent who belonged to the latter category. Some 12.2 percent of pupils did not have access to any form of light, and this may adversely affect their ability to do homework at night. However, most homes. A large proportion of children came from homes whose structures reflected some measure of poverty. For example, over half lived in homes with unsealed floors, 36 percent from homes with unsealed walls, and a 39.5 percent from homes with unsealed roofs. The most common livestock kept in most homes were cattle (a mean of 5) goats (mean of 5) and chickens (average of 10.4). Sheep, pigs and horses or donkeys were far fewer.

As expected, only a fifth of the pupils lived in urban locations, and the average distance to the nearest amenities was about 21 kilometres. A very large percentage of pupils, comprising just over 80 percent, spoke English in their homes at least sometimes. Pupils were on average absent from school on 2 days a month, and the most common reason for absence was illness. A worrying percentage of pupils, comprising 52.9 percent, had repeated a grade at least once.

Less than half of the pupils received homework from their teachers most days, and of those that got it, only a small but significant proportion (about one fifth) never had it corrected. The help children got, in whatever form, at home with their school work was generally inadequate. The vast majority of pupils shared reading and mathematics textbooks, and this is a matter of concern. Also of concern, but to a lesser degree, is the large proportion of pupils who did not have essential items of stationery for use in the classroom. More than four-fifths of the pupils had access to the library, and this is commendable.

Extra tuition remains an issue. Regardless of its benefits or disadvantages, this issue needs to be examined further so that a deeper understanding of the dynamics involved can be gained. It also has to be examined within the framework of existing policies and Ministry's position on school fees and payment for additional tuition. Overall, the broad the goal should be to ensure that some children – whether it be those who participate or those who fail to participate in it – are not disadvantaged.

Chapter 4

Teachers' Characteristics and their Views about Teaching, Classroom Resources, Professional Support and Job Satisfaction

Introduction

Improving the quality of teaching and learning in Ugandan schools is still a problematic issue, and it is likely that more effort will be directed at this issue in future. One key component in any education system is the teacher. Indeed, the teacher is considered to be central to all efforts at improving the quality of education. However, it is important to note that, when examining the teacher as a variable, there is also need to examine the conditions under which the teacher works, as well as the other issues and processes that they consider to be important in their work. In this chapter, important information about Primary 6 teachers is presented. The purpose of presenting this information on the key variables related to teachers is very much similar to that for presenting information on pupils. The information serves as a baseline against which assessments can be made about future changes in the profile of the teaching force in Uganda.

General Policy Concern 6: What were the personal characteristics of Primary 6 teachers (for example, age, gender and socio-economic level), and what was the condition of their housing?

Several important characteristics of teachers were measured including their age, sex, whether they were specialist or general class teachers, academic qualifications, professional qualifications, years of teaching experience, and the number of in-service courses attended. The findings have been presented item by item below. Once again, it is important to note that since all data were disaggregated to the pupil level, the statistics presented should be interpreted to mean “the percentage of pupils taught by a teacher with the particular characteristic”.

What was the age distribution of the mathematics and reading teachers in schools?

The age distribution of teachers is very important since such information is needed for teacher recruitment, retirement and manpower planning. A teaching service with a young and vibrant workforce is more likely to be effective than an ageing one. On the other hand, older (but not very old) teachers are likely to be more experienced, and can therefore be effective teachers. Information on the teachers' age has been summarized in Table 4.1 below.

Table 4.1 . Means, percentages, and sampling errors for age, gender, and socio-economic background of reading and mathematics teachers

Region	Reading teacher						Mathematics teacher					
	Age (years)		Gender (female)		Possession at home (index)		Age (years)		Gender (female)		Possession at home (index)	
	Mean	SE	%	SE	Mean	SE	Mean	SE	%	SE	Mean	SE
Central	31.8	1.15	30.5	8.80	3.7	0.41	30.9	0.83	15.9	7.45	3.5	0.34
Eastern	32.9	1.19	10.5	3.94	3.6	0.25	30.5	0.99	2.4	1.77	3.3	0.33
Northern	33.0	1.20	6.6	3.68	4.0	0.41	31.8	1.00	2.1	2.17	3.8	0.32
South Western	35.1	2.18	26.9	9.99	3.0	0.35	36.2	1.67	13.2	13.54	3.1	0.44
Western	33.8	2.91	11.7	11.07	3.5	0.35	32.7	1.78	9.6	7.25	3.0	0.48
Uganda	33.1	0.69	17.4	3.29	3.6	0.16	31.9	0.55	7.8	2.70	3.4	0.16

It can be seen that the average Primary 6 pupil in Uganda had a teacher who was 33 years old. In the Western region it was 34 years old and in the Central region it was 32 years. In short, there was not much variation in the average ages across the regions. The same was true for mathematics teachers. Primary 6 teachers were, therefore, fairly youthful.

It should be noted that in the period 1971 to 1986, Uganda was greatly affected by civil wars and this resulted in the death of many teachers. When the wars came to an end in 1986, the government of Uganda embarked on the revitalization of the education system and teacher recruitment and training was a high priority. This resulted in a young and vibrant generation of primary teachers. Furthermore, the government of Uganda, through the Ministry of Public Service, instituted a policy of prompt payment of retirement benefits, which encouraged the voluntary retirement of teachers, thereby creating more room for the recruitment of youthful teachers.

What was the gender distribution of teachers?

In Table 4.1 it can be seen that only 17.4 percent and 7.8 percent of the reading and mathematics teachers respectively were females. There were considerable variations in the percentages of female teachers across regions. The percentage of female reading teachers was highest in the Central Region (30.5%) and lowest in the Northern Region (6.6%). For mathematics teachers, the South Western Region had the highest proportion of female teachers (13.2%) while the Eastern Region had the lowest (2.4%). It is therefore clear that female participation in the teaching profession is still low.

Women's participation in many activities has been hampered by many factors, including culture, religious beliefs, educational background and socio-economic factors. Several efforts such as girl child initiatives and women's emancipation have greatly enhanced women empowerment. However it is still relatively difficult to attract females into the teaching profession.

Policy suggestion 4.1: The Ministry of Education and Sports through the Department of Education Standards Agency (ESA) together with Ministry of Gender, Labour and Social Development should come up with new modalities of affirmative action that will help to make teaching, especially mathematics teaching, more attractive to women.

What was the socio-economic status of teachers in terms of their material possessions and ownership of livestock at their homesteads?

In the teacher questionnaire there were questions related to the material possessions of teachers. The possessions referred to were the same as those already reported for pupils in Chapter 3. An index was calculated to get an average value for all possessions of teachers. The index ranged from 0 to 13 items. As can be seen in Table 4.1, the average number of possessions ranged from 3.0 to 4.0 for reading teachers and 3.0 to 3.8 for mathematics teachers. The highest index was for the teachers in the Northern region. This figure was, by any standards, very low and reflects the prevalence of poverty among Ugandan teachers.

Another indicator of wealth was the number of livestock possessed by the teachers. The information obtained from the reading teachers has been presented in Table 4.2, and corresponding data for mathematics teachers in Table 4.3.

Table 4.2. Means and sampling errors for the type and amount of livestock at reading teachers' homes

Region	Type of livestock											
	Cattle		Sheep		Goats		Horses/ Donkeys		Pigs		Chickens	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	1.0	0.28	0.1	0.07	0.7	0.29	0.0	0.03	0.4	0.14	4.7	1.04
Eastern	0.9	0.28	0.2	0.08	2.6	0.60	0.1	0.12	0.5	0.15	10.1	3.69
Northern	3.9	2.46	1.5	0.85	8.6	3.61	0.0	0.00	0.5	0.22	9.5	1.96
South Western	1.3	0.56	0.2	0.16	2.9	0.81	0.0	0.00	0.3	0.18	4.0	0.99
Western	0.2	0.13	0.0	0.04	2.4	1.02	0.0	0.00	0.3	0.14	5.3	1.43
Uganda	1.5	0.47	0.4	0.16	3.3	0.72	0.0	0.04	0.4	0.08	7.2	1.24

From Tables 4.2 and 4.3 (for mathematics teachers), it can be seen that the teachers of Primary 6 pupils in Uganda did not have many livestock. They tended to have the odd cow, a couple of goats and a few chickens and that was all. There was some variation among the regions with the teachers in the Northern region having a few more.

Table4.3. Means and sampling errors for the type and amount of livestock at mathematics teachers' homes

Region	Type of livestock											
	Cattle		Sheep		Goats		Horses/ Donkeys		Pigs		Chickens	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	2.1	1.08	0.4	0.24	2.0	0.76	0.1	0.05	1.6	0.60	9.9	3.39
Eastern	0.6	0.29	0.5	0.24	2.6	0.94	0.0	0.00	0.5	0.25	7.7	1.62
Northern	1.5	0.51	0.7	0.28	4.6	1.11	0.0	0.00	0.4	0.22	10.0	2.65
South Western	0.6	0.34	0.5	0.30	2.7	0.86	0.0	0.00	0.7	0.37	2.9	1.14
Western	0.6	0.31	0.0	0.00	2.3	0.40	0.0	0.00	0.5	0.44	9.3	3.38
Uganda	1.1	0.29	0.5	0.12	2.9	0.43	0.0	0.01	0.8	0.18	8.3	1.17

What was the general housing condition of teachers?

Teachers within have been identified as one of the major factors helping the improvement of pupils' performance. Teachers are often tempted to skip lessons because of lack of accommodation at the school. One of the contributory factors was the long distances which teachers have to travel to get to school. The availability of teachers' houses, particularly houses of good quality and in good condition, is therefore a strong motivational factor. In order to assess this, a question was asked in the teacher questionnaire about the condition of the teachers' living accommodation. The options were: generally in a poor state, some parts require major repairs, some parts require minor repairs, and generally in a good condition. It is the percentage of teachers in the last two categories that have been presented in Table 4.4.

Table 4.4. Percentages and sampling errors for teacher housing in acceptable conditions

Region	Teacher housing in acceptable conditions			
	Reading teacher		Mathematics teacher	
	%	SE	%	SE
Central	26.4	7.38	22.4	7.89
Eastern	7.8	3.74	7.6	4.55
Northern	22.6	9.39	0.7	0.74
South Western	28.1	12.47	10.7	10.99
Western	29.2	11.40	11.5	9.74
Uganda	20.5	3.51	10.4	2.85

It can be seen that the overall housing conditions of teachers' houses as well as homesteads was very worrying. From the results only 20.5 percent and 10.4 percent of the Primary 6 pupils were being taught by reading teachers and mathematics teachers respectively who resided in houses of acceptable conditions. The regional distribution showed that for the reading teachers, 28.1 percent Primary 6 pupils in South Western region were taught by teachers who resided in houses with acceptable conditions yet the Eastern region had the lowest corresponding figure of only 7.8 percent. In the case of mathematics teachers, the Central region emerged with the highest percentage of 22.4 and the Northern region with 0.7 percent. This is a major challenge, since poor housing conditions can be a disincentive for good quality education. However, the reading teachers seem to have had slightly better housing conditions than the mathematics teachers. In fact, the percentage of reading teachers residing in houses of acceptable conditions was more or less double that of mathematics teachers living in houses of similar conditions.

However, for some years now, the government has been allocating a sizeable percentage of the funds meant for classroom construction to building teachers' houses, but still the

demand for teachers' houses out ways the supply. Priority is still being focused on classroom construction

Policy suggestion 4.2: The Ministry of Education and Sports through the Department of Education Planning should increase the percentage of school facilities grant allocation to the construction of teachers' houses. The provision of teacher housing should be one of the long-term goals in the Mid-Term Budget Framework (MTBF).

What was the general condition (repair status and lighting) of the reading teachers' housing?

Good lighting was identified as a key input in effective teaching, lesson planning and marking of take-away assignment scripts since most of these tasks are performed at teachers' homesteads in the evening. Since it is the responsibility of the government to provide conducive working environments to teachers, questions were asked about lighting in the homes. The findings have been presented in Table 4.5.

Table 4.5. Percentages and sampling errors for the type of lighting in reading teachers' homes

Region	Type of lighting							
	No light		Candle/Oil Lamp		Gas lamp		Electric lighting	
	%	SE	%	SE	%	SE	%	SE
Central	0.0	0.00	69.2	7.97	1.6	1.14	29.2	7.82
Eastern	0.0	0.00	72.6	7.89	3.9	3.89	23.5	7.48
Northern	0.0	0.00	100.0	0.00	0.0	0.00	0.0	0.00
South Western	0.0	0.00	100.0	0.00	0.0	0.00	0.0	0.00
Western	0.0	0.00	77.5	10.60	2.2	2.18	20.4	10.52
Uganda	0.0	0.00	81.4	3.39	1.8	1.26	16.8	3.25

The results presented in Table 4.5 show that that all Primary 6 pupils were taught by teachers who had light of some sort in their homes. Most (81.4%) had candles or oil lamps. The rest of the teachers, constituting less than 20 percent, had gas lights or electricity. This situation, though not ideal, is commendable.

What was the general condition (repair status and lighting) of mathematics teachers' housing?

Similar findings were made from the responses provided by mathematics teachers. These have been presented in Table 4.6.

Table 4.6. Percentages and sampling errors for the type of lighting in mathematics teachers' homes

Region	Type of lighting							
	No light		Candle/Oil Lamp		Gas lamp		Electric lighting	
	%	SE	%	SE	%	SE	%	SE
Central	0.0	0.00	77.9	8.25	2.2	2.21	19.9	8.05
Eastern	0.0	0.00	100.0	0.00	0.0	0.00	0.0	0.00
Northern	0.0	0.00	100.0	0.00	0.0	0.00	0.0	0.00
South Western	0.0	0.00	100.0	0.00	0.0	0.00	0.0	0.00
Western	0.0	0.00	86.0	8.84	0.0	0.00	14.0	8.84
Uganda	0.0	0.00	93.3	2.15	0.5	0.51	6.2	2.12

As was the case for the reading teachers, results presented in Table 4.6 show that all Primary 6 pupils were taught by mathematics teachers with at least a source (mostly candles or oil lamps) of lighting at their homesteads. A smaller percentage had access to gas lamps or electric lighting.

It can be seen that those regions with large urban centres used more electric lighting than the other regions. Most of the regions in Uganda lack access to electric lighting or cannot afford the high costs associated with providing electric lighting. Candles, on the other hand seemed, to have been the main source of lighting for most teachers, probably because of their availability and affordability.

Policy suggestion 4.3: The Government of Uganda, through Uganda Revenue Authority (URA) should revise the country's import policy to be cognizant of income elasticity of demand for various sources of energy and respond to the existing energy consumption patterns, giving special priority to items such as kerosene and candles on which grass-root populations, among them teachers, depend.

The overall condition of teachers' houses was however worrying considering the small numbers of primary 6 pupils that were taught by teachers who had access to houses with minimum acceptable standards. The results further showed that, all teachers had light of some sort in their homes with most of the teachers using candles.

General Policy Concern 7: What were the professional characteristics of Primary 6 teachers (in terms of academic, professional and in-service training) and how do they rate the effectiveness of in-service training?

Teacher education and teacher training are important characteristics that play an important role in determining how good the teachers are. The characteristics assessed were academic education that teachers had, pre-service teacher training and professional in-service training attained, and their effectiveness as perceived by the teachers themselves. The findings on teacher characteristics have been presented in Tables 4.7 to 4.11.

What were the professional teaching qualifications attained by primary 6 teachers?

The results of the analyses of the educational attainments of the Primary 6 reading teachers have been presented in Table 4.7.

Table 4.7: Percentages and sampling errors of Primary 6 reading teachers having reached different levels of education

Region	Primary		Junior Secondary		Senior Secondary		A-Level		Tertiary	
	%	SE	%	SE	%	SE	%	SE	%	SE
Central	3.6	3.02	4.0	4.00	49.2	9.12	41.8	9.06	1.4	1.44
Eastern	4.5	2.65	0.00	0.00	51.4	8.07	40.9	8.15	3.2	1.92
Northern	1.1	1.13	2.2	2.22	64.6	9.89	30.4	9.15	1.6	1.65
South Western	2.4	2.43	0.00	0.00	57.2	10.7	33.1	9.72	7.3	7.32
Western	13.4	9.14	0.00	0.00	61.7	11.35	23.9	8.76	1.0	0.99
Uganda	4.4	1.59	1.4	1.05	55.4	4.32	36.1	4.15	2.8	1.30

As can be seen from the results in Table 4.7, a small percentage (4.4) of pupils was taught by reading teachers who had a maximum educational attainment of primary school only. Western Region was the most disadvantaged, with 13.4 of Primary 6 pupils being taught by teachers who had a maximum professional qualification of primary level education. Most pupils had teachers who had completed either senior secondary or 'A' level.

A summary of the mathematics teachers' qualifications has been presented in Table 4.8 below.

Table 4.8: Percentages and sampling errors for the educational attainment of mathematics Teachers.

Region	Primary		Junior Secondary		Senior Secondary		A-Level		Tertiary	
	%	SE	%	SE	%	SE	%	SE	%	SE
Central	0.00	0.00	3.2	3.23	62.0	9.61	29.1	8.74	5.7	4.24
Eastern	1.3	1.29	0.00	0.00	65.1	9.38	31.0	9.23	2.7	1.93
Northern	0.00	0.00	0.00	0.00	72.5	9.60	27.5	9.60	0.00	0.00
South Western	0.00	0.00	0.00	0.00	42.1	16.59	21.7	14.26	36.2	17.99
Western	0.00	0.00	0.00	0.00	59.7	15.77	40.3	15.77	0.00	0.00
Uganda	0.4	0.39	0.8	0.75	62.5	5.05	29.6	4.69	6.8	2.80

It can be observed from the data above that 62.5 percent of pupils were taught by teachers with an educational attainment of senior secondary. This was a higher percentage than for reading teachers. In short, mathematics teachers were slightly more qualified than their reading counterparts.

A graphical illustration of the distribution of the mathematics teachers' qualifications reveals a normal distribution curve as shown in Figure 4.1 below:

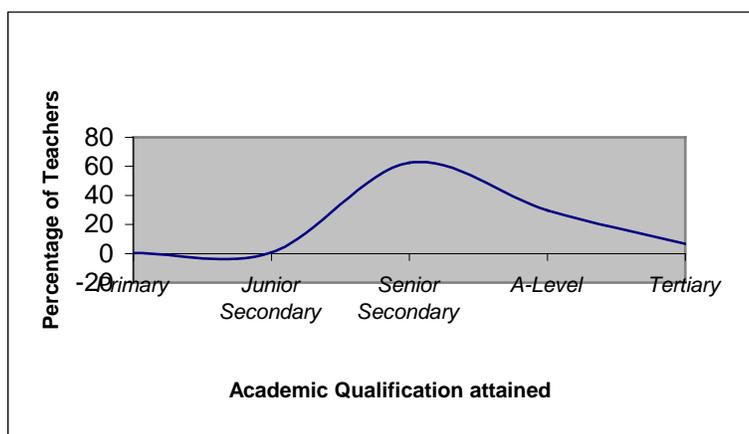


Figure 4.1: Distribution of mathematics teachers' qualifications

The largest percentage of the teachers with O-level education was from the Northern Region. However, considering the teachers who had attained A-level and tertiary levels of education, the South Western region seemed to have an edge over the other regions.

What was the frequency of exposure to pre-service teacher training courses by Primary 6 teachers?

Good teachers have a good grasp of both the content of their subject area as well as the pedagogical skills required for effective lesson delivery. Such knowledge and skills are developed and sharpened through training and experience. Information concerning the frequency of exposure to professional teacher training courses by Primary 6 teachers including the duration of such courses and the teachers' work experience have been presented in Table 4.9.

Table 4.9: Primary 6 teachers' exposure to professional pre-service training and work experience.

Region	Reading teacher				Mathematics teacher			
	Experience (years)		Training (years)		Experience (years)		Training (years)	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	7.5	0.91	2.1	0.22	6.1	0.75	2.0	0.21
Eastern	8.2	0.76	2.4	0.12	6.2	0.75	2.5	0.12
Northern	9.7	2.55	2.5	0.22	5.2	0.70	2.3	0.11
South Western	8.7	2.29	2.2	0.17	7.7	1.64	2.3	0.44
Western	10.1	2.55	2.2	0.10	8.5	1.59	2.5	0.25
Uganda	8.6	0.72	2.3	0.08	6.4	0.43	2.3	0.09

It can be seen that primary 6 pupils had reading teachers who, on average, had a work experience of 8.6 years, with little variation among regions. Conversely, the duration of teachers' professional pre-service training courses was 2.3 years. The mathematics

teachers had a slightly lower work experience (6.4 years) with the Western region having the most experienced category (8.5 years). The relative inexperience of the teaching force can be attributed to the post-1986 reforms and recruitment drive.

What was the frequency of exposure to professional in-service training courses attended by Primary 6 teachers?

In order for teachers to keep abreast with developments in effective teaching methods as well as in the most up to date content in their subject area, teachers have to attend in-service courses from time to time. The frequency of teachers' participation in in-service training courses was measured and the findings have been presented in the Table 4.10 below:

Table 4.10. Means and sampling errors for teacher in-service courses and days attended in the last three years

Region	Reading teacher				Math teacher			
	In-service courses		Days		In-service courses		Days	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	4.1	1.02	24.9	8.01	2.2	0.83	32.7	9.73
Eastern	3.4	0.56	28.5	9.55	8.0	3.46	38.6	12.68
Northern	4.1	1.00	47.8	11.59	1.2	0.42	32.1	13.72
South Western	3.0	1.08	30.4	15.34	1.6	1.11	11.6	7.53
Western	3.6	1.29	41.9	20.26	3.0	1.04	42.5	28.15
Uganda	3.7	0.41	33.0	5.26	3.7	1.11	32.7	6.25

Reading and mathematics teachers had attended an average of 3.7 in-service training sessions during the three years preceding the year of data collection. With regards the number of in-service course attended by reading teachers, there was little variation among regions. However, there was massive variation in the number of in-service courses

attended mathematics teachers. In Central and Northern Regions reading teachers had attended an average of 4.1 training sessions each while Eastern Region had 3.4, which was the lowest. On the other hand, in Eastern Region mathematics teachers had attended an average of eight training sessions while teachers in Northern and South Western Regions had attended only 1.2 and 1.4 in-service courses respectively. When one examines the number of days spent on in-service training, the pattern in regional variation is similar, but the degree of variation is much lower for both reading and mathematics teachers.

Policy suggestion 4.4: The Education Service Commission should formulate a policy on minimum frequency of teacher in-service training courses that should be attended by every serving teachers.

How effective were the in-service training courses attended by Primary 6 teachers?

Teachers were asked to assess the quality and effectiveness of the training sessions that they had attended. The findings have been summarized in Table 4.11 below.

Table 4.11. Percentages and sampling errors for the teachers' perception of the effectiveness of reading and mathematics in-service courses

Region	Effectiveness of in-service courses			
	Reading in-service courses		Mathematics in-service courses	
	%	SE	%	SE
Central	31.3	7.68	30.3	9.28
Eastern	36.2	7.73	31.5	9.42
Northern	40.1	10.48	17.4	6.91
Southwestern	33.2	12.07	21.7	11.99
Western	28.5	12.11	22.5	15.53
Uganda	34.4	4.18	25.8	4.45

On average, 34.4 percent of pupils had reading teachers who indicated that they deemed the training they had received to be effective, and the corresponding figure for mathematics was only 25 percent. The highest levels of satisfaction with the effectiveness of the in-service training was recorded among teachers in Northern Region (40.1% of reading teachers) and the lowest was recorded among mathematics teachers also in Northern Region (17.4%). It was among mathematics teachers that levels of perceived effectiveness were not only lower, but also where regional variation was greatest. In general, the percentage of pupils having teachers who found that the in-service courses were effective was very low. This reflects badly on the content of the courses, because the implications are that the in-service training courses do not respond to the needs of the teachers, either in terms of their content or mode of delivery, or both.

Policy suggestion 4.5: The Ministry of Education and Sports must revise the content and delivery of in-service training programmes to ensure that they are more responsive to the needs of the teachers.

General Policy Concern 8: How did Standard 6 teachers allocate their time among responsibilities concerned with teaching, preparing lessons, and marking?

What were the duration and frequency of the periods taught by both the reading and mathematics teachers?

The number and duration of lessons taught has a direct bearing on learning outcomes and that is why it is vital to have benchmark data on the number of periods teachers teach as well as their duration. The information regarding the number of periods taught per week by both reading and mathematics teachers has been presented in Table 4.12.

Table 4.12. Means and sampling errors for the number of periods and time spent on teaching per week

Region	Reading teachers				Mathematics teachers			
	Periods per week		Hours per week		Periods per week		Hours per week	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Central	23.9	2.24	16.4	1.50	19.6	2.47	13.4	1.62
Eastern	25.0	2.17	16.6	1.40	23.8	3.14	15.9	1.89
Northern	28.0	3.46	19.1	2.29	28.8	2.65	19.0	1.83
South Western	27.1	3.07	18.0	2.04	23.8	5.23	15.8	3.49
Western	28.9	3.05	19.2	1.95	22.6	4.00	15.1	2.66
Uganda	26.0	1.21	17.5	0.80	23.9	1.47	15.9	0.95

From Table 4.12, it can be seen that the reading and mathematics teachers had about 25 periods per week. The Western Region had the highest number of reading periods per week (28.9) and the lowest were recorded in Central Region (23.9). A more accurate sense of this difference between the two regions can be obtained if the difference is spread over 40 weeks, in which case it translates to 200 periods. The cumulative durations of these periods varied from region to region ranging from 19.2 hours to 16.4 hours per week. The Central and Eastern Regions had the lowest number of periods and

the shortest durations per week. The Western and Northern regions however had the highest numbers of periods as well as the longest durations per week. In Uganda, the average duration of a reading period was 40 minutes.

The mathematics teachers, on the other hand, had an average number of 23.9 periods per week, which was slightly lower than that for reading teachers. Northern Region registered the highest number of periods per week (28.8) while the Central Region had the lowest (19.6). Again the average length of a mathematics period was 40 minutes.

Observations showed that the number of periods per week varied from region to region, and this created a problem of work load differentials for the teachers and pupils. This problem was most prominent in Northern, South Western and Western regions for the reading teachers and in Northern Region for mathematics teachers. These differences may be a reflection of an inequitable distribution of teachers among regions.

Policy suggestions 4.6: The Ministry of Education and Sport must carry out a study to establish why there is such a big difference in the number of periods taught by teachers in different regions and schools. It must, in particular, re-examine patterns in teacher allocation among schools so as to ensure that there is greater equity in the distribution of the teachers..

How many hours per week did teachers spend in lesson preparation and marking homework?

Proper lesson planning and the regular marking of homework can enhance the quality of teaching and learning. This is why it was deemed important to collect baseline data relating to the time teachers took in lesson preparation and marking homework. The teachers' responses have been summarized in Table 4.13.

Table 4.13. Percentages and sampling errors for the time teachers spend on lesson preparation and marking homework

Region	Reading lesson (hours)		Math lesson (hours)	
	Mean	SE	Mean	SE
Central	18.2	2.95	13.1	2.92
Esatern	22.0	3.02	22.3	3.67
Northern	20.6	4.41	15.9	4.14
South Western	15.1	3.09	10.3	3.01
Western	22.7	4.20	23.1	3.69
Uganda	19.9	1.57	17.3	1.71

At the national level, reading teachers spent about 20 hours per week on lesson preparation and marking homework and for mathematics teachers this was about 17.3 hours. The number of hours varied among regions ranging from 15.1 to 22.7 hours for reading teachers and from 10.3 to 23.1 for mathematics teachers.

Policy suggestion 4.7: The Ministry of Education and Sports should develop a policy to ensure that all inspectors at the districts carry out inspections at schools with clear guidelines on how undertake quality inspection work.

Policy Concern 9: What were Standard 6 teachers' views about (a) pupil activities within the classroom, (b) teaching goals, (c) teaching approaches/strategies, (d) assessment procedures, and (e) meeting and communicating with parents?

During reading and mathematics lessons, teachers usually prepare a set of activities for pupils to perform. These activities are meant to improve a child's literacy and numeracy through active participation. In this study, teachers' views were sought on those different activities that were deemed important in enhancing pupils' performance. The rating options given were 'not very important', 'important' and 'most important' for each of the activities that was listed. The percentages of pupils with teachers rating the reading and

mathematics activities as ‘most important’ have been presented in Table 4.14 and Table 4.15 respectively.

Table 4.14. Percentages and sampling errors for the activities of teaching reading

Activity	Activity rated as ‘most important’	
	%	SE
Listening to reading	6.8	2.61
Silent reading	8.9	2.48
Learning new vocabulary	13.1	2.78
Sounding words	14.0	3.09
Reading for comprehension	41.4	4.48
Taking books home to read	2.6	1.49
Reading materials in home	8.5	2.58
Reading aloud in class	4.7	1.68

From Table 4.14 it can be seen that the largest percentage of pupils, comprising 41.4 percent, had reading teachers who thought that the “reading for comprehension” was the most important activity for teaching reading. The most plausible reason for this was the fact that children loved story-telling and listening to fairy tales more often. It was also surprising to note that reading aloud in class was considered most important by a small percentage of teachers (4.7%). “Taking textbooks home to read” was the least prioritised activity, and the rest of the activities also received low ratings. It was not clear why these received low ratings, and there is need to find out why.

The results for mathematics have summarized in Table 4.15.

Table 4.15. Percentages and sampling errors for the activities involved in the teaching of mathematics

Activity	Activity rated as ‘most important’	
	%	SE
Working in pairs or groups	39.7	5.71
Working alone	5.3	2.8
Preparing projects to be shown to the class	7.5	3.38
Using practical equipment	21.1	4.58
Homework assignments	7.4	2.68
Studying and interpreting graphs	5.0	2.09
Reciting Tables, formulae, etc.	1.8	1.34
Quizzes, tests, examinations, etc.	12.2	3.34

It can be seen that 39.7 percent of pupils had teachers who regarded “working in pairs or groups” as the ‘most important’, activity; 21.1 percent “using practical equipment” and 12.2 percent “quizzes, tests and examinations”. However the activity of “reciting tables, formulae, etc” was deemed to be of least importance with only 1.8 percent. Apart from “working in pairs or groups”, other activities received low ratings, and the reasons for this were not clear.

Policy suggestion 4.8: The Ministry of Education and Sports must undertake a study to find out the activities most frequently used by teachers in reading and mathematics lessons, and thereafter sensitise teachers, through pre-service and in-service training, on the importance of other activities that can enhance pupil learning.

What were the Primary 6 teachers’ views about goals of teaching?

There are many goals associated with teaching, and the importance attached to any of the goals tends to influence the teacher’s choice teaching activities. Teachers were therefore

asked to rank the goals of teaching reading and mathematics and the results have been presented in Tables 4.16 and 4.17 respectively.

Table 4.16. Percentages and sampling errors for the goals of teaching reading

Goal	Goal rated as ‘most important’	
	%	SE
Making reading enjoyable	4.2	1.87
Extending vocabulary	17.2	3.46
Improving word attack skills	5.7	1.97
Improving reading comprehension	18.8	3.58
Developing a lasting interest	29.7	4.01
Opening up career opportunities	5.7	1.79
Developing of life skills	18.7	3.32

“Developing a lasting interest” was deemed to be ‘most important’ by the largest percentage of teachers (29.7%). Relatively small percentages of pupils had teachers who endorsed all the other goals set for teaching reading.

The corresponding views expressed by the mathematics teachers on the goals of teaching mathematics have been presented in Table 4.17.

Table 4.17. Percentages and sampling errors for the goals of teaching mathematics

Goals	Goal rated as 'most important'	
	%	SE
Basic numeracy skills	5.5	2.42
Problem solving	58.8	5.71
Different ways of thinking	16.2	4.58
Confidence in solving problems	3.9	1.77
Satisfaction from doing Mathematics	1.7	1.18
Opening up career opportunities	1.8	0.93
Developing of life skills	12.1	3.76

It can be seen from Table 4.17 that the majority of Primary 6 pupils had mathematics teachers who rated “Problem solving” as the most important goal (58.8%). Much smaller percentages rated each of the other goals as ‘most important’. “Satisfaction from doing mathematics” and “Opening up career opportunities” had the lowest percentages of teachers (1.7% and 1.8% respectively) who rated them as ‘most important’.

The impression gained from these results is that the mathematics teachers go through the drills of teaching without being explicitly aware of the goals they are pursuing. It might be worthwhile having the teacher training colleges and the curriculum development personnel examine the goals mentioned and how explicitly the teacher trainees are taught.

What were the teaching strategies employed by Primary 6 reading teachers?

Different teachers prefer to use different sets of teaching strategies in reading and mathematics, Of course, the effectiveness of a strategy depends on many factors, among them the context, nature of pupils, ant others. However, it is also true that some strategies are generally more effective than others. Teachers were therefore presented with a set of common instructional approaches, and they were asked to indicate the ones they

employed. The results for reading and mathematics teachers have been presented in the Table 4.18 and Table 4.19 respectively.

Table 4.18 Percentages and sampling errors for the strategies of teaching reading

Approach	Percentage indicating 'often used'	
	%	SE
Introducing passage before reading	68.8	4.19
Asking questions to test comprehension	87.9	2.91
Asking questions to deepen understanding	82.1	3.66
Using materials made by teacher	37.5	4.39
Reading aloud to the class	66.9	4.29
Giving positive feedback	82.2	3.52

It can be seen from results summarized in Table 4.18 that the most common strategies were “Asking questions to test comprehension” (87.9%), “Giving positive feedback” (82.2%) and “Asking questions to deepen understanding” (82.1%). The results also indicate that “Using materials made by teacher” was an approach used least often, and yet, ideally, improvised materials are supposed to be more responsive to the needs and circumstances of the teacher and pupils.

Table 4.19. Percentages and sampling errors for the strategies of teaching mathematics

Approach	Percentage indicating 'often used'	
	%	SE
Using everyday problems	60.8	6.09
Teaching the whole class as a group	56.6	6.34
Teaching in a small group	15.5	4.94
Teaching individually	15.3	3.93
Teaching through question and answer technique	85.1	4.60
Giving positive feedback	82.5	4.96
Relating to everyday life situations	77.5	4.84
Basic skills training	55.9	6.23
Explaining mathematical processes	69.5	6.08
Using available local materials	68.0	5.88

From Table 4.19 it can be seen that, with the exception of 'teaching in a small group' and 'teaching individually', all the strategies were endorsed as being often used by large percentages of teachers. The simultaneous use of all strategies seemed an ideal approach that would enhance pupil performance. It would be interesting to explore the reasons why small group classes and the application of mathematics knowledge to real life situations appear to be less attractive instructional strategies.

In making their judgments, the teachers should consider the cost-effectiveness of the alternative teaching strategies, the level of participation elicited by the approach, its ability to optimize pupils' ability to understand with minimum input, and the approach's capacity to increase knowledge flow among pupils.

Policy suggestion 4.9: The Ministry of Education and Sports, in conjunction with the Education Standards Agency, should carefully examine the school curriculum and come up with clear guidelines on (a) the teaching goals to be pursued by teachers, (b) the teaching strategies or approaches teachers should use, and (c) the key activities teacher should prioritise when teaching reading and mathematics.

What was the frequency with which Primary 6 teachers gave tests to their pupils?

It is important for every teacher to obtain feedback on what they are teaching. Such feedback may inform them of the learning areas that pupils had grasped or were having difficulties with, and on the basis of such information they can adjust their teaching or take remedial measures. One way of obtaining such feedback is by giving pupils tests in reading and mathematics. Teachers were asked to indicate the frequency with which they administered tests on their pupils, and the results for reading and mathematics teachers have been summarized in the Tables 4.20 and 4.21 respectively.

Table 4.20. Percentages and sampling errors for the frequency of reading tests

Region	Frequency of reading tests					
	Less often		2/3 per month		1 + per week	
	%	SE	%	SE	%	SE
Central	16.2	7.42	26.5	7.95	57.3	9.13
Eastern	13.4	5.59	49.1	8.87	37.5	8.37
Northern	14.4	9.30	22.8	7.89	62.8	10.59
South Western	9.2	7.16	24.4	10.69	66.4	11.94
Western	36.4	12.99	38.6	11.68	25.1	9.69
Uganda	16.3	3.54	34.0	4.30	49.7	4.51

It can be seen that in the year 2000, the teachers in South Western and Northern Regions gave their pupils tests more frequently than any of the other sister regions. Statistics showed that 66.4 percent of pupils in the South Western region had teachers who gave tests to their pupils more than once a week. Northern region had 62.8 percent of teachers giving out tests at least once a week. The region with the largest percentage of teachers who gave pupils tests less often was Western Region (36.4%).

The frequency of mathematics tests was similarly examined and the results have been presented in Table 4.21..

Table 4.21. Percentages and sampling errors for frequency of mathematics tests

Region	Frequency of mathematics tests					
	Less often		2/3 per month		1 + per week	
	%	SE	%	SE	%	SE
Central	21.5	10.62	38.9	12.64	39.6	11.78
Eastern	14.2	7.17	31.2	10.36	54.5	11.56
Northern	16.0	8.34	31.7	11.04	52.3	11.57
South Western	44.7	17.75	14.0	8.63	41.3	17.09
Western	15.1	11.30	36.5	16.10	48.4	18.02
Uganda	20.7	4.69	30.9	5.24	48.4	5.83

The results presented in Table 4.21 show that, on average, mathematics tests were most frequently given in Eastern Region (54.5%) while Central Region had the lowest percentages of teachers who gave mathematics tests frequently (39.6%). On the whole mathematics tests were more frequently given across all the regions than reading tests.

Policy suggestion 4.10 The Ministry of Education and Sports must investigate why teachers in Western region did not give reading tests frequently, and why teachers in South Western did not give mathematics tests frequently

Was there a specific provision in the pupil school reports for comments on reading and mathematics?

While testing pupils helps to provide the teacher with feedback on pupil learning, it is equally important for the teacher to provide pupils and their parents or guardians with feedback on their performance. One of the most effective ways of doing this is to have a section in the report where comments on reading and mathematics can be made. In this study, an effort was also made to ascertain whether or not there was a provision made for

comments by mathematics and reading teachers in the school reports. The findings have been presented in Table 4.22.

Table 4.22. Percentages and sampling errors for a provision in the school report for comments on Reading and Mathematics.

Region	Reading/English section		Mathematics section	
	%	SE	%	SE
Central	72.9	8.52	64.7	9.39
Eastern	75.0	7.50	75.7	8.61
Northern	67.9	10.97	60.3	11.52
South Western	66.5	12.10	72.7	15.61
Western	66.3	11.18	60.3	16.00
Uganda	70.9	4.22	67.6	4.94

Just over 70 percent of pupils had teachers who indicated that they had sections in the reports for comments on reading, and the corresponding percentage for mathematics was 67.6. Although there was some variation among regions for both reading and mathematics, it was not statistically significant.

What was the frequency with which Primary 6 teachers interacted with the parents' of their pupils?

Parents play an important role in children's learning by providing various forms of material support (such as putting up and maintaining school infrastructure) and non-material support (such as management support) to the school. Most importantly, they also provide direct support to their children through the provision of help with homework. If schools are to tap on parents' support effectively, then they have to meet regularly for consultations both at school level and at the class level. Information concerning the frequency with which Primary 6 teachers interacted with the parents of pupils has been presented in Table 4.23. The percentages presented are the percentages of

pupils who had teachers who indicated that they met with the parents or guardians of their pupils once a term or once or more a month.

Table 4.23. Percentages and sampling errors for the frequency of teacher meetings with parents frequently

Region	Percentages of teacher meetings with parents frequently			
	Reading teacher		Mathematics teacher	
	%	SE	%	SE
Central	80.5	6.70	78.7	8.21
Eastern	80.9	6.49	76.9	9.25
Northern	93.9	3.22	76.9	8.95
South Western	72.8	11.63	76.1	15.99
Western	74.4	10.15	75.9	13.16
Uganda	81.3	3.36	77.1	4.53

A little over 80 percent of pupils had reading teachers who reported having met with pupils' parents or guardians at least once a term. There was not much variation among regions. A slightly lower percentage of mathematics teachers met parents frequently (77.1%). Although there must some concern over the one fifth to one quarter of pupils with teachers who did not hold meetings with parents frequently, both figures were fairly low, and this was commendable. Efforts can therefore be targeted at those teachers who did not meet parents frequently.

What were the percentages of Primary 6 reading and mathematics teachers who asked pupils' parents whether they had signed the assignments scripts of their children?

It has already been noted that the education of pupils is most effective when parents are involved in their children's learning. Parents or guardians can help in the educational process by ensuring that their children complete their homework assignments. Questions were asked on whether the teacher ever took the trouble to ask parents to sign their

pupils' assignment or homework, and the responses obtained have been summarized in Table 4.24.

Table 4.24. Percentages and sampling errors of teachers asking parents to sign homework

Region	Sign reading homework		Sign mathematics homework	
	%	SE	%	SE
Central	37.5	9.04	39.3	10.46
Eastern	27.8	8.14	25.7	9.87
Northern	37.8	10.55	59.8	10.75
South Western	36.9	12.52	26.5	13.03
Western	46.0	12.20	38.3	16.01
Uganda	35.4	4.41	38.0	5.20

Some 35.4 percent and 38 percent of pupils had reading and mathematics teachers respectively who asked parents to sign their children's assignment or homework. There were no significant differences among regions. The figures were generally low, and efforts must be made to encourage parents to sign their children's homework. This helps to secure greater parental involvement and interest in their children's education.

What was the availability of classroom furniture (for example, sitting/writing places, teacher table, teacher chair and bookshelves) and classroom materials (for example, chalkboard, dictionary, maps, book corner and teacher guides) in Primary 6 classrooms?

In order to learn effectively, pupils need to have a sitting and writing place that offers them reasonable comfort. Where pupils had to sit on the floor, it can be expected that their concentration will be frequently interrupted. Similarly, if they have no place to write on, they cannot do their best in written work. Teachers' responses to questions on the

provision of sitting and writing places for pupils in the classroom have been summarized in Table 4.25.

Table 4.25. Percentages and sampling errors for pupils having sitting and writing places

Region	% having sitting place		% having writing place	
	%	SE	%	SE
Central	93.7	1.92	86.6	2.39
Eastern	89.8	3.67	64.8	5.94
Northern	82.4	4.69	71.0	5.94
South Western	94.7	2.36	77.0	5.87
Western	83.3	6.06	75.8	3.88
Uganda	89.5	1.70	74.5	2.46

It can be seen that nearly 90 percent of pupils had sitting places but only 75 percent had writing places. Northern region was least provided in terms of both sitting and writing places. Eastern region also had a poor provision of writing places. It is clear, therefore, that there is a problem in the provision of both writing and sitting places, with a quarter of pupils not having a place to write on and a tenth having no place to sit. The Ministry will need to take action on this.

Policy suggestion 4.11 The Ministry of Education and Sports must carry out an audit on the provision of sitting and writing places and secure additional furniture for distribution to targeted regions and schools.

For much the same reasons as pupils', teachers also need chairs to sit on and a tables to write on. In addition to these, there are some key resources that teachers need in order to

teach effectively, and these are: a usable writing board., chalk, a wall chart, a cupboard, one or more bookshelves and a classroom library or book corner. Responses on the teachers who had each of these have been presented in Table 4.26.

Table 4.26. Percentages and sampling errors for availability of classroom resources for the teachers

Resource	Availability of classroom resources			
	Reading teacher		Mathematics teacher	
	%	SE	%	SE
A usable writing board	85.1	3.11	83.8	3.80
Chalk	89.8	2.60	82.2	4.04
A wall chart of any kind	66.1	4.32	60.9	5.06
A cupboard	16.8	2.86	12.0	3.16
One or more bookshelves	8.7	2.23	10.4	2.79
A classroom library or book corner	23.4	3.41	27.4	4.80
A teacher table	59.0	4.34	53.9	5.35
A teacher chair	75.8	3.67	71.7	4.80

From the information presented in Table 4.26, it is clear that, For both reading and mathematics teachers, the provision of bookshelves, cupboards and teacher tables was a problem. Only about 25 percent of pupils were in classrooms with a classroom library or book corner. For reading this is a serious problem given that having sufficient books available to read is one a necessity for effective learning. Some 15 percent of pupils were in classrooms without a chalkboard. This figure may be small, but considering that a chalkboard is an absolute necessity in teaching, this should be a matter of serious concern to the Ministry.

Policy suggestion 4.12. The Ministry of Education and Sports must carry out an audit on the provision of essential classroom resources and secure additional resources for distribution to those regions and schools with an inadequate supply of these resources. Attention must specifically be paid to the supply of classroom libraries, bookshelves, teacher tables and chalkboards.

Teachers' responses on classroom resources were aggregated to construct a classroom resource index by adding up the number of classroom items that each teacher reported out of a total of 8 items. The mean scores for the indices across the seven regions and for the whole have been presented in Table 4.27.

Table 6.2. Means and sampling errors for the classroom resources index

Region	Classroom resources index			
	Reading teacher		Mathematics teacher	
	Mean	SE	Mean	SE
Central	4.1	0.34	3.6	0.46
Eastern	4.2	0.28	3.8	0.41
Northern	4.8	0.29	4.6	0.31
South Western	4.1	0.55	4.4	0.80
Western	4.2	0.41	4.0	0.57
Uganda	4.2	0.16	4.0	0.21

An average reading pupil in the year 2000 was in a classroom for reading that had 4.2 out of the eight resource items, and in a classroom for mathematics with 4.0 items out of the eight items listed above. This level of provision is low, by any standard, and the Ministry of Education and Sports needs to give this matter attention. It could do this by starting with the implementation of Policy suggestions 4.12 and 4.13.

How was the availability of library books in the classrooms?

As already mentioned the availability of textbooks in the classrooms is very important as it generally expands pupils' opportunities for learning. Teachers were therefore asked to indicate the number of library books in their classrooms, and the mean numbers of library books per classroom have been presented in Table 4.28.

Table 4.28. Means and sampling errors of class library books per pupil

Region	Class library books per pupil	
	Mean	SE
Central	0.5	0.20
Eastern	0.5	0.34
Northern	1.3	0.45
South Western	2.9	2.98
Western	0.2	0.12
Uganda	0.9	0.36

Results from Table 4.28 above show that, on average, there was approximately one book per pupil in the classrooms regardless of the subject in question. South Western Region had more books than any other region (about 3 books per pupil) while Northern region followed with an average of about 3 books for every 4 pupils in a classroom. Western region with 1 book for every 5 pupils had the smallest pupil:book ratio. The situation across the entire country in this respect is clearly very bad.

Teaching aids are a major input in the teaching-learning process. More often, schools in the rural setting are always greatly affected by inadequate supply of teaching aids. An assessment of the supply and availability of teaching aids at the schools was carried out and the survey results from the report are depicted in the Table 4.29.

Table 4.29 Percentages and sampling errors of reading teachers with teaching aids in the school.

Region	Teaching aids									
	For teaching reading						For teaching mathematics			
	Map		English dictionary		Teacher's guide		Geometrical instruments		Teacher's guide	
	%	SE	%	SE	%	SE	%	SE	%	SE
Central	46.0	8.87	68.7	7.77	68.9	7.89	66.3	10.11	62.2	10.30
Eastern	72.8	6.79	75.2	7.48	72.2	7.38	83.8	6.86	92.6	4.40
Northern	64.6	10.49	87.2	7.62	80.7	8.27	91.6	4.41	78.1	8.43
South Western	69.4	11.74	72.9	10.77	69.0	10.92	71.7	14.49	76.9	15.66
Western	60.8	11.87	64.5	11.30	67.1	11.84	59.3	15.24	76.1	12.11
Uganda	62.9	4.25	74.3	3.83	71.9	3.92	77.2	4.20	78.4	4.14

From Table 4.29 it can be seen that 62.9 percent of the teachers had maps with the teachers in the Eastern Region being the most favoured (72.8%), followed by those from the South Western Region (69.4%) and those from Central Region coming last (46.0%).

On the whole, 74.3 percent of the reading teachers had access to English dictionaries with the teachers in Northern Region being the most advantaged (87.2%) while those from Western Region had the lowest percentage (64.5%). A similar percentage of pupils, (71.9%) had reading teachers with access to teachers' guides. Northern Region had the highest teacher access (80.7%) while Western Region had the lowest (67.1%). But, all teachers should have access to the teacher's guides. On the side of the mathematics teachers, approximately 77.2 percent of them had access to geometrical instruments. Northern Region had the highest percentage (91.6%) and Western Region had the lowest (59.3%).

It is clear that, for most items, Western Region had the lowest levels of supply and the possible causes for this situation remain unknown and have to be investigated.

Policy suggestion 4.13. The Ministry of Education and Sports must carry out an audit on the availability of essential teaching aids and, for those regions and schools with inadequate supplies of these items, put in place mechanisms for the allocation of these items. Particular attention must be paid to Western Region that has the lowest levels of provisions.

What professional support (in terms of education resources centres, inspections, advisory visits and guidance by school heads was given to Primary 6 teachers?

If teachers have constantly improved their performance in the classroom and acquire a sense of professional growth and development, then they must be provided with professional support. Such professional support usually takes the form of provision of teachers' resource centres, as well as professional guidance by school inspectors and headteachers. Teacher resource centres are of paramount importance in enhancing the quality of education delivery as they provide opportunities for teachers to sharpen their knowledge and skills. Information on the availability of teacher resource centres, the degree to which teachers have visited them, and whether they have used them has been presented in Table 4.30.

Table 4.30. Percentages and sampling errors for the availability of education resource centres for teachers

Region	Reading teacher						Math teacher					
	None available		Have not visited		Have Used		None available		Have not visited		Have used	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Central	19.9	7.03	3.2	3.19	76.9	7.47	20.4	8.51	1.8	1.79	77.8	8.62
Eastern	13.2	4.79	7.5	4.16	79.3	5.93	18.0	7.42	1.4	1.38	80.6	7.53
Northern	12.3	6.38	9.2	7.05	78.5	8.89	5.8	3.50	21.3	9.33	73.0	9.74
South Western	16.3	8.55	14.6	9.46	69.1	11.5	13.6	10.77	17.0	13.79	69.4	15.98
Western	26.7	10.7	9.5	9.54	63.8	12.3	17.0	10.05	24.8	16.49	58.2	15.98
Uganda	16.7	3.08	8.0	2.61	75.3	3.74	15.2	3.54	10.5	3.31	74.4	4.55

The findings corroborate the close linkage that exists between accessibility to a resource centre on the one hand and the intensity of their use on the other. Thus, teacher utilization of resource centres was lowest in Eastern Region (63.8%) where their availability was also lowest, and was highest in areas where there was a good resource centre network, namely, Northern (78.5%) and Eastern (79.3%). Although 15 to 17 percent of pupils were taught by teachers who did not have resource centres available to them, it was commendable that, where they existed, resource centres were visited and used by a high percentage of teachers.

Having a resource centre available and visiting it are one thing, and using it productively is quite another. Teachers can put resource centres to many uses, and some of them are the following:

- (i) Data banks from which they can borrow a variety of study materials.
- (ii) Units from which they produce improvised teaching-learning aids.
- (iii) Venues for conducting some short-term but well targeted in-service training courses.

- (iv) Meeting points for general networking and sharing of experiences with fellow teachers and other stakeholders.

A selected set of these uses was presented and teachers were asked to indicate the uses to which they had put the resource centres. A summary of the various uses to which the teachers had out resource centres has been presented in Table 4.31.

Table 4.31. Percentages and sampling errors for teachers' utilisation of the resource centers

Region	Reading teacher									
	Don't Use		Borrow Material		Make Material		Training		Speak with teachers	
	%	SE	%	SE	%	SE	%	SE	%	SE
Central	32.1	7.47	33.8	8.65	46.1	8.77	48.2	7.99	61.9	8.39
Eastern	13.9	5.28	35.9	7.44	47.6	7.50	67.2	7.71	56.8	7.89
Northern	18.2	9.26	39.9	10.40	59.0	10.72	62.6	10.31	68.7	10.09
South Western	30.9	11.52	47.4	12.83	45.9	11.97	63.0	12.36	69.1	11.52
Western	33.7	12.60	32.6	10.29	38.0	11.11	41.1	11.86	57.1	12.34
Uganda	21.8	3.71	37.4	4.25	48.0	4.29	58.1	4.23	62.0	4.26

About one-fifth of pupils had reading teachers who never used the resource centres at all. In Western and South Western Regions the figures were quite high (30.9% and 30.9% respectively). The uses to which the highest proportion of teachers put these facilities were in-service training (58.1%) and networking with colleagues (62.0%). It was not clear why such a low percentage of teachers borrowed materials from the resource centres, and why a fairly low percentage also used them for the preparation of their own teaching materials. On the whole, reading teachers from Northern and Eastern Regions were the ones who utilized the resource centres most intensively.

Similarly, in Table 4.32 the purposes to which the resource centre were put by the mathematics teachers have been summarised.

Table 4.32. Percentages and sampling errors of mathematics teachers' purposes for using the resource centre

Region	Mathematics teachers									
	Don't use		Borrow material		Make material		Training		Speak with teachers/staff	
	%	SE	%	SE	%	SE	%	SE	%	SE
Central	17.1	8.56	39.3	10.22	40.1	9.84	58.8	10.12	65.7	9.88
Eastern	13.1	6.74	48.6	10.48	47.9	10.33	68.6	9.31	73.6	8.86
Northern	25.2	9.87	58.0	11.13	47.1	11.64	61.1	10.84	68.0	10.05
South Western	20.7	14.07	59.6	16.70	53.7	17.34	63.0	18.04	64.4	16.34
Western	29.3	16.68	29.0	12.64	47.9	14.76	54.4	15.67	58.4	15.22
Uganda	19.5	4.33	47.8	5.32	46.6	5.30	62.4	5.12	67.6	4.86

The findings presented in Table 4.32 were strikingly similar to those for reading teachers, and the comments made in respect of reading teachers also apply to mathematics teachers.

Inspectors and advisors can play a key role in the professional development of teachers. Their effectiveness, however, depends on the frequency of their visits as well as the manner in which they carried out their roles and functions. In particular, the manner in which they carried out their work influenced teachers' perceptions about their (inspectors' and advisors') role. Teachers were asked to indicate their views about inspectors and advisors, and these views have been summarised in Table 4.33.

Table 4.33. Teachers' ratings of the actions of the inspector and advisor

Description of the actions	Percentage of teachers agreeing							
	Reading teacher				Math teacher			
	Inspector		Advisor		Inspector		Advisor	
	%	SE	%	SE	%	SE	%	SE
Pedagogical role								
Bring new ideas	89.8	2.55	87.3	3.33	80.8	4.82	90.2	4.17
Clarify educational objectives	83.6	3.13	72.3	4.49	77.1	4.85	72.9	5.90
Recommend new teaching materials	84.8	3.26	74.1	4.57	82.0	3.93	69.0	6.55
Contribution to my classroom teaching	32.2	4.28	32.1	4.93	25.4	5.09	24.3	5.29
Explain curriculum content	75.9	3.78	68.0	4.97	67.6	5.19	56.9	6.70
Suggest improving teaching methods	89.3	2.48	82.5	3.87	84.1	4.21	72.9	6.33
Critical versus advisory role								
Comes to advise	88.9	2.71	92.4	2.67	81.8	4.72	92.6	3.23
Comes to criticise	41.8	4.51	42.1	4.97	38.0	5.28	48.2	6.69
Finds faults and report them to the employer	40.5	4.53	78.4	3.81	31.5	4.93	79.5	5.24
Professional development role								
Provides information for teacher self-development	63.6	4.44	32.3	4.74	64.4	5.44	51.7	6.65
Encourage professional contacts with other teachers	84.7	3.17	66.5	5.00	76.5	4.93	61.6	6.63
Provides in-service training to teachers	67.0	4.53	52.5	5.06	61.5	5.31	50.9	6.66

In general, the teachers had positive views about the inspectors and advisors. They felt that they were there to advise them (bring new ideas, clarify educational objectives, recommend new teaching material, suggest improving teaching methods, coming to

advise, encourage professional contacts), on how to improve their teaching rather than to criticise them.

It is worrying that about three-quarters of pupils had teachers who believed that advisors came to find fault and report them to their employers. This perception has to be corrected through, among other things, changing the manner in which advisors carry out their functions and opening up communication that establishes a new relationship between the two parties.

Another aspect that should be of concern to the Ministry of Education and Sports and that needs to be attended to is the suggestion in the findings that, in the mathematics teachers' assessment of both the advisory and professional development roles of inspectors and advisors, little attention was paid to the actual classroom teaching process. The emphasis on their advisory function took precedence over the professional development role.

How many school heads advised their teachers on matters related to their teaching?

It is the role of the head teacher to give advice and guidance where necessary to his or her teachers so that the teachers are motivated to perform well. It was therefore necessary to have an assessment of the frequency of advice received by teachers from their head teachers and the results of the findings have been presented in Table 4.34..

Table 4.34. Percentages and sampling errors for the frequency of advice to teacher from school head.

Region	Percentage of teachers receiving advice 'sometimes' or 'often'			
	Reading teacher		Mathematics teacher	
	%	SE	%	SE
Central	96.9	2.53	97.8	2.21
Eastern	100.0	0.00	100.0	0.00
Northern	95.3	4.71	95.1	4.93
South Western	94.2	5.86	100.0	0.00
Western	99.1	0.96	100.0	0.00
Uganda	97.5	1.35	98.4	1.21

As can be seen from the results presented in Table 4.34, nearly all pupils had teachers who indicated that they received advice from their respective head teachers. All the teachers from Eastern Region were regularly advised by head teachers and the rest of the results from other regions were also very positive. There were no large variations among the regions.

Conclusion

A great deal of information about teachers has been presented and analysed in this chapter. Most of the teachers were fairly youthful, and had been teaching for eight or nine years. However, female teachers were still under-represented in the teaching profession. Their overall housing conditions were not encouraging with only 20.5 percent meeting the minimum housing requirements. The majority of teachers had 'O' level educational background, which is fair considering the entry requirements for Grade III teacher training. There was also adequate exposure of teachers to in-service training programmes. The frequency with which head teachers gave teachers advice was very encouraging and fairly equitable across the regions.

Teachers taught an average of 17 hours per week and spent about 19 hours preparing lessons and marking homework assignments. They held very diverse views about the goals of teaching their subjects, and this had implication for in-service teacher training and what inspectors and advisors do and should when they go to schools.

Teachers used tests fairly frequently but often there was no section in the school report for reporting in detail on a pupil's progress. Parents were generally not asked to sign the work that their children had completed at home. There need for more efforts to sensitise parents to the importance of getting involved in their children's learning, and for encouraging more interaction between home and school for the benefit of the child.

A tenth of all pupils did not have a sitting place in school and 25 percent had no writing place. This might mean that classrooms were either overcrowded or lacked furniture. There was a lack of cupboards and bookshelves and a serious lack of reading books in the classroom library, a necessary prerequisite if pupils are to learn to read with comprehension. There were 15 percent of pupils in classrooms without a blackboard and 20 to 35 percent of pupils with teachers not having access to the relevant teacher guides.

The roles of the inspectorate and the advisors seem to have been appreciated, although advisors were largely viewed as coming to 'find fault' more than inspectors.

Only a small proportion of pupils were taught by teachers who were in areas that lacked a resource centre. About three-quarters of pupils had teachers who used the resource centres for a variety of purposes, the most common among them training and networking with fellow professionals.

Chapter 5

School Heads' Characteristics and their Opinions about School Infrastructure, Organization, Operations and the Behavioral Problems of Pupils and Staff

Introduction

In this chapter data describing the school heads and the schools which the Primary 6 pupils attended have been presented. The major reasons for presenting data on school heads is to inform the reader of the conditions of schooling in Uganda, and to put together baseline information against which assessments of changes in the future can be made. As explained earlier, all statistics relating to school heads have to be interpreted in terms of the percentages of pupils having school heads with the specific characteristics. In this chapter, the main characteristics of school heads as well as their views about the school infrastructure, various school policies, inspections and behavioral problems in the school have been summarized.

General Policy Concern 13: What were the personal characteristics of school heads (for example; age and gender)?

The school head is, perhaps, the most important single factor influencing school performance. Within a few years, a school head can transform a school by attracting and retaining a well qualified and highly motivated staff and by providing strong instructional leadership. The reverse is true: a poor school head can quickly turn an otherwise good school into a bad one.

The quality of the leadership offered by a head teacher is contingent on many factors that include his/her personal characteristics and other environmental variables. In this study, several school head characteristics were examined.

What was the age distribution of the school heads?

One asset older school heads have is maturity and a wealth of experience in school management. On the other hand, younger school heads can be more energetic and innovative than older ones. Information concerning the age of school heads has been presented in the first column of Table 5.1.

Table 5.1. Means, percentages, and sampling errors for school head age and gender

Region	Age (years)		Gender (female)	
	Mean	SE	%	SE
Central	42.9	1.27	18.2	6.27
Eastern	43.8	1.22	13.1	5.42
Northern	40.6	1.54	0.0	0.00
South Western	40.7	1.44	27.2	11.38
Western	45.8	2.19	17.2	10.53
Uganda	42.7	0.66	14.7	3.09

The figures in the tables show that the average pupil in Primary 6 had a school head who was 42.7 years old. There was not much variation among the regions except that the school heads in Northern Region were slightly younger than those in the other regions. On the whole, it can be seen that school heads were considerably older than teachers (see Chapter 4). This is not surprising, considering the fact that school headship is a promotional post, and the more mature and experienced teachers are more likely to be promoted to this post.

What was the gender distribution of the school heads?

In the third and fourth columns of Table 5.1, the percentages and standard errors of school heads who were female have been presented. On the whole, only about 15 percent of pupils had school heads that were female. There was some variation among regions with no female heads in the Northern Region. Southern Region had the highest percentage of female heads (27.2%). The results reflect a serious under-representation of females in school leadership positions. With an increasing number of female teachers entering the profession, it may well be possible to redress this imbalance.

Policy suggestion 5.1: The Education Service Commission ought to investigate the reasons for the low percentage of female school heads and implement measures to ensure that the gender gap is gradually narrowed through the enhancement of promotional prospects for eligible female.

General Policy Concern 14: What were the professional characteristics of school heads?

Under normal circumstances, a school head who is highly qualified is likely to perform better than the one who is less highly qualified. Therefore Ministry of Education and Sports, through the Education Service Commission, recruits school heads who hold the prescribed academic and professional qualifications and try to ensure equity in the allocation of these school heads. The focus of this section is on the academic and professional qualifications of school heads.

How many years of academic education had school heads completed?

The school heads were asked to report “the highest level of academic education” that they had attained. Five educational levels were used, Primary, Junior Secondary, Senior

Secondary, and ‘A’ level and tertiary education. Their responses have been summarized in Table 5.2.

Table 5.2. Level of academic education of school heads

Region	Level of academic education									
	Primary		Junior secondary		Senior secondary		A-level		Tertiary	
	%	SE	%	SE	%	SE	%	SE	%	SE
Central	1.3	1.35	2.9	2.03	44.8	8.79	41.4	8.46	9.6	6.04
Eastern	3.8	2.85	3.0	2.34	41.3	8.83	39.0	8.45	13.0	6.57
Northern	2.2	2.22	1.1	1.13	52.6	10.95	32.4	10.23	11.7	6.66
South Western	0.0	0.00	0.0	0.00	40.6	13.30	52.5	13.37	6.9	6.96
Western	0.0	0.00	9.7	9.78	50.8	12.78	33.0	12.45	6.5	5.12
Uganda	1.9	1.02	2.9	1.41	45.2	4.62	39.7	4.45	10.3	2.99

It can be seen from Table 5.2 that, at least 95 percent of the school heads countrywide completed senior secondary education (i.e. ‘O’ Level, ‘A’ Level) and Tertiary education. There were some variations across regions in the levels of academic education, but the values were associated with large sampling errors, making them a little unstable.

How many years of teacher training had school heads completed

The average number of years of teacher training school heads completed have been presented in Table 5.3.

Table 5.3. Means and sampling errors for the teaching experience and training of the school heads

Region	Experience (years)		Teacher training (years)		Specialised training (weeks)	
	Mean	SE	Mean	SE	Mean	SE
Central	18.1	1.29	3.3	0.16	25.9	4.50
Eastern	21.0	1.26	3.4	0.16	27.5	4.22
Northern	18.7	1.54	3.5	0.20	18.0	4.24
South Western	16.4	1.73	3.4	0.25	22.9	6.65
Western	17.5	1.67	3.3	0.21	31.0	5.30
National	18.7	0.66	3.4	0.08	25.1	2.21

Results presented in Table 5.3 show that at the national level the average number of years of teacher training completed by school heads was 3.4 years. There were no significant differences across regions. The length of this training is, once again, longer than that for teachers, the reason being that the better qualified teachers are more likely to be promoted to the school headship post than the less qualified ones.

How many years of teaching experience had school heads completed?

Ideally, head teachers with more teaching experience might be expected to be better head teachers. It can be seen that the average pupil in Uganda had a school head with 18.7 years of teaching experience. The lowest number of years of experience was recorded in South Western Region (16.4 years) and the highest was recorded in Eastern Region (20.0 years). This mean is considerably higher than that for teacher because school heads tend to be appointed from the stock of more experienced professionals.

Have school head teachers received specialized training in school management?

Although a school heads' position requires managerial skills, it is not always the case that school heads have had such training prior to their appointment to this position. It is often necessary, for example, to give school heads specialized training in school management. School heads were therefore asked to indicate whether they had received such training and, if so, the total length of such training in weeks. From the data in Table 5.3 it can be seen that at the national level, school heads on average had 25.1 weeks (or about six months) of specialized training in school management, and this is considerable. The school heads in Western Region had the training of the longest duration (31 weeks) while those in Northern Region had the shortest (18 weeks). Under the Teacher Development Management System (TDMS), which started in 1993, school heads undergo a special one-year certificate course in basic management skills while the rest of the teachers undergo refresher courses. This explains why all of the sampled school heads indicated participation in specialized management training programmes. It is logical to expect these school heads to have acquired improved management skills.

How many years of experience had school heads had as either a school head or an acting school head – in the current school and altogether

The more experience a school head had in the leadership position in a school or schools, the more likely he or she was to be a better manager. Furthermore, when a school head stays in the same school for a long period of, say, five or more years, he or she can develop plans and see them through their implementation. A rapid turnover of school heads can have a destabilizing effect on a school. School heads were asked to indicate the number of years they had spent as school heads in the present school, and the number of years they were a school head altogether. The information generated has been presented in Table 5.4.

Table 5.4. Means and sampling errors of school heads' years of experience as a school head

Region	This school		Altogether	
	Mean	SE	Mean	SE
Central	2.8	0.34	11.5	1.47
Eastern	3.9	0.78	11.5	1.37
Northern	2.7	0.44	8.6	1.43
South Western	3.6	0.70	9.4	1.66
Western	2.8	0.55	10.9	1.30
Uganda	3.2	0.29	10.6	0.68

It can be seen from Table 5.4 that at the national level school heads had an average experience of 3.2 years as heads in their current schools and an average of 10.6 years of administrative experience altogether. There was not much regional variation. Results indicated that most of the school heads in 2000 had not stayed very long in their current schools, but had had considerable managerial experience.

What percentages of the school staff had post-secondary academic education?

The management tasks associated with the management of school with a team of academically and professionally well qualified staff are likely to be slightly different from those associated with unqualified and/or under-qualified staff. Teachers who have received sufficient academic and professional preparation were expected to require less guidance from the school head in the performance of their duties than those with little or no preparation. School heads were therefore asked to indicate the number of teachers in their school who had post-secondary education. Furthermore, they were also asked to state the length of training (in years) teachers in their schools had received. The results have been presented in Table 5.5.

Table 5.5. Percentages, means and sampling errors for the qualifications of the school staff that had post-secondary academic education

Region	Post-Secondary Academic Education		Teacher Training (Years)	
	Percent	SE	Mean	SE
Central	39.1	7.59	1.9	0.12
Eastern	31.4	6.57	2.1	0.10
Northern	24.4	5.30	2.1	0.12
South Western	35.9	10.23	2.2	0.09
Western	38.8	11.71	1.8	0.17
Uganda	33.6	3.52	2.1	0.05

Results from Table 5.5 show that at the 33.6 percent of the school staff had post-secondary academic education. There was considerable variation in the number of school staff that had post-secondary education across regions, ranging from 24.4 percent in Northern Region to 39.1 percent in Central Region. The sampling errors for were generally high. From these results, it can be observed that school heads were managing staff that generally had low academic qualifications.

What was the average number of years of teacher training received by the school staff?

Information concerning teacher training has been presented as the second set of figures in Table 5.5. It can be seen from the results in Table 5.5 that, on average, the school staff spent 2.1 years in teacher training. The variation among regions was small. In Uganda the majority of schoolteachers complete two years of college training before they become Grade III teachers. While the academic qualifications of teachers were generally low, the average teacher had received sufficient professional training.

Policy suggestion 5.2: The Director of Education consider encourage and assist more teachers to acquire post-secondary education and, as a long-term measure, recruit into the teaching force only those with post-secondary education.

General Policy concern 15: What were the school heads' opinions about general school infrastructure and the condition of school buildings?

The lack of facilities and equipment has often been cited as a major reason for low educational quality. In this section school heads were asked to make an assessments of the provision of a selected set of key facilities and pieces of equipment. Additional information on the facilities available in all schools was derived from the Annual School Census (ASC) conducted by the MoES.

What items of equipment and general facilities did schools have?

From the data presented in Table 5.6 a favourable picture emerges of the availability of general facilities in schools. The majority of the schools had libraries (95.1%), sports grounds (84.1%) and school gardens (74.6%). Relatively fewer schools had school head's offices, staff rooms, store rooms, school halls and cafeterias.

Apart from the fair supply of radios (49.5%), the information presented shows that most schools did not have equipment and services such as fax machines, overhead projectors, video-cassette recorders, photocopiers, computers, electricity and telephones. The relative lack of electric equipment in most schools is attributable to the poor electricity supply..

Table 5.6. Percentages and sampling errors for schools with general facilities

Facility	Percent	SE
School buildings		
School library	95.1	1.91
School hall	20.1	3.43
Staff room	50.5	4.56
School head's office	61.4	4.58
Store room	36.1	4.33
Cafeteria	13.5	2.70
School grounds		
Sports area/ playground	84.1	3.56
School garden	74.6	4.00
General services		
Piped water/ well or bore-hole	60.6	4.50
Electricity	14.7	3.01
Telephone	7.0	1.95
Equipment		
First-aid kit	39.1	4.41
Fax machine	2.5	1.17
Typewriter	28.7	3.91
Duplicator	21.1	3.42
Radio	49.4	4.54
Tape recorder	11.7	2.86
Overhead projector	1.4	0.80
Television set	4.1	1.50
Video-cassette recorder	2.8	1.44
Photocopier	0.9	0.7
Computer	4.2	1.82

What kind of water supply did schools have?

Every school needs a good supply of potable water for a variety of purposes. Where such water was not available, sanitation can be a problem. Information concerning water supply to schools has been presented under "General services" section in Table 5.6. The results show that about 60 percent of the schools had piped water, a well or a borehole. The rest had to rely on springs and streams as their water sources.

What was the availability of school buildings?

Information concerning the availability of school buildings for different purposes has been presented in Table 5.6. It can be seen in the table that

What was the repair status of the buildings and provision for toilet facilities in schools?

In some countries, poor maintenance of school buildings often results in the deterioration of the structures to a point where they are unsafe or unsuitable for use. School heads were asked if in their view their school buildings needed to be completely rebuilt, needed major repairs, a lot of minor repairs, only a few minor repairs or if the building was in a good condition. The percentages of pupils in schools in the first two categories (needing a complete rebuilding or major repairs) were then calculated and presented in Table 5.7. Heads were also asked about the number of toilets they had. The number of toilets was then divided by the total number of pupils in the school to get the number of pupils per toilet. Where schools operated a double-shift system, the number of pupils in the largest shift was used in the calculation. The results have also been presented in Table 5.7.

Table 5.7. General condition of buildings and toilet facilities

Region	Need repair		Toilet provision	
	%	SE	Mean	SE
Central	75.6	7.68	130.8	32.95
Eastern	82.6	6.93	118.0	19.36
Northern	73.6	9.19	156.7	33.85
South Western	83.5	8.45	142.8	34.24
Western	74.1	10.16	126.9	30.39
Uganda	78.4	3.67	133.2	13.09

Nationally, 78.4 percent of pupils in Primary 6 were in schools that needed complete rebuilding or major repairs, with the highest percentage being in South Western Region (83.5%) while Western Region had the lowest (74.1%). This was as a result of the bulge in the number of pupils following the introduction of Universal Primary Education in 1997. It can be seen that the provision of good school buildings is of major concern in the country.

Policy suggestion 5.3: The Education Planning Department should, as a matter of urgency, and in collaboration with other ministries, communities, local authorities and other stakeholders, put in place and implement a school rehabilitation programme. Furthermore, all school heads should be provided with training in school maintenance so that the life of existing buildings can be lengthened.

It can also be seen from the figures presented in Table 5.7 that a Primary 6 pupil was in a school where there was an average of 145.2 pupils per toilet. There was considerable variation in toilet provision across regions ranging from a low ratio of 124.1 pupils per toilet in Eastern region to a high ratio of 176.1 pupils per toilet in Northern region. The problem of toilets in African countries takes several forms ranging from the total absence of toilets to the provision of unhygienic toilets. By any standards, 145 pupils per toilet reflects under-supply. The Government of Uganda under the school facilities grant allocates a capitation grant to districts for constructing classrooms, toilets and teachers houses. Therefore the toilet conditions can be improved in primary schools of a larger portion of the grant is set aside for the construction of additional toilets..

Policy suggestion 5.4: The Education Planning Department should conduct a national audit of toilet facilities in schools, and where they are found to be inadequate, the support of local communities and other stakeholders should be mobilised in order to improve the pupil-toilet ratio.

What was the classroom space available for pupils?

In order to work comfortably, each pupil must have sufficient space for himself or herself. Overcrowding is also unhygienic, and can contribute to the rapid transmission of communicable diseases. In order to calculate the mean classroom space per pupil, the area (in square metres) of permanent and temporary structures was summed for the school as a whole and then divided by the number of pupils in the school. The results have been presented in Table 5.8.

Table 5.8. Means and sampling errors of the classroom space available per pupil

Region	Classroom space	
	Mean	SE
Central	0.9	0.30
Eastern	1.8	1.00
Northern	0.4	0.09
South Western	0.6	0.09
Western	2.0	0.78
Uganda	1.2	0.32

The average classroom space for Uganda was 1.2 square metres with the Western Region having the highest score of 2.0 and the Northern region with the lowest score of 0.4. Normally, 1.5 square metres per pupil is expected, and therefore it is clear that there are major problems of overcrowding in the Central, Northern, and South Western Regions.

Policy suggestion 5.5: The Education Planning Department should, in collaboration with other ministries, communities, local authorities and other stakeholders, formulate and implement plans for reducing overcrowding in classrooms through the construction of additional classrooms in targeted regions and schools.

General Policy Concern 16: What were the school heads' opinions about daily activities, organizational policies, inspections, community inputs, behavioural problems with pupils and staff?

There are many aspects to managing a school. Under this general policy concern several aspects of running a school have been grouped together in order to have a picture of some of the key areas of responsibility for head teachers.

What amount of teaching did school heads undertake?

It can be argued that school heads with more teaching and administrative experience will be better informed about the operation of schools and, therefore will be more effective in managing them and providing leadership to the whole of the school community than the less experienced ones. Furthermore it can be argued that school heads who actually teach in their schools as part of their regular duties will be in a better position to keep abreast of the teaching and learning activities in their schools than those who do not. Information was therefore collected on the weekly teaching load of school heads and the information has been presented in Table 5.9.

Information concerning the headteachers' weekly teaching load in minutes has been summarized in Table 5.9

Table 5.9. Means and sampling errors for the school heads' weekly teaching load

Region	School head teaching minutes per week	
	Mean	SE
Central	486.3	89.52
Eastern	399.3	54.40
Northern	564.4	96.34
South Western	734.8	163.80
Western	401.4	107.82
Uganda	502.9	42.87

From Table 5.9 it can be seen that the Primary 6 pupils had headteachers with an average weekly teaching load of 502.9 minutes (just over eight hours). There was considerable

variation of this statistic among regions, ranging from 399.3 minutes in Eastern Region to 734.8 minutes per week in South Western region. The values were associated with very big sampling errors, suggesting that they were quite unstable. One major reason for the large variations in the schools heads' number of teaching hours could possibly be a shortage of teachers in a particular school. In this case the school head may be compelled to teach more periods per week. Regions like South Western and Northern Regions, which had insurgency in 2000, had fewer teachers and hence school heads were obliged to teach more periods than was the case under normal circumstances.

What level of importance did school heads attach to activities such as community contacts, monitoring pupil progress, administrative tasks etc?

The role of the school head is associated with the execution of a variety of tasks. The amount of time and effort different school heads invested in the different tasks reflected the importance they attached to each. Six of these tasks were listed and school heads were requested to indicate the tasks that they considered to be "very important". The results from the school heads' ratings have been presented in Table 5.10.

Table 5.10. School heads' views regarding the importance of various managerial responsibilities

Task	Percentage rating as 'Very important'	
	Percentage	SE
1. Contact with community	90.1	2.69
2. Monitoring pupils progress	90.9	2.63
3. Administrative tasks	96.7	1.49
4. Discuss educational objectives with the teaching staff	85.9	3.02
5. Professional development (Teachers)	88.0	2.77
6. Professional development (School Heads)	98.6	1.20

Results from Table 5.10 showed that administrative tasks (96.7%) and professional development for school heads' (98.6%) were considered to be very important responsibilities by the largest percentage of school heads. Nevertheless, all the other four

tasks were also highly rated by the headteachers. Interestingly, the lowest percentage of school heads gave the need to discuss educational objectives with their teaching staff.

What was the incidence of special school functions such as a school magazine, Public speech day, “open days” etc?

Schools that are effective tend to include as part of their educational programme some activities that provide pupils with enhanced learning opportunities. Four of these (school magazine, public speech day and open days and formal debates or debating contests) were listed and school heads were asked to indicate whether they had each one of them in their schools. Information concerning the presence of each of these school activities has been presented in Table 5.11.

Table 5.11. Percentages and sampling errors for the special school functions

Activity	Percentage of special school functions	
	Percent	SE
School Magazine	12.3	2.67
Public Speaking Day	45.2	4.44
Open Day	85.1	3.54
Formal Debates or Debating Contests	88.5	2.95

The results in Table 5.11 show that the majority of the pupil in Primary six (88.5 percent) participated in formal debates or debating contests while 85.1 percent of the pupils were in schools that had open days. It can be seen from the table that a smaller percentage of pupils (45.2%) were in schools that had held public speaking days while an even smaller percentage (12.3%) were in schools that had a school magazine to which the pupils contributed. School heads should consider having more of the school activities listed above and thus provide pupils with more opportunities for learning.

How many school days were lost in the last school year due to special school functions?

The school calendar is ordinarily designed taking into account the range of learning activities or the syllabus pupils must complete over a given period. When official days are lost due to participation in other non-learning activities, pupils are deprived of the chance to learn, and there is the risk that they may not complete the activities planned. Information concerning the average number of school days which were lost in 1999 arranging for special school functions has been presented in Table 5.12.

Table 5.12. Means and sampling errors for number of official school days lost

Region	Average of official school days lost	
	Mean	SE
Central	6.6	1.17
Eastern	10.7	1.20
Northern	13.3	2.23
South Western	6.9	1.54
Western	7.0	1.23
Uganda	9.1	0.69

Results presented in Table 5.12 show that, on average, 9 days were lost to the organization of special school functions in Uganda, with Eastern Region losing the most (13 days) and Central Region losing the least (7 days).

What was the Frequency of targeted school Inspection?

In almost all school systems, there are structures and mechanisms in place to ensure that schools are visited by inspectors from time to time. The purpose of such inspection visits may vary, and usually reflect the emphasis placed by those who plan and carry out such inspections. School heads were asked about how many times an inspector had visited

their schools for a particular purpose in the last three years. In Table 5.13 the percentages of pupils in schools that received at least one visit from inspectors in the last three years has been presented.

Table 5.13 Percentages and sampling errors for school inspections

Purpose of inspection	Inspection took place in past 3 years	
	%	SE
Full inspection	85.3	3.30
Routine inspection	67.9	4.41
Inspect teachers – <u>not</u> for promotion	37.5	4.38
Inspect teachers – <u>for</u> promotion	11.7	2.63
Assist teachers	60.7	4.44
Advise the school head	55.6	4.58
Address crisis/problem	26.4	3.96
Courtesy call	53.0	4.58

It can be seen from Table 5.13 that the largest percentage of pupils (85.3%) were in schools that had had a full inspection. About a third (67.9%) of the pupils were in schools that were visited at least once by the concerned officials on routine inspection, and 60.7 percent were visited to assist teachers. Results from the table also show that few inspectors (11.7 percent) visited schools to inspect teachers for promotion or to address crises or problems. Rather they were perceived to be coming to the school in order to assist teachers and advising the school head. The pattern of visits by purpose appear to be in line with general expectations of inspection visits.

What was the contribution of the local community to the school?

The provision of facilities, equipment and services in schools can be substantially improved through contributions from parents and the local school community. There are many aspects of the school parents and communities can contribute to, depending on

need. School heads were asked to indicate, from a list of those provided, the aspects parents and school communities contributed to, and information concerning the type of contribution provided to the schools has been presented in Table 5.14.

Table 5.14. Parent/Local community contributions to the school

Type of contribution	Pupils in school with community contributing to	
	%	SE
Building of school facilities	79.4	3.44
Maintenance of school facilities	70.7	3.99
Construction/maintenance and repair of furniture/equipment	41.6	4.38
The purchase of textbooks	13.1	2.91
The purchase of stationery	14.9	3.19
The purchase of other school supplies	17.3	3.39
Payment of examination fees	14.6	3.13
Payment of the salaries of additional teachers	17.6	3.28
Payment of an additional amount of the salary of teachers	9.0	2.45
Payment of the salaries of non-teaching staff	28.9	4.05
Payment of an additional amount of the salary of non-teaching staff	8.2	2.41
Extra-curricular activities	27.9	4.02
Assisting teachers in teaching without pay	32.8	4.10
Provision of school meals	41.7	4.14

From Table 5.14 it can be seen that the majority of pupils (over 70 percent) were in schools where parents and communities contributed to the building and maintenance of school facilities. About 41 percent of the pupils were in schools where parents helped with the making and repairing of furniture and the provision of school meals. Appreciable percentages (32.8% and 27.9%) assisted teachers in teaching without payment and helping with extra-curricular activities respectively, while 28.9 percent provided payment

for non-teaching staff. All other forms of contributions attracted percentages of less than 20 percent.

What were the main behavioral problems of pupils?

Issues of school discipline among pupils and teachers are important because, in many cases, poor discipline is associated with disruptive behaviour or with behaviour that goes against the values promoted by the school. In extreme cases, some of the behaviour may be a threat to the welfare of pupils and teachers. Several types of behavioural problems that are sometimes encountered in schools were listed. School heads were then asked how frequently the problem occurred. The results have been presented in Table 5.15. The figures reflect the percentages of pupils in schools where the school heads indicated total *absence* of a given type of behavioural problem.

For the first item, arriving late at school, it can be seen that the figure given is 1.6. This means that 1.6 percent of the pupils were in schools where the head said that pupils arriving late at school was never a problem. This means that 98.4 percent of pupils were in schools where it was something of a problem. If 20 percent is taken as a cut-off point meaning that at least 80 percent of pupils were in schools where the problem existed, then arriving late at school, absenteeism, dropping out of school, theft, fights and health were major problems. It was worrisome too to observe that 60 percent of pupils were in schools where intimidation of pupils occurred.

Table 5.15. Pupil behavioural problems

Frequency of pupil behavioural problem	Indicating 'never' occurs	
	%	SE
Arriving late at school	1.6	1.10
Skipping classes	28.1	3.90
Dropping out of school	6.7	2.18
Classroom disturbance	14.9	3.44
Cheating	32.2	4.22
Use of abusive language	23.7	3.86
Vandalism	33.3	4.21
Theft	14.8	3.31
Intimidation of pupils	38.4	4.30
Intimidation of teachers/staff	52.4	4.51
Physical injury to staff	71.9	4.18
Sexual harassment of pupils	58.5	4.44
Sexual harassment of teachers	81.0	3.62
Drug abuse	72.9	4.07
Alcohol abuse	71.6	4.06
Fights	13.7	3.38
Health problems	6.8	2.45

From the table above, it can be seen that the most prevalent problems were the following: arriving late for school, health problems, dropping out of school, fights, theft and classroom disturbance. In each of these cases, less than 15 percent of the school heads indicated that these problems never occurred. While the percentages reporting the absence of drug abuse, alcohol abuse, sexual harassment of pupils and intimidation of staff were fewer, it must be borne in mind that these are more serious problems, and might also require attention. In some cases, problems such as arriving late at school, skipping classes and dropping out of school are rarely absent in any school, but they can

be reduced through relatively simple measures. Others are more serious but less frequent, and require a more complex set of interventions.

Some school heads may have overemphasized the problems but there are sufficient numbers of pupils in schools where the above-mentioned problems occurred frequently enough to warrant a special investigation into the nature of this problem with a view to finding remedies.

Policy suggestion 5.6: The Ministry of Education and Sports must conduct a study to establish the nature and seriousness of the different behavioural problems among pupils and recommend measures to reduce them.

What were the main behavioural problems of teachers?

Similar behavioural problems can also be common among teachers, and their effect are similar to pupils'. School heads were therefore asked about behavioural problems associated with teachers in their schools, and the results have been presented in Table 5.16. Once again, the percentages presented are of pupils in schools where the school head stated that the problem never occurred

Table 5.16. Teacher behavioural problems

Frequency of teacher behavioural problem	Indicating 'never' occurs	
	%	SE
Arriving late at school	8.9	2.77
Absenteeism	17.6	3.52
Skipping classes	45.7	4.53
Intimidation or bullying of pupils	67.6	4.10
Sexual harassment of teachers	82.2	3.51
Sexual harassment of pupils	83.0	3.41
Use of abusive language	57.8	4.55
Drug abuse	76.6	3.86
Alcohol abuse	63.1	4.28
Health problems	10.3	2.69

It can be seen that the major problems for teachers were late coming (91.1%), health problems (89.7%), and absenteeism (82.4%). In several ways, the pattern is similar to pupils'. Results indicated that in 54.3 percent of the schools, teachers skipped classes, and this raises concern. With such bad role models, it is difficult for pupils adopt positive behaviours such as not coming late to school, not being absent and not dropping out of school..

Policy suggestion 5.7: The Ministry of Education and Sports must conduct a study to establish the nature and seriousness of the different behavioural problems among teachers and recommend measures to reduce them.

Conclusion

In this chapter, a variety of information about the school heads has been presented. Only about 15 percent of the pupils had a female school head and the average pupil had a school head who was 42.7 years old, had 18.7 years of teaching experience, and had

received teacher training over a period covering 3.4 years. The good news was that very few Primary 6 pupils had school heads that had primary level education as their highest level of education (1.9 percent), and these were located in Central, Eastern and Northern Regions. This is so because before 1980 the minimum academic qualification for a teacher was Primary 7. Those who entered teacher education had to complete four years in a teacher training college and then graduate as a Grade II teacher. When Grade II was phased out in 1980 all Grade II teachers were allowed to up-grade to Grade III and even beyond. This seems to have paid dividends. At least 95 percent of pupils had school heads in 2000 who had completed Senior Secondary School, with 45.2 percent completing 'O' Level, 39.7 percent completing 'A' Level and 10.3 percent completing tertiary education. Information obtained from the survey also showed that majority of school heads received specialized training in school management through TDMS.

Both pupils and teachers arrived late to school, were frequently absent, and had health problems. The other problems of a serious nature were less common but prevalent, and there was need to gain a deeper understanding of these behavioural problems in order address them effectively.

The majority of the Primary 6 pupils were in schools where parents participated in the building of school facilities (79.4%), the maintenance of school facilities (70.7%), and contributed to the provision of school meals (41.7%).

On their role as school heads, school heads rated the performance of administrative tasks as their most important activity.

Ninety-five percent of pupils were in schools that had a library, 20.1 percent had a school hall, 50.5 percent had a staff room, 61.4 percent had a school head's office, 36.1 percent had a storeroom and 13.5 percent had dining hall. However, the provision of other equipment was very low and schools must make an effort to acquire these. Nevertheless, the major constraint with some of the equipment that is electrically operated might be the non-availability of electricity in some areas. On average there were 145 pupils per toilet,

and each Primary 6 pupil had an average space of only 1.2 square metres. The provision of these two facilities must be a major concern to the Ministry.

There is much to be done to improve primary schools and schooling in Uganda and throughout the chapter several suggestions for improving the system were made. These have been addressed in greater detail in Chapter 8.

Chapter 6

Equity in the Allocation of Human and Material Resources among the Regions and Among Schools within Regions

Introduction

One of the Education and Sports Sector's strategic objectives is to achieve an equitable distribution of human and material resources among regions and among schools within the regions. This is aimed at ensuring that all children of school going age have an equal opportunity to quality learning. In this chapter, an examination has been made of the existing pattern of resource allocation across the schools in the different regions. Such inter- and intra-regional analyses will help locate the level at which decisions must be taken in order to address any uneven distribution of resources that might have been observed. The key variables that were analyzed include human resources (the distribution of teachers and school heads by qualification and experiences) and material resources (such as classroom materials and school facilities). Such information is also important for the future as the Ministry may want to see if there is an improvement or deterioration in equity over time.

Approaches used to measure equity

Two statistical techniques have been used to explore variations in human and material resources in the education system where the Primary 6 pupils in Uganda participated in 2000. The first technique uses the ratio of standard deviations to compare the variation of resources among schools in a region with the variation among schools at the national level. The second technique uses a coefficient of intraclass correlation called rho to determine the percentage of variation in a resource distribution among schools in a region that can be attributed to variation among the regions.

(a) Variations among Regions

The coefficient of intraclass correlation is used to measure the amount of variation that can be attributed to variation among the regions.

The value of the coefficient (rho) varies between zero and one. A numerical value of zero percent in the variation means that none of the variation among the schools can be attributed to variation among the regions. A rho value of 1.00 percent in the variation means that all the variation in the allocation of a particular resource among schools can be attributed to variation among the regions.

(b) Variations among schools within regions

It is also possible to quantify the differences among schools within a particular region by making a comparison with the variation among schools at the national level. This can be achieved by using the following formula:

$$\text{Variation among schools} = \frac{\text{Standard deviation for schools in a region}}{\text{Standard deviation for schools in the country}} \times 100$$

The standard deviation of an indicator or resource index for a particular region measures the amount of variation among schools within that region, whereas the standard deviation for the whole country measures the amount of variation among schools in the country. The ratio of the two standard deviations, expressed as a percentage, provides a measure of equity in the region compared to the national picture.

General Policy Concern 10: Have human resources been allocated in an equitable fashion across regions and among schools within regions.

The figures presented in this section show variations among schools within regions and among regions, which implies that for any given variable in the tables, variations of 120

or more portray an uneven distribution of individual items in question whereas lower figures portray a more equitable distribution of the same items in question.

Specific research question: Were qualified and experienced Primary 6 teachers and school heads distributed equitably among regions and among schools within regions?

The Ministry Education and Sports in conjunction with the Ministry of Public Service, develops a staff establishment ceiling for all districts depending on the available financial resources in the Mid-Term Budget Framework (MTBF) and enrolments in primary schools in the districts. The harmonized staff establishment ceilings are circulated to all the districts. The recruitment, deployment and posting of teachers is the responsibility of the district. The district service commission advertises for available posts in primary schools in districts in the media and interviews the candidates who apply. The successful ones are offered a letter of appointment. The District Education Officers post the appointed teachers to primary schools which have vacancies. The Ministry of Public Service places all the appointed teachers on the government payroll.

The results depict the situation regarding human resource allocation among regions. Where results portray a variation of teachers among schools within regions and between regions it means that there are deviations between independent individual schools within regions and between regions. The variations among schools have been transformed to a scale of 100 percent meaning that the interpretations in the table will relate to the standard national score of 100 percent.

Information concerning equity of human resource allocations as assessed by variation among schools within regions, and variation between regions has been presented in Table 6.1.

Table 6.1. Equity of human resource allocation as assessed by (a) variation among schools within regions, and (b) variation among regions

<i>Human resources</i>	Variation among schools within regions					Variation among regions
	Central	East	North	South Western	Western	(rho x 100)
Reading teacher prof. qualif.	129.3	86.5	102.9	96.5	56.6	0.0
Reading teacher experience	91.3	81.0	138.9	107.1	88.9	0.0
Math. teacher prof. qualif.	133.0	77.8	80.0	98.4	104.4	0.0
Math. teacher experience	88.4	82.9	110.8	79.7	139.8	0.2
School head prof. qualif.	98.8	86.7	83.4	123.2	119.6	1.5
School head experience	102.1	100.8	97.6	117.9	77.2	0.9
Inspectors/advisors visits for reading teachers	102.3	99.9	99.8	100.0	91.8	1.5
Inspectors/advisors visits for mathematics teachers	116.4	96.3	95.4	90.9	84.5	0.5
Pupil/teacher ratio	66.4	109.0	103.8	51.2	145.1	1.0

It can be seen from the results presented in Table 6.1 that the variation in the allocation of human resources among regions was very low as reflected by the small rho values. The highest value was only 1.5. What we may conclude is that human resources are generally equitably distributed among the regions. However, results from the same table concerning variations among schools within regions indicated that the central region had a lot of variation with regard to both reading (129.3) and mathematics (133.0) teacher qualifications. Northern and Western Regions had a high variation of 138.9 for reading teacher experience and 139.8 for mathematics teacher experience respectively. There was

also considerable variation in the allocation of school heads by professional qualification (123.2) among schools in South Western Region

Further analysis of the data in Table 6.1 shows that there was a lot of variation (145.1) in pupil/teacher ratio among schools in West Region. This implies that the pupil/teacher ratio in some of the schools within West Region is high. The most probable reason for high pupil teacher ratios in some schools as compared to others is the existence of marked rural/urban income differentials. Other reasons why some schools in some regions like the Central Region attracted many good teachers are:

- High remuneration packages for teachers;
- Better infrastructure in terms of classrooms and teachers houses;
- Better incentives in terms of other facilities in classrooms;
- Proximity to urban settings; and
- Access to social amenities.

Conversely, the civil war raging in Northern Region has discouraged teachers from opting to go and work there.

Policy Suggestion 6.1: The MoES must re-examine patterns in the allocation of qualified teachers and school heads in Central, South Western and West Regions and the allocation of experienced teachers in Western and North Regions and take corrective measures to ensure that there is greater equity.

Policy Suggestion 6.2: The MoES must redistribute teachers among schools in West Regions to ensure that there is greater equity in pupil/teacher ratios. Such an exercise should be supported by long-term measures to ensure that the under-staffed schools get more teachers when they become available.

General Policy Concern 11: Have material resources been allocated in an equitable fashion between regions and schools within regions?

The study also looked at the distribution of material resources to regions and among schools within regions.

The Government of Uganda initiated a School Facilities Grant (SFG) programme in 1999 to construct classrooms, teachers' houses, and toilets in all regions of Uganda. Furniture is also provided for the classrooms, which are built. It is the responsibility of the regions to allocate funds to the most needy areas within the regions according to their regional plans.

Specific Research question: Were (a) general school infrastructure, (b) classroom equipment, and (c) classroom teaching materials distributed equitably among regions and among schools within regions?

Information concerning the allocation of material resources has been presented in Table 6.2.

Table 6.2. Equity of material resource allocation as assessed by (a) variation among schools within regions, and (b) variation among regions (SACMEQ II)

Material resources	Variation among schools within regions					Variation among regions (rho x 100)
	Central	East	North	South Western	Western	
Classroom furniture index by reading teacher	100.9	86.6	91.3	120.9	115.6	0.0
Classroom furniture index by mathematics teacher	117.5	90.4	89.4	108.9	101.7	0.0
Toilets per pupil	89.1	76.0	146.7	77.6	99.3	0.0
Classroom library by reading teacher	104.4	89.8	113.0	93.5	100.7	0.0
Classroom library by mathematics teacher	95.4	87.4	113.6	101.5	100.1	2.1
Classroom space per pupil	19.1	99.7	11.8	4.9	219.2	1.4
Reading teacher housing quality	112.8	72.0	98.6	105.0	114.0	2.1
Mathematics teacher housing quality	138.2	89.5	28.9	89.7	106.2	5.4
School resources index	120.2	85.8	79.8	94.1	113.0	0.0

As can be seen from Table 6.2 the rho values of regional variation among regions for all the listed resources are either zero or very small. The highest was 5.4. This implies that there was very little variation in material resource allocation across the regions. At the same time, it has been noted in Chapter 4 that for many of the items listed the provision was very low. Thus, the equity measures indicate that they all had a very low provision.

Central Region had a high variation (138.2) for mathematics teacher housing quality. In Northern Region, figures show that there was a lot of variation (146.7) for pupils per toilet. There was also a very big variation in classroom space in schools in Western

Region (219.2), and this is a critical issue that requires the attention of the Ministry of Education and Sports.

Policy suggestion 6.3: The Ministry of Education and Sports must give attention to the serious inequities in the provision of toilet facilities in Northern Region and of classroom space in the Western Region and take measures to address this problem by to put up additional toilets and classrooms in those areas and schools where there is an under-supply of these facilities.

Conclusion

The findings in this chapter show that, for both human and material resource provisions, intra-regional disparities were more pronounced than the imbalances among regions. Such disparities appear to be a reflection of the differences in income disparities between the rural and urban people. The economic gap between the poor and the rich is greatest within regions that have many urban centres or towns.

Since the labour market is demand driven, most of the well qualified and experienced teachers and school heads are more attracted to the those regions that have urban centres. Within these same regions, there are also rural areas that cannot meet attract qualified and experienced teachers and school heads. The end result is that there will be, within the same region, a mixture of some schools with highly qualified and experienced teachers as well as school heads and other schools with poorly qualified and relatively less experienced teachers and school heads. This explains why inequalities are more conspicuous in more urbanized regions such as Central Region as compared to other regions.

The other factors that d affect the distribution of teachers within regions include the presence of good infrastructure in terms of roads and public amenities as well as access to services such as electricity, piped water, telephones, and others. In the case of Northern Region, intra-regional variation in both qualified and experienced reading and

Uganda Chap6

mathematics teachers were high because of instability in the region. As has already been mentioned, security is an issue in this troubled region.

Chapter 7

The Reading and Mathematics Achievement Levels of Pupil and their Teachers

Introduction

The sixth goal of the Dakar World Education Forum states the need for all countries to make efforts at “improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and life skills”. UNESCO, 2000:17. The main focus of this chapter is on pupils’ and their teachers’ achievement in reading and mathematics tests. While the results presented in this chapter cannot certainly be used as the basis for definitive statements on the quality of education in Uganda, they provide some valuable information on learning outcomes of Primary 6 pupils and their teachers.

Three ways of reporting the test scores

The performance results of Primary 6 pupils have been presented in three different ways.

First, achievement has been presented in the form of mean scores against (a) all items and (b) against a subset of items which were identified by Ugandan reading and mathematics specialists as being “essential” or central to Uganda’s curriculum and its context. It must be noted, however, that the correlation between pupils’ and teachers’ scores on “all items” and their scores on “essential items” was so high (over .98) that it did not matter which score one used to assess levels of achievement. This is the traditional approach to reporting on achievement.

Secondly, achievement has been presented in the form of the percentage of pupils and teachers reaching the “minimum” and “desirable” level of competence. As the tests were based on the syllabi of several countries, there was a need for each country to allow its own reading and mathematics specialists to identify those reading and numeracy items that a learner/pupil should be able to master if he or she is to barely manage to undertake a successful programme of study at Primary 7 (minimum level) or if he or she is to be guaranteed of success at Primary 7 (desirable level). This criterion was chosen as it was argued that in the tenth month of the school year, Primary 6 pupils should have acquired the reading and numeracy skills that would allow them to continue their studies successfully in Primary 7. This form of reporting on achievement is based on comparisons with expert judgements.

Lastly, results on pupils' and their teachers' achievement in reading and mathematics have been presented in the form of "competence levels". This third approach was based on a scaling technique known as the *Rasch Model*. This technique enabled the ability levels of pupils and teachers to be aligned with different levels of test items according to a probabilistic linkage between person ability and item difficulty. This made it possible to place the test items along a "difficulty" dimension and then group them into "clusters" that were linked to common groups of skills. The cluster of test items were then examined and described in terms of the specific skills that were required for pupils to provide correct responses. This enabled the pupil and teacher performances to be aligned with one of eight levels of "competence" in reading and mathematics.

Furthermore, for each of these approaches measures of achievement have also been presented for the different subgroups, namely, boys and girls, urban and rural pupils, and pupils from different socio-economic backgrounds. The details regarding each of the three approaches used to measure achievement as well as the steps taken in the development of the tests have been presented in Chapter 2.

What were the levels in the achievement levels of Primary 6 pupils and their teachers in reading and mathematics?

The results for the country as a whole and for the regions have been presented in Table 7.1. The mean for all countries in SACMEQ was 500 and the standard deviation was 100.

Table 7.1. Means and sampling errors for the reading and mathematics test scores of pupils on all items

Region	Pupil performance on all items			
	Reading		Mathematics	
	Mean	SE	Mean	SE
Central	491.8	15.23	526.6	21.76
Eastern	492.3	10.73	517.3	13.94
Northern	468.4	6.92	485.4	20.71
South western	482.6	20.55	505.4	17.37
Western	457.3	11.32	465.4	9.06
Uganda	482.4	6.12	506.3	8.17

It can be seen from Table 7.1 that the overall national mean score for reading was 482.4, which was below the SACMEQ mean of 500. For mathematics, the mean score was 506.3 which was slightly higher than the SACMEQ average of 500. There were some variations in mean scores amongst regions. In reading, pupils in Eastern Region had the highest mean score (492.3) and Western Region had the lowest (457.3). For mathematics, Central Region had the highest mean score (526.6) and Western Region had the lowest (465.4).

The mean scores for teachers for reading and mathematics have been presented in Table 7.2.

Table 7.2. Means and sampling errors for the reading and mathematics test scores of teachers¹

Region	Teacher performance on all items			
	Reading		Mathematics	
	Mean	SE	Mean	SE
Central	702.9	14.85	820.3	15.49
Eastern	682.9	18.46	794.8	27.27
Northern	720.1	19.15	824.0	15.03
South western	681.2	23.33	847.6	50.80
Western	694.8	13.67	875.9	34.93
Uganda	695.8	8.61	822.9	12.17

It can be seen that the average teacher score for reading was 695.8 and for mathematics it was 822.9. The teachers in Northern Region performed better than the teachers in other regions in reading while it was the teachers in Western Region that performed best in mathematics.

It was expected, of course, that teachers' mean scores would be higher than those for the pupils they teach. However, it can also be seen that the teacher scores have little to do with the pupil scores by region. That is, one would expect the region with the highest scoring pupils to also have the highest scoring teachers. For example, teachers in Western Region had the highest mathematics score that was 375.9 points above the SACMEQ average. However, the pupils in this region had the lowest score. Similarly, the reading mean score for teachers' in Northern Region was the highest, but the mean score for pupils in this region was the second from the bottom. This pattern is unusual, and the reasons for this need to be investigated.

Policy suggestion 7.1: The Director of Education Standards Agencies (ESA) should investigate the reasons why there is a negative correlation between teachers' scores and their pupils' scores.

¹ Because the scores had been 're-scaled' with 14 countries, the Mean scores can not be compared with the tables of MINEDAF paper.

In this survey, Primary 6 pupils were categorised by gender, by socio-economic status groups (defined by having above average number of possessions (High SES) and below average number of possessions (Low SES)), and by school location as stated by their school head. The purpose was to explore whether these factors were associated with the performance of pupils on both the reading and mathematics tests. In Table 7.3, Primary 6 pupils' mean scores have been presented for each of the socio-economic status and school location groups.

Table 7.3. Means and sampling errors for the reading and mathematics test scores of pupils by sub-groups (SACMEQ II)

Sub-groups	Pupil performance on all items			
	Reading		Mathematics	
	Mean	SE	Mean	SE
<i>Gender</i>				
Boys	479.6	5.71	508.1	7.62
Girls	485.9	8.31	504.0	11.46
<i>Socio-economic level</i>				
Low SES	472.3	5.84	496.3	9.21
High SES	495.5	8.49	519.2	10.52
<i>School location</i>				
Isolated/Rural	475.0	6.69	498.5	8.70
Small town	508.8	16.94	544.4	26.15
Large city	520.9	30.76	508.6	21.90
Uganda	482.4	6.12	506.3	8.17

In Table 7.3, it can be seen that, on average, girls' performance in reading was better than that of boys. The average performance for girls was 485.9 yet that for boys was 479.6. The difference was, however, not statistically significant. In mathematics, the pattern in performance was reversed, with boys marginally outperforming girls. Once again, the difference was not statistically significant.

Pupils from the upper socio-economic status subgroup performed better in the reading tests with an average score of 520.1 than those in the lower socio-economic group whose score was 467.0. In addition, the results also show that the best performing schools were those in the urban locations possibly because there were more facilities and access to other services that enhanced their learning opportunities. In mathematics, pupils from the higher socio-economic group scored higher than those from the lower socio-economic group, and the pupils from urban areas similarly scored higher than those from rural areas. This pattern was expected.

Policy suggestion 7.2: The Director of Education Standards Agency needs to investigate the large gaps in pupil achievement levels between rural-isolated schools and schools in large cities with the aim of finding ways of improving the achievement levels of pupils in schools located in rural and isolated locations.

What percentage of pupils reached minimum and desirable levels of mastery in reading?

In SACMEQ 1 it had been possible to have reading experts in the different countries agree on the number of items that should be mastered if pupils were to be considered as having reached the minimum mastery level and the number of items to be mastered if the pupils were to be considered as having reached the desirable levels of mastery. The average for all the countries in SACMEQ 1 was used in each case for SACMEQ II countries. The results have been presented in Table 7.4.

Table 7.4. Percentages and sampling errors of pupils reaching minimum and desirable levels of mastery in reading

Region	Pupils reaching minimum level of mastery		Pupils reaching desirable level of mastery	
	%	SE	%	SE
Central	38.1	7.18	15.8	4.18
Eastern	42.1	5.05	10.3	3.44
Northern	30.7	3.74	3.3	1.13
South western	31.5	8.01	10.5	6.02
Western	24.9	5.27	6.2	2.77
Uganda	35.4	2.79	10.0	1.76

From Table 7.4 it can be seen that nationally only 35.4 percent of the pupils were able to reach minimum level of mastery in reading and 10.0 percent were able to reach desirable level of mastery in reading.

An examination of the results for regions presented in Table 7.4 shows large variations among regions in terms of the percentage of pupils that had reached the minimum level of reading literacy. Eastern Region recorded the highest percentage (42.1) and Western Region had the lowest (24.9%).

Similarly with the desirable levels of mastery, Central Region still emerged best with 15.8 percent of the pupils reaching desirable levels of mastery and the worst being Northern Region with only 3.3 percent.

Policy Suggestion 7.3: The Director of Education Standards Agency in conjunction with Uganda National Examinations Board (UNEB) should come up with a policy to address the issue of low levels of mastery both for reading and mathematics subjects by identifying causes and recommending appropriate solutions.

Analysis of mastery levels by sub-groups

In Table 7.5 the results for the percentages of pupils reaching minimum and desirable levels of mastery have been presented for certain sub-groups. The first sub-groups to be examined were males and females. Other sub-groups broken down into different categories of socio-economic background and school location were also considered.

Table 7.5. Percentages and sampling errors of pupils reaching minimum and desirable reading levels of mastery by sub-groups

Sub-groups	Pupils reaching minimum level of mastery		Pupils reaching desirable level of mastery	
	%	SE	%	SE
<i>Gender</i>				
Boys	34.3	2.66	9.5	1.74
Girls	36.9	3.75	10.6	2.40
<i>Socio-economic level</i>				
Low SES	30.5	2.74	7.4	1.75
High SES	41.8	3.90	13.3	2.54
<i>School location</i>				
Isolated/Rural	31.4	2.89	7.9	1.94
Small town	49.6	8.57	17.2	5.11
Large city	58.4	16.48	20.4	6.89
Uganda	35.4	2.79	10.0	1.76

About 35 per cent of pupils reached the minimum mastery level and about 9 percent the desirable mastery level. There were no significant differences between boys and girls' percentages reaching mastery.

For the low socio-economic groups (0-3 possessions) only 30.5 of the pupils reached the minimum level, whereas for the very high socio-economic group (10-13 possessions) 41.8 percent of pupils reached the minimum mastery level.

For the desirable level of pupil performance only 7.4 percent of pupils in the lowest socio-economic group reached mastery and for the highest SES group the percentage was 13.3.

The third set of figures presented in Table 7.5 show that there were also major differences in reading performance when the pupils were classified according to whether their school was located in an isolated or rural area, a small town, or a large city. Major improvements in pupil performance were observed as the school location categories changed from isolated/rural school settings towards more urbanized settings. It is important to note that care must be exercised in interpreting these trends because of the possibility of confusion associated with differences in socio-economic levels among school locations. The results may simply reflect the fact that pupils in schools located in urban areas tend to come from more privileged backgrounds than those in schools located in rural locations.

All of the above analyses provide a preliminary glimpse of the relationships between reading literacy levels and other contextual factors. Clearly, further detailed analyses of these data are required before detailed policy suggestions related to the impact of particular inputs to schooling or reading literacy outcomes can be made.

Policy Suggestion 7.4: Ministry of Education and Sports must undertake further analyses of the SACMEQ data to determine factors which are associated with pupil achievement, with an attempt made to identify factors accounting for the big differences between schools. Thereafter, it must propose measures to improve achievement in those schools that have low performance in order to reduce the differences between schools.

What were the percentages of teachers reaching the mastery levels set for pupils?

The same mastery levels were used to examine the percentage of teachers reaching them and the results have been presented in Table 7.6.

Table 7.6. Percentages and sampling errors of teachers reaching minimum and desirable reading levels of mastery

Region	Teachers reaching minimum level of mastery		Teachers reaching desirable level of mastery	
	%	SE	%	SE
Central	92.4	3.67	80.6	5.57
Eastern	85.5	6.09	75.2	6.88
Northern	94.8	3.89	89.6	4.66
South western	81.9	6.26	73.0	7.85
Western	95.5	2.37	86.5	5.42
Uganda	89.5	2.41	80.2	3.01

It can be seen from Table 7.6 that at the national level 89.5 percent of the teachers reached the minimum level of mastery in reading literacy and 80.2 percent reached the desirable level. However, this means that 10 percent did not reach the minimum level and 20 percent did not reach the desirable level. This is clearly a worrying result. One would expect that all teachers to attain both of the mastery levels used for pupils.

An examination of the results for the regions presented in Table 7.6 show that there was not much variation among regions in terms of percentage of teachers that reached the minimum and desirable level of reading literacy.

Policy suggestion 7.5: There should be an in-built mechanism for providing professional back-up support to the teachers who need to enhance their basic skills in reading and mathematics. This can be implemented through exposure to regular, highly targeted in-service courses that use teaching guides and the regular school curriculum.

What were the different competency levels in reading and mathematics for pupils and their teachers?

The different levels of achievement for reading and mathematics for Primary 6 pupils and their teachers have been presented in Tables 7.7 to 7.10 respectively and also shown pictorially in

Figures 7.1 and 7.2. There were no significant differences in the performance of pupils across regions except for Western region. The most probable reason for this low level of pupil achievement in Western Region could be the insurgency created by rebels. Most families in that area were continuously on the move from 1986 to 2002. Generally, this was disappointing in that about 47 percent and 70 percent of the pupils performed at Level 3 or below for literacy and mathematics respectively.

From the description of the levels in Chapter 2 it can be seen that those pupils at Levels 1 and 2 had still not reached literacy or numeracy. From Tables 7.7 and 7.8 it can be seen that 25.5 percent of pupils were at Levels 1 and 2 in literacy and 38.8 percent were at these levels in numeracy. That such large percentages of pupils were in Primary 6 but were still illiterate and innumerate should be a matter of concern to the Ministry.

For the teachers too, the picture was similarly disappointing in that 21 percent of them were at Level 6 or below in reading and 12.9 percent were at Level 6 or below in mathematics. Surprisingly, figures also show that 5.8 percent and 8.2 percent of the pupils performed better than 12.9 percent and 21 percent of the teachers in mathematics and reading respectively. This is a worrying reality.

The performance of pupils in reading and mathematics by level of competence has also been presented in the form of a graph in Figure 7.1. This performance assumes a similar pattern across all the regions, with the skewed distribution of pupils heavily tilted towards the lower levels of competence. For teachers, as expected, the graphs are skewed in towards the higher levels of competence.

Table 7.7. Percentages and sampling errors for literacy levels of pupils

Region	Percentage of pupils reaching the reading competence level															
	1		2		3		4		5		6		7		8	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Central	8.5	1.96	20.4	3.65	19.7	2.80	15.7	2.77	10.1	2.42	12.6	3.73	8.1	2.40	4.9	2.20
Eastern	4.4	1.32	15.5	2.73	21.4	2.51	21.3	2.64	19.3	2.74	9.7	1.73	5.9	2.14	2.4	1.38
Northern	7.6	1.58	16.6	3.01	24.2	3.23	26.1	3.04	18.4	2.91	5.1	1.26	1.3	0.64	0.7	0.52
South western	6.8	1.71	18.8	5.49	20.4	4.46	26.5	3.81	13.1	3.01	5.0	1.97	4.7	2.72	4.7	3.84
Western	11.7	3.18	23.1	2.72	25.6	3.00	20.8	2.46	9.7	2.75	3.3	1.18	4.9	2.08	0.9	0.54
Uganda	7.2	0.82	18.3	1.61	21.8	1.41	21.5	1.35	14.8	1.31	8.2	1.14	5.3	1.00	2.9	0.91

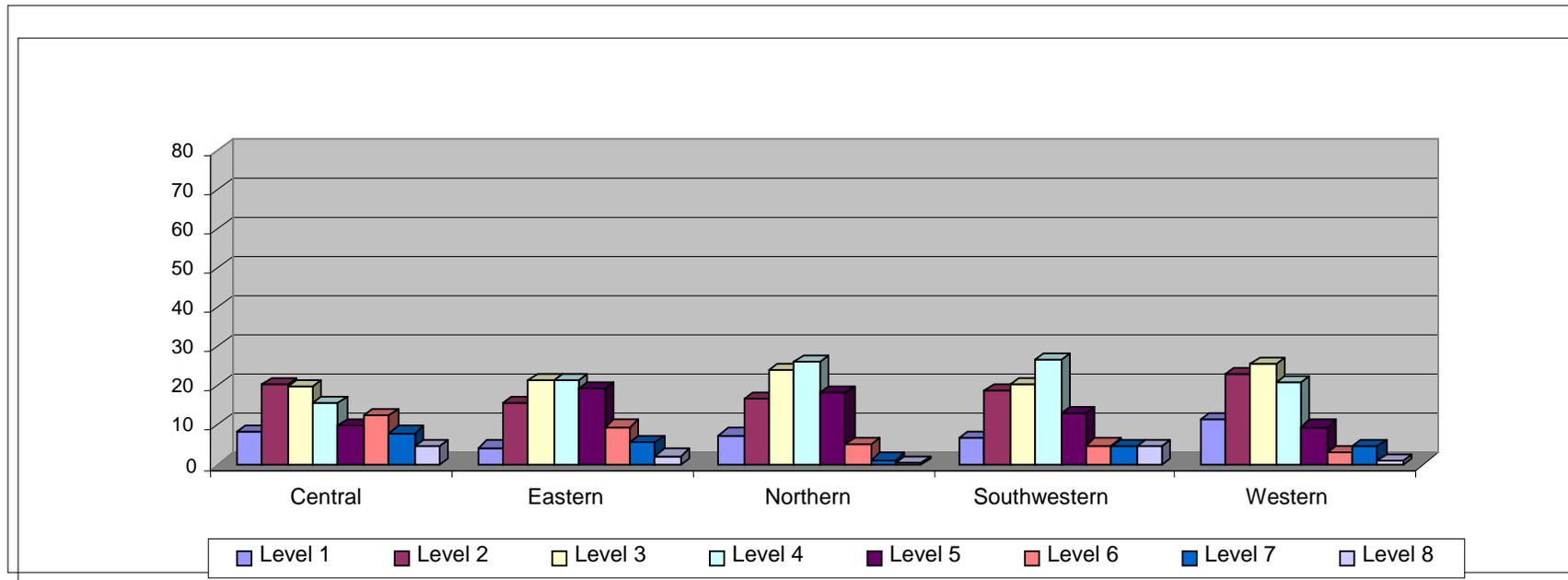


Figure 7.1: Percentage of pupils reaching the desired reading competence levels

Table 7.8. Percentages and sampling errors for numeracy levels of pupils

Region	Percentage of pupils reaching the mathematics competence level															
	1		2		3		4		5		6		7		8	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Central	6.8	1.70	30.9	4.72	26.4	3.46	8.9	2.00	6.0	1.62	9.6	2.75	10.9	4.53	0.5	0.34
Eastern	2.4	0.93	30.9	4.60	33.7	3.42	13.1	2.18	8.7	2.27	5.8	1.99	4.0	2.00	1.2	0.72
Northern	8.4	2.47	37.7	3.99	32.3	3.75	10.9	3.00	2.6	0.87	2.8	1.51	4.7	4.54	0.6	0.41
South western	3.6	1.32	27.6	5.26	37.7	4.35	19.0	3.94	6.1	3.05	3.7	3.08	2.3	2.32	0.0	0.00
Western	8.2	1.88	46.7	4.28	28.7	2.70	10.1	2.27	4.5	1.81	1.8	0.88	0.1	0.14	0.0	0.00
Uganda	5.4	0.73	33.4	2.17	31.6	1.68	12.3	1.19	6.0	0.96	5.5	1.05	5.2	1.55	0.6	0.24

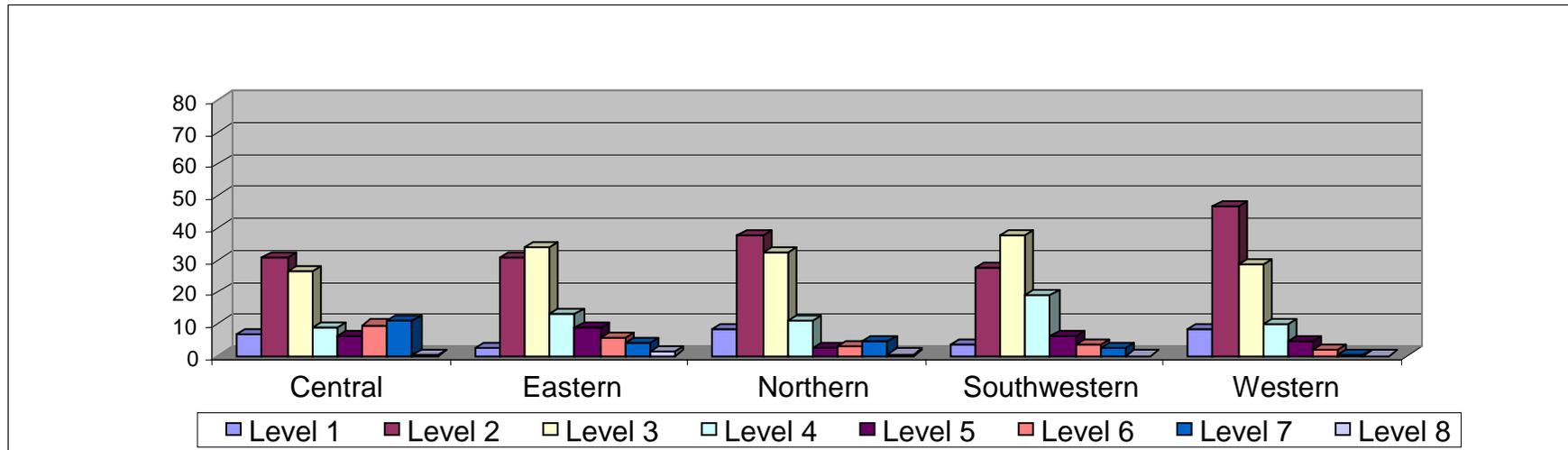


Figure 7.2: Percentage of pupils reaching the desired mathematics competence levels

Table 7.9. Percentages and sampling errors for literacy levels of teachers

Region	Percentage of teachers reaching the reading competence level															
	1		2		3		4		5		6		7		8	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Central	0.0	0.00	0.0	0.00	0.8	0.77	6.8	3.63	7.4	3.86	4.5	3.17	16.7	6.27	63.8	7.72
Eastern	0.0	0.00	0.0	0.00	1.6	1.59	12.9	6.05	7.1	4.21	4.9	2.96	22.9	6.82	50.6	7.42
Northern	0.0	0.00	0.0	0.00	0.0	0.00	5.2	3.89	3.8	2.27	4.6	3.54	13.7	6.53	72.7	8.77
South western	0.0	0.00	0.0	0.00	5.6	3.87	12.6	5.92	8.9	6.75	0.0	0.00	28.8	11.61	44.1	10.31
Western	0.0	0.00	0.0	0.00	1.0	1.05	3.5	2.09	5.1	3.00	3.8	3.87	34.5	12.51	52.0	12.15
Uganda	0.0	0.00	0.0	0.00	1.6	0.77	8.9	2.37	6.6	1.95	3.9	1.43	21.9	3.65	57.1	4.06

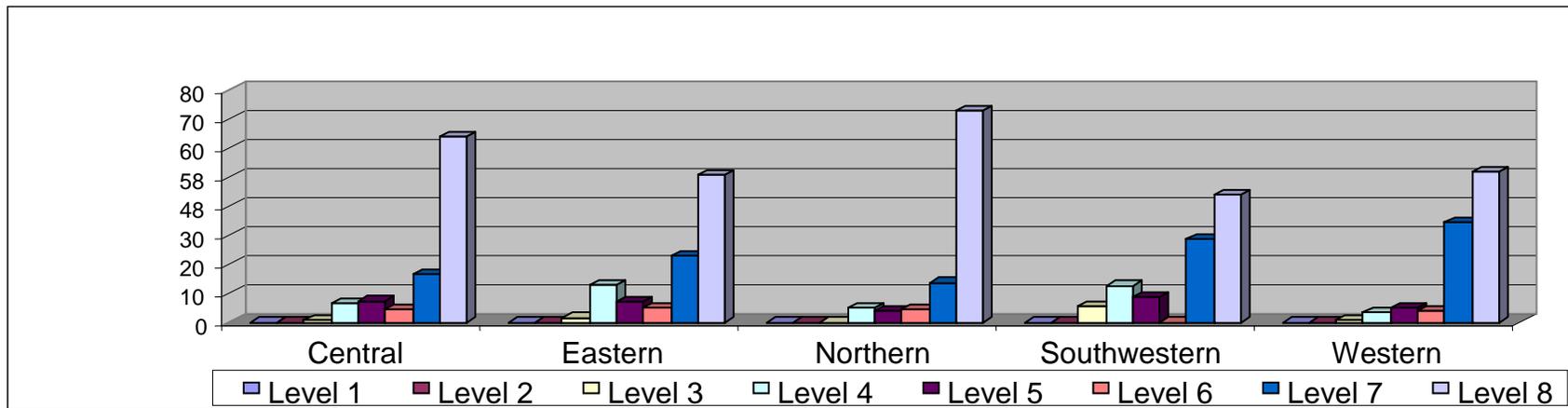


Figure 7.3: Teachers' levels of competence in reading

Table 7.10. Percentages and sampling errors for competence levels of teachers in numeracy

Region	Percentage of teachers reaching the mathematics competence level															
	1		2		3		4		5		6		7		8	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Central	0.0	0.00	0.0	0.00	0.0	0.00	2.5	2.48	0.0	0.00	9.3	5.27	38.2	10.69	50.0	10.39
Eastern	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	9.8	6.11	22.1	9.66	22.3	8.03	45.8	10.39
Northern	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.7	0.74	9.2	6.56	37.2	11.56	52.9	11.61
South western	0.0	0.00	0.0	0.00	0.0	0.00	4.8	4.92	13.2	13.54	0.0	0.00	17.3	10.83	64.7	16.13
Western	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	4.0	4.09	4.0	4.09	15.0	10.87	77.1	12.82
Uganda	0.0	0.00	0.0	0.00	0.0	0.00	1.2	0.84	5.3	2.53	11.4	3.59	27.9	4.78	54.2	5.32

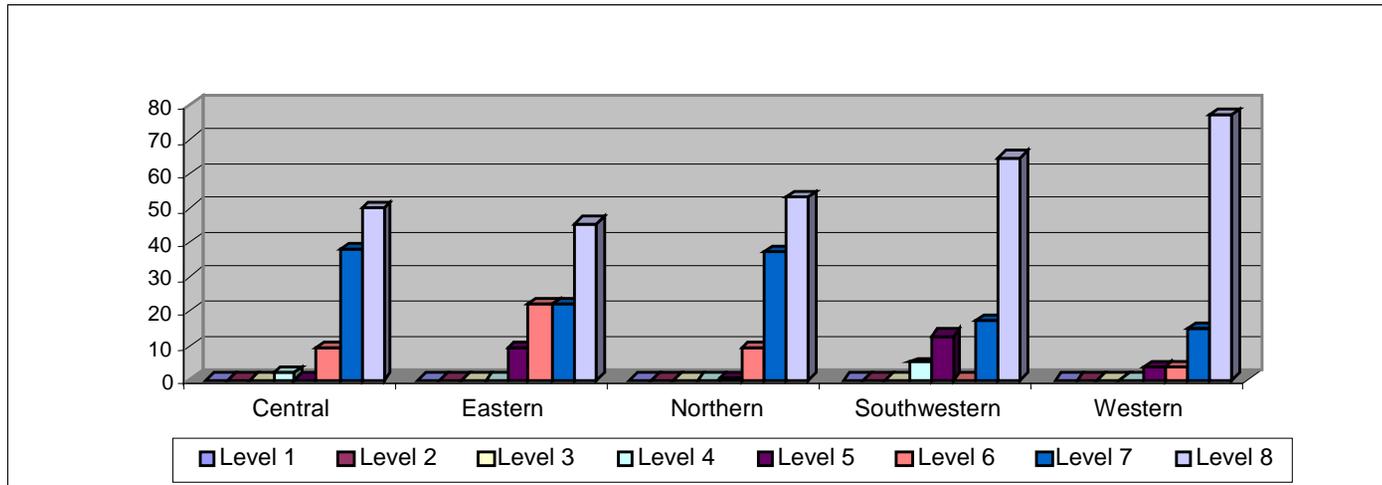


Figure 7.4: Percentage of teachers reaching the desired mathematics competence levels

What were the Reading and Mathematics achievement levels of important sub-groups of Primary 6 pupils?

The study also categorized the levels of achievements of the Primary 6 pupils in terms of gender, socio-economic level and location. The results for literacy and numeracy levels have been presented in Tables 7.11 and 7.12.

Looking at the figures by gender, it can be seen that while 24.9 of the boys were at Level 1 and 2 (that is to say, they were not literate), 26.2 of the girls were at this level. Although more girls were illiterate, the difference was not significant. On the other hand, substantially more girls reached Levels 7 and 8 (9.2%) than boys (6.5%). As expected, a larger percentage of Primary 6 pupils from low SES (27.4%) was illiterate than that of pupils from high SES (23.1%), but the difference was small and insignificant. However, the difference between the percentage of pupils in the low SES who reaches Levels 7 and 8 (6.0%) was much lower than that of pupils in the high SES (11.2%).

An analysis of the Primary 6 pupils' level of competence by school location shows that there were no major differences in the pupils from schools in rural/isolated, small town and large city who were illiterate (26.8%, 20.6% and 21.8% respectively). However, the percentage of pupils from schools in rural isolated locations (6.5%) was less than half that of pupils from schools in small towns, and were nearly one third that of pupils from schools in large towns.

The analysis of Primary 6 levels of competence in mathematics by gender shows that a larger percentage of girls was innumerate (42.0%) when compared to boys' (36.3%), but the percentage of girls reaching Levels 7 and 8 (6.5%) was slightly higher than that for boys (5.2%). While 42.3 percent of pupils from the low SES were innumerate, 34.2 percent of pupils from the high SES were innumerate. Similarly, a larger proportion of pupils from the high SES reached Levels 7 and 8 (6.5%) than those from low SES (5.2%). The percentages of innumerate pupils by school location showed a confusing pattern,. While 41.9 percent of pupils from rural/isolated schools were innumerate, only 30.2 percent of pupils from large cities were innumerate, and this was

expected. However, those pupils from small towns who were innumerate constituted a smaller percentage (25.8%) than those from large cities. The percentages of pupils reaching Levels 7 and 8 displayed an even more confusing pattern. While 4.8 percent of pupils from schools in rural/isolated areas reached these two levels, only 0.6% of pupils from large cities reached the levels, and a remarkable 12.1 percent reached the top two levels. Overall, it appears as though pupils from small towns outperformed both their rural/isolated and large city counterparts.

Policy suggestion 7.6: The Ministry of Education and Sports should conduct a study to establish why such a large proportion of Primary 6 pupils is illiterate and innumerate. This study should be extensive, covering a broad range of factors such as the curriculum and its goals, pedagogical practices, learning materials and other key factors found to have a significant influence on achievement in the earlier chapters of this report. Thereafter, it should design and implement a programme for enhancing pupil learning across the board.

Table 7.11. Percentages and sampling errors for literacy levels of pupils by sub-groups (SACMEQ II)

Sub-groups	Percentage of pupils reaching the reading competence level															
	1		2		3		4		5		6		7		8	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
<i>Gender</i>																
Boys	7.0	1.05	17.9	1.73	23.4	1.57	22.2	1.60	14.1	1.37	7.9	1.26	5.7	1.09	1.8	0.64
Girls	7.5	1.00	18.7	1.95	19.8	1.86	20.6	1.76	15.6	1.80	8.5	1.72	4.9	1.12	4.3	1.61
<i>Socio-economic level</i>																
Low SES	7.1	0.90	20.3	2.12	23.7	1.76	23.0	1.68	14.4	1.67	5.6	0.89	4.3	1.09	1.7	0.87
High SES	7.4	1.26	15.7	1.71	19.3	1.89	19.6	1.87	15.3	1.78	11.5	2.29	6.6	1.35	4.6	1.34
<i>School location</i>																
Isolated/Rural	7.6	0.95	19.1	1.75	23.6	1.57	22.8	1.56	13.9	1.42	6.5	1.10	3.6	0.95	2.9	1.10
Small town	5.7	1.89	14.9	4.72	15.4	3.58	17.8	3.17	18.2	3.64	13.4	4.24	11.4	3.82	3.2	1.64
Large city	5.7	2.28	16.1	9.61	12.6	5.44	10.8	3.63	17.8	6.57	20.0	6.68	14.0	4.56	2.9	1.34
Uganda	7.2	0.82	18.3	1.61	21.8	1.41	21.5	1.35	14.8	1.31	8.2	1.14	5.3	1.00	2.9	0.91

Table 7.12. Percentages and sampling errors for numeracy levels of pupils by sub-groups

Sub-groups	Percentage of pupils reaching the mathematics competence level															
	1		2		3		4		5		6		7		8	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
<i>Gender</i>																
Boys	4.5	0.82	31.8	2.27	34.1	2.07	13.2	1.34	6.6	1.06	4.6	0.93	4.4	1.31	0.8	0.32
Girls	6.6	1.03	35.4	2.93	28.5	2.40	11.1	1.49	5.4	1.08	6.5	1.56	6.2	2.58	0.3	0.21
<i>Socio-economic level</i>																
Low SES	6.3	1.01	36.0	2.44	32.2	2.05	11.6	1.40	4.7	1.03	3.9	1.03	4.5	1.67	0.7	0.36
High SES	4.3	0.78	29.9	2.83	31.0	2.31	13.1	1.54	7.8	1.59	7.4	1.46	6.0	2.27	0.5	0.20
<i>School location</i>																
Isolated/Rural	6.2	0.88	35.7	2.50	31.0	1.84	11.6	1.31	5.3	1.02	5.4	1.23	4.4	1.44	0.4	0.16
Small town	2.8	1.22	23.0	4.16	34.6	5.52	13.4	3.01	8.5	2.99	5.7	2.62	10.3	6.68	1.8	1.33
Large city	2.0	1.40	28.7	11.82	32.2	4.21	20.9	7.77	10.8	4.50	4.8	1.80	0.6	0.65	0.0	0.00
Uganda	5.4	0.73	33.4	2.17	31.6	1.68	12.3	1.19	6.0	0.96	5.5	1.05	5.2	1.55	0.6	0.24

Conclusion

The outcomes of the reading test show that the performance of Primary 6 pupils in 2000 was low. An analysis of performance in terms of scores shows that Ugandan pupils' performance (484) fell below the SACMEQ mean of 500. However, in mathematics Ugandan pupils' performance (506.3) was slightly above the SACMEQ mean. Performance by expert judgments shows that the 35.4 percent of Uganda's pupils reached the minimum level of competence in reading while only 10 percent reached the desirable level. While nearly 90 percent of the teachers reached minimum level and just over 80 percent reached the desirable level, there should be concern over the teachers failed to reach both these levels. It should actually be a matter of concern that, when we look at the percentage of teachers and pupils who reached Levels 7 and 8, 12.9 percent and 21 percent of the teachers performed worse off than 5.8 percent and 8.2 percent of the pupils in mathematics and reading respectively.

With 25.5 percent and 38.8 percent of pupils illiterate and innumerate respectively, there is need to raise the overall percentage of pupils who reach acceptable levels of achievement. One issue that particularly needs to be examined in greater detail is the negative correlation between pupil scores and teacher scores.

While there were no differences in performance by gender, the results also highlight the urgent need to improve the quality of education across the board, with specific interventions designed to improve learning outcomes in schools that accommodate pupils from lower socio-economic backgrounds, and those in schools located in isolated and rural areas

As part of an comprehensive plan for improving performance, the causes for the low achievement of Ugandan pupils need to be established as a first step towards remedying the severe shortcomings of the education system. Further analyses of the available survey data can provide valuable information on factors associated with pupil's achievement, and such analysis should be given priority. Thereafter, studies can focus on the factors and areas which have been highlighted by the preliminary analysis as areas of concern.

Chapter 8

From Policy Suggestions to an Agenda for Action

Introduction

This is the first study on the conditions of schooling and the quality of primary education undertaken by Uganda as part of the SACMEQ consortium. The analyses in the preceding chapters have been based on data from a national survey of primary schools in Uganda. The analyses yielded detailed information on conditions and the functioning of primary schools. By relating the results to the local context, it has been possible to highlight the successes of the system and to identify areas that need improvement.

The results of this study also confirmed some of the concerns of the Ministry such as those relating to the age of pupils, inadequate textbook provision, the unfavourable learning environment in the classroom and the low level of numeracy and literacy. In addition, some of the weaknesses of the system in terms of teacher motivation, school organization and the allocation of resources have been highlighted.

Improving the quality of education more than marginally requires that all shortcomings affecting the educational process be addressed simultaneously. Providing quality education is a complex undertaking comprising many linked components. All major elements of the system have an influence on the system as a whole, and it is thus essential that deficiencies throughout the education sector be attended to. The policy suggestions presented in this report need to be considered as part of a holistic approach by the Ministry of Education and Sports as it strives to improve the quality of education in Uganda. Consideration must, however, be given to the realities that face Uganda, among them the limited financial and human resources available to the Ministry.

In this chapter, the policy suggestions made in this report have been summarized. The implementation of these proposals can only have the intended impact if it adopts the holistic approach suggested above, and this approach must also take into account the

Ministry's Strategic Investment Programme (2004 – 2015) that covers most components of the Ministry's operations. It must also take into account other initiatives already in place, such as the Medium Term Budget Framework, and the national assessment system.

Classification of policy suggestions

All of the 37 policy suggestions made in Chapters 3 to 7 have been presented in Table 8.1 in a manner that facilitates their implementation by the Ministry of Education and Sports. Firstly, the policy suggestions have been presented under five main categories.

The first group is made up of those policy suggestions that require consultation with staff, community, and experts. This group contained three suggestions (3.2, 3.7 and 4.1) that required a variety of consultations and discussion with a broad range of stakeholders. These stakeholders included parents and other social groups such as women teachers, or female prospective teachers, for example

In the second group we have ten policy suggestions (3.1, 3.6, 4.3, 4.4, 4.5, 4.9, 5.2, 6.1, 6.2 and 7.3) that require conducting reviews of existing policies or planning procedures. The general focus of this group of policy suggestions is the need to revisit and reform existing regulations and practices, including putting in place new policies and regulations in order to address problems identified. A simple review of the policy on the entry age of pupils, or simply enforcing the existing policy on entry age, can form part of the solution to some of the problems identified (for example, the problem of over-aged pupils).

The third group contains those policy suggestions that require the Ministry of Education and Sports to undertake some data collection where there are some gaps, and using the data collected for planning purposes. In this group there are five suggestions (3.3, 4.11, 4.12, 4.13 and 5.4).

The fourth group of policy suggestions suggested undertaking education policy research projects in order to gain a broader or deeper understanding of a problem and the

dynamics associated with it before remedial action could be taken. There are twelve suggestions in the is group (3.4, 3.5, 4.6, 4.8, 4.10, 5.1, 5.6, 5.7, 7.1, 7.2, 7.4 and 7.6.) that identified specific educational policy research projects. An example of policy suggestions in this group are those that require the Ministry to conduct studies on the causes and prevalence of pupil absenteeism, on teacher and pupil behavioural problems, and on the differences in achievement among different subgroups of pupils.

The last group of policy suggestions call upon the Ministry of Education and Sports to make investments in human and material resources. In this group there are seven suggestions (3.8, 3.9, 4.2, 5.3, 5.5, 6.3 and 7.5). These investments required substantial resource outlays in order to acquire teaching and materials, to put up school infrastructre, and to tain personnel.

In order to ensure that action is taken on the policy suggestions, the individual, section, or department of the Ministry to be responsible for initiating and leading action on each policy suggestion was identified. It should therefore be easy to make a follow up in cases where implementation deficits are observed. It must be stressed, however, that in most cases the individual, section or department named has to work in partnership with other stakeholders with an interest in the issue, or who have the expertise required to resolve the problem. The sources of the data to be used as the basis for action have also been suggested, but these are by no means exhaustive.

The timeframe required for the implementation of the policy suggestion has also been specified. 'Short term' means that implementation can be accomplished within the financial year; 'medium term' refers to those policy actions that can be completed within one to two years; and 'long term' refers to those that require more than two years to accomplish.

Lastly, the estimated cost was also provided for each policy suggestion, and these were arrived at after discussing with relevant colleagues in the Ministry. Policy suggestions associated with 'low' cost of can be implemented within the current budget,; those linked

to ‘moderate’ cost will require re-adjustments of funds within existing budgets; and those policy suggestions associated with ‘high’ costs are those that will require major investment of funds outside the regular budgets.

The specification of the responsible individual, section or department and the data sources, of the time frame, and of the cost is meant to facilitate decisions by the Ministry, taking into account the realities of the situation at any one point in time.

Table 8.1. Summary of policy suggestions including responsibility centres, data sources, and time frame

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Group 1: Consultation with staff, community, and experts			
Policy suggestion 3.2: Gender parity is one of EFA and MDG goals to be achieved by 2005 in primary schools. The Commissioner for Primary Education should address the issue of persistent gender disparities in primary school enrolment by strengthening multi-media campaigns to sensitize parents to send girls to school and keep them in school.	Commissioner Pre-primary and Primary Education Reports	Medium	Low
Policy suggestion 3.7: The Director of Education must design ways of motivating parents to actively support their children’s schooling. These could include massive awareness campaigns on the importance of home support for children’s school work.	Director of Education Reports	Medium	Low

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 4.1: The Ministry of Education and Sports through the Department of Education Standards Agency (ESA) together with Ministry of Gender, Labour and Social Development should come up with new modalities of affirmative action that will help to make teaching, especially mathematics teaching, more attractive to women.	Director of Education Policy reports	Medium	Moderate
Group 2: Reviews of existing planning and policy procedures			
Policy suggestion 3.1: The Director of Education should ensure that the official school entrance age of 6 years should be strictly enforced in order to reduce the percentage of over-age pupils. Complementary centres should be introduced for those who are over-aged.	Director of Education EMIS data	Medium	Low
Policy suggestion 3.6: The Ministry of Education must draw up and distribute to all schools guidelines for teachers on the frequency of giving homework and on correcting such homework. Provisions in these guidelines should be integrated into pre- service and in-service training programs.	Commissioner of Education Planning Medium Term Budget Framework	Medium	Low
Policy suggestion 4.3: The Government of Uganda, through Uganda Revenue Authority (URA) should revise the country's import policy to be cognizant of income elasticity of demand for various sources of energy and respond to the existing energy consumption patterns, giving special priority to items such as kerosene and candles on which grass-root populations, among them teachers, depend.	Permanent Secretary, MoES Reports	Long	Moderate

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 4.4: The Education Service Commission should formulate a policy on minimum frequency of teacher in-service training courses that should be attended by every serving teachers.	Commissioner of Education Planning Reports	Medium	Moderate
Policy suggestion 4.5: The Ministry of Education and Sports must revise the content and delivery of in-service training programmes to ensure that they are more responsive to the needs of the teachers.	Commissioner of Teacher Education Reports	Medium	High
Policy suggestion 4.7: The Ministry of Education and Sports should develop a policy to ensure that all inspectors at the districts carry out inspections at schools with clear guidelines on how undertake quality inspection work.	Director Education Standards Agency Inspection reports;	Short	Low
Policy suggestion 4.9: The Ministry of Education and Sports in conjunction with the Education Standards Agency, <u>should carefully examine the school curriculum and come up with clear guidelines on (a) the teaching goals to be pursued by teachers, (b) the teaching strategies or approaches teachers should use, and (c) the key activities teacher should prioritise when teaching reading and mathematics.</u>	Director of Education Policy reports	Medium	Low
Policy suggestion 5.2: The Director of Education must encourage and assist more teachers to acquire post-secondary education and, as a long-term measure, recruit into the teaching force only those with post-secondary education.	Director of Education Inspection reports	Medium	Moderate

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy Suggestion 6.1: The MoES must re-examine patterns in the allocation of qualified teachers and school heads in Central, South Western and West Regions and the allocation of experienced teachers in Western and North Regions and take corrective measures to ensure that there is greater equity	Permanent Secretary Quarterly monitoring reports	Medium	Low
Policy Suggestion 6.2: The MoES must redistribute teachers among schools in West Regions to ensure that there is greater equity in pupil/teacher ratios. Such an exercise should be supported by long-term measures to ensure that the under-staffed schools get more teachers when they become available.	Permanent Secretary Quarterly monitoring reports	Medium	Low
Policy Suggestion 7.3: The Director of Education Standards Agency in conjunction with Uganda National Examinations Board (UNEB) should come up with a policy to address the issue of low levels of mastery both for reading and mathematics subjects by identifying causes and recommending appropriate solutions.	Director Education Standards Agency; UNEB Inspection reports; NAPE results	Short	Low
Group 3: Data Collection for planning purposes			
Policy Suggestion 3.3: The Director of Education should map out in greater detail the needy areas for targeted support programmes such as the feeding programmes in primary schools.	Commissioner Education Planning MTBF	Short	Low
Policy suggestion 4.11 The Ministry of Education and Sports must carry out an audit on the provision of sitting and writing places and secure additional furniture for distribution to targeted regions and schools.	Commissioner Education Planning MTBF	Short	Low

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 4.12. The Ministry of Education and Sports must carry out an audit on the provision of essential classroom resources and secure additional resources for distribution to those regions and schools with an inadequate supply of these resources. Attention must specifically be paid to the supply of classroom libraries, bookshelves, teacher tables and chalkboards	Commissioner Education Planning MTBF	Short	Low
Policy suggestion 4.13. The Ministry of Education and Sports must carry out an audit to establish the availability of essential teaching aids and, for those regions and schools with inadequate supplies of these items, put in place mechanisms for the allocation of these items. Particular attention must be paid to Western Region that has the lowest levels of provisions	Commissioner Education Planning MTBF	Short	Low
Policy suggestion 5.4: The Education Planning Department should conduct a national audit of toilet facilities in schools, and where they are found to be inadequate, the support of local communities and other stakeholders should be mobilised in order to improve the pupil-toilet ratio	Commissioner Education Planning MTBF	Short	Low
Group 4: Educational policy research programme			
Policy suggestion 3.4: The Director of Education should commission a investigation into the reason for absenteeism. The study should, in particular, assess the impact of illness on attendance and put forward concrete recommendations on how this problem can be addressed.	Director of Education & Commissioner Pre- primary and Primary Education EMIS & ESA reports	Short	Moderate

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 3.5: The Ministry of Education must conduct a study to establish the reasons for the high rates of repetition and recommend strategies for reducing it. In particular, the Ministry has to closely monitor the policy of automatic promotion to ensure that it is fully implemented.	Director of Education & Commissioner Pre-primary and Primary Education EMIS & ESA reports	Short	Moderate
Policy suggestions 4.6: The Ministry of Education and Sport must carry out a study to establish why there is such a big difference in the number of periods taught by teachers in different regions and schools. It must, in particular, re-examine patterns in teacher allocation among schools so as to ensure that there is greater equity in the distribution of the teachers..	Director Education Standards Agency Inspection reports	Short	Low
Policy suggestion 4.8: The Ministry of Education and Sports must undertake a study to find out the activities most frequently used by teachers in reading and mathematics lessons, and thereafter sensitise teachers, through pre-service and in-service training, on the importance of other activities that can enhance pupil learning.	Director Education Standards Agency Inspection reports	Short	Low
Policy suggestion 4.10 The Ministry of Education and Sports must investigate why teachers in Western region did not give reading tests frequently, and why teachers in South Western did not give mathematics tests frequently.	Director Education Standards Agency Inspection reports	Short	Low

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 5.1: The Education Service Commission ought to investigate the reasons for the low percentage of female school heads and implement measures to ensure that the gender gap is gradually narrowed through the enhancement of promotional prospects for eligible female.	Director of Education Policy reports	Medium	Low
Policy suggestion 5.6: The Ministry of Education and Sports must conduct a study to establish the nature and seriousness of the different behavioural problems among pupils and recommend measures to reduce them.	Director of Education Inspection reports	Short	Low
Policy suggestion 5.7: The Ministry of Education and Sports must conduct a study to establish the nature and seriousness of the different behavioural problems among teachers and recommend measures to reduce them.	Director of Education Inspection reports	Short	Low
Policy suggestion 7.1: The Director of Education Standards Agencies (ESA) should investigate the reasons why there is a negative correlation between teachers' scores and their pupils' scores.	Director of Education Standards Agency Inspection reports	Short	Low
Policy suggestion 7.2: The Director of Education Standards Agency needs to investigate the large gaps in pupil achievement levels between rural-isolated schools and schools in large cities with the aim of finding ways of improving the achievement levels of pupils in schools located in rural and isolated locations.	Director of Education Standards Agency Inspection reports	Short	Low

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy Suggestion 7.4: Ministry of Education and Sports must undertake further analyses of the SACMEQ data to determine factors which are associated with pupil achievement, with an attempt made to identify factors accounting for the big differences between schools. Thereafter, it must propose measures to improve achievement in those schools that have low performance in order to reduce the differences between schools.	Commissioner Education Planning SACMEQ Data Archive	Short	Low
Policy suggestion 7.6: The Ministry of Education and Sports should conduct a study to establish why such a large proportion of Primary 6 pupils is illiterate and innumerate. This study should be extensive, covering a broad range of factors such as the curriculum and its goals, pedagogical practices, learning materials and other key factors found to have a significant influence on achievement in the earlier chapters of this report. Thereafter, it should design and implement a programme for enhancing pupil learning across the board.	Director of Education Standards Agency and Secretary, UNEB Inspection reports; NAPE results	Short	Low
Group 5: Investment in human and material resources			
Policy suggestion 3.8: The Director of Education must ensure the provision of adequate textbooks for use by pupils in all schools by (a) giving appropriate priority to the purchase of textbooks in the Ministry Mid-Term Budget Framework, (b) designing and implementing measures for equitable distribution of textbooks to schools, and (c) taking effective measures to ensure that textbooks are well looked after and given to pupil's to take home.	Permanent Secretary, MoES MTBF	Medium	Moderate

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 3.9: The Director of Education must ensure the adequate supply of various items of stationery for pupils in all schools by giving these items priority in the Ministry Mid-Term Budget Framework and by ensuring their equitable distribution to schools.	Permanent Secretary, MoES MTBF	Medium	Moderate
Policy suggestion 4.2: The Ministry of Education and Sports through the Department of Education Planning should increase the percentage of school facilities grant allocation to the construction of teachers' houses. The provision of teacher housing should be one of the long-term goals in the Mid-Term Budget Framework (MTBF).	Commissioner of Education Planning Quarterly monitoring reports	Short	Low
Policy suggestion 5.3: The Education Planning Department should, as a matter of urgency, and in collaboration with other ministries, communities, local authorities and other stakeholders, put in place and implement a school rehabilitation programme. Furthermore, all school heads should be provided with training in school maintenance so that the life of existing buildings can be lengthened.	CEP EMIS data; Survey reports	Medium	High
Policy suggestion 5.5. The Education Planning Department should, in collaboration with other ministries, communities, local authorities and other stakeholders, formulate and implement plans for reducing overcrowding in classrooms through the construction of additional classrooms in targeted regions and schools.	CEP EMIS data; Survey reports	Medium	High

POLICY SUGGESTIONS	RESPONSIBLE & DATA SOURCE	TIME	COST
Policy suggestion 6.3: The Ministry of Education and Sports must give attention to the serious inequities in the provision of toilet facilities in Northern Region and of classroom space in the Western Region and take measures to address this problem by to put up additional toilets and classrooms in those areas and schools where there is an under-supply of these facilities.	Permanent Secretary, MoES EMIS data	Medium	High
Policy suggestion 7.5: There should be an in-built mechanism for providing professional back-up support to the teachers who need to enhance their basic skills in reading and mathematics. This can be implemented through exposure to regular, highly targeted in-service courses that use teaching guides and the regular school curriculum	Commissioner Teacher Education Inspection reports	Medium	Moderate

Implementation of the policy suggestions

By presenting the ‘Agenda for action’ above, the researchers are aware that it will not be possible for the Ministry of Education and Sports in Uganda to implement all the actions at the same time. This, obviously, would put an undue strain on the system, given the limited financial resources, the human resources, and the time required both to keep on-going activities on course as well as introducing new ones. However, it must be stressed that there are some problems that will require immediate attention, and for which resources must be prioritised. Such problems, if not addressed in good time, could hamper other efforts at providing education of high quality on an equitable basis. There will need for the Ministry to examine the full set of policy suggestions against the problems they are designed to address, and then draw up a list of those that will require priority action.

All education systems have established ways of dealing with problems, and efforts should be made to ensure that the established structures, systems and procedures contribute to the solution of the problems identified. The whole idea of engaging policy makers into a policy dialogue was meant to address this issue. Actions that are at variance with the core values and norms of the Ministry are less likely to succeed as they will face resistance, and will therefore require substantially more effort. This notwithstanding, there are cases where bold decisions will have to be made in the interests of progress, even if it means breaking away from traditional practice. All necessary safeguards, however, have to be taken to avoid an unpleasant backlash. In some cases, such decisions or actions need prior consultation with key stakeholders, and in others they require research. Whichever options Ministry chooses, the one that stands the best chance of yielding benefits with minimum cost and effort have to be selected.

The Ministry of Education and Sports is most likely to rely on its own staff to implement the agenda for action, but external assistance may be required where Ministry's capacity falls short of the requirements. What is important is that the Ministry remains firmly in the driver's seat, and is guided in its decisions by the desire to accomplish its mission of providing good quality education to all pupils in Uganda.

Concluding remarks

Finally, it is worth noting that the production of this report evolved through a series of capacity building training activities that included intense training workshops conducted by IIEP in Paris (2000) Seychelles (2001) and Mauritius (2002). The outstanding success of SACMEQ II project illustrates the effectiveness of SACMEQ's unique cooperative "working style" whereby expertise and knowledge are exchanged and concerns and experiences are shared at an international level. The authors of this report hope that the

report will provide the impetus for an intense but fruitful national debate concerning the issues that have been raised in the “Agenda for Action”.

All of these policy suggestions call for massive injections of additional funds into the education sector and their actualization would, within the context of a limited resource envelope, appear to be a distant possibility. However, it is known that the Ministry of Education and Sports has accumulated vast experience over the many years of providing education services and managing educational reform. These policy suggestions should, therefore, be achievable.

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Appendix A

**General Policy Concerns, Specific Research Questions, and Dummy Tables
for the Design of the SACMEQ II Project**

General Policy Concern 1: What were the personal characteristics (for example, age and gender) and home background characteristics (for example, parent education, regularity of meals, home language, etc.) of Grade 6 pupils that might have implications for monitoring equity, and/or that might impact upon teaching and learning?

Specific Research Questions

- What was the age distribution of pupils?
Questionnaire: SI: P2; SII: P2
Dummy Table: 3.1(a), 3.1(b)
- What was the gender distribution of pupils?
Questionnaire: SI: P3 ; SII: P3
Dummy Table: 3.1(a), 3.1(b)
- What was the level of the parents' education?
Questionnaire: SI: P9, P10; SII: P11, P12
Dummy Table: 3.1(a), 3.1(b), 11.17(a), 11.17(b)
- How regularly did pupils eat meals?
Questionnaire: SI: P18; SII: P10
Dummy Table: 3.1(a), 3.1(b)
- What percentage of pupils spoke the language of the test at home?
Questionnaire: SI: P4; SII: P4
Dummy Table: 3.2(a), 3.2(b)
- Where did pupils live during the school week?
Questionnaire: SI: P5; SII: P5
Dummy Table: 3.3(a), 3.3(b)
- How many books were there in pupils' homes?
Questionnaire: SI: P6; SII: P6
Dummy Table: 3.1(a), 3.1(b)
- What other reading materials and electronic media did pupils have at home?

Questionnaire: SI: P8.01, P8.02, P8.03, P8.04, P8.05, P8.06, P8.07 ;

SII: P7.01, P7.02, P7.03, P7.04, P7.05, P07.06, P7.07

Dummy Table: 3.1(a), 3.1(b)

- What was the socio-economic status of pupils' parents in terms of possessions, housing conditions (lighting, floor, wall, roof), and livestock?

Questionnaire: SI: P8 ; SII: P7, P8, P9, P13, P14, P15

Dummy Table: 3.1(a), 3.1(b), 3.4(a), 3.4(b), 3.4(c), 3.4(d), 3.4(e), 3.5

General Policy Concern 2: What were the school context factors experienced by Grade 6 pupils (such as location, absenteeism (regularity and reasons), grade repetition, and homework (frequency, amount, correction, and family involvement)) that might impact upon teaching/learning and the general functioning of schools?

Specific Research Questions

- What was the location of the school?

Questionnaire: SI: S11, S12; SII: S13, S14

Dummy Table: 7.2

- How many days were pupils absent in the previous month, and what were the reasons for these absences?

Questionnaire: SI: P19; SII: P16, P17

Dummy Table: 3.2(a), 3.2(b), 3.2(c)

- How many pupils had repeated a grade, and were they currently repeating Grade 6?

Questionnaire: SI: P23; SII: P18

Dummy Table: 3.2(a), 3.2(b)

- How frequently did pupils receive homework in reading and mathematics?

Questionnaire: SI: P11; SII: P33, P36

Dummy Table: 8.4(a)

- Did the teachers correct assigned homework?

Questionnaire: SII: P34, P37

Dummy Table: 8.4(b), 8.4(c)

- Did family members monitor, assist with, request demonstrations, ask questions about, and/or look at, pupils' homework?

Questionnaire: : SI: P12, P13, P14, P15, P16; SII: P24, P25, P26, P27, P28, P29, P30

Dummy Table: 9.7(a), 9.7(b), 9.7(c)

General Policy Concern 3: Did Grade 6 pupils have sufficient access to classroom materials (for example, textbooks, readers, and stationery) in order to participate fully in their lessons?

Specific Research Questions

- What percentage of students had reading and mathematics textbooks?

Questionnaire: : SI: P20; SII: P35, P38

Dummy Table: 6.4

- What percentage of pupils had adequate basic classroom supplies for writing, ruling, erasing, etc.?

Questionnaire: : SI: P22; SII: P21

Dummy Table: 6.5(a), 6.5(b)

General Policy Concern 4: Did Grade 6 pupils have access to library books within their schools, and (if they did have access) was the use of these books being maximized by allowing pupils to take them home to read?

Specific Research Questions

- What percentage of pupils had access to (school and classroom) library facilities?

Questionnaire: : SI: T10.9, S31.01; SII: T12.6, S38.01

Dummy Table: 6.1, 7.3

- Were pupils permitted to take library books home? (This question to be crosschecked from pupil and school head questionnaires.)

Questionnaire: : SI: P21, S34; SII: P20, S39

Dummy Table: 11.1

General Policy Concern 5: Has the practice of Grade 6 pupils receiving extra lessons in school subjects outside school hours become widespread, and have these been paid lessons?

Specific Research Questions

- What percentage of pupils received extra tuition?
Questionnaire: : SI: P17; SII: P31
Dummy Table: 8.3(a)
- Was payment made for receiving extra tuition?
Questionnaire: : SII: P32
Dummy Table: 8.3(b)

General Policy Concern 6: What were the personal characteristics of Grade 6 teachers (for example, age, gender, and socio-economic level), and what was the condition of their housing?

Specific Research Questions

- What was the age distribution of teachers?
Questionnaire: SI: T3; SII: T3
Dummy Table: 4.1(a), 4.1(b)
- What was the gender distribution of teachers?
Questionnaire: SI: T2; SII: T2
Dummy Table: 4.1(a), 4.1(b)
- What was the socio-economic status of teachers in terms of possessions and livestock?
Questionnaire: SI: T28; SII: T27, T28
Dummy Table: 4.1(a), 4.1(b), 11.2(a), 11.2(b)
- What was the general condition (repair status and lighting) of teacher housing?
Questionnaire: SI: T31; SII: T29, T30,
Dummy Table: 4.5, 11.3(a), 11.3(b)

General Policy Concern 7: What were the professional characteristics of Grade 6 teachers (in terms of academic, professional, and in-service training), and did they consider in-service training to be effective in improving their teaching?

Specific Research Questions

- How many years of academic education had teachers completed?
Questionnaire: SI: T4; SII: T4
Dummy Table: 4.3(a), 4.3(b), 4.3(c)
- How many years of teacher training had teachers completed?
Questionnaire: SI: T5; SII: T5
Dummy Table: 4.2(a), 4.2(b)
- How many years of teaching experience had teachers completed?
Questionnaire: SI: T6; SII: T6
Dummy Table: 4.2(a), 4.2(b)
- How much in-service training had teachers completed?
Questionnaire: SI: T7; SII: T7, T8
Dummy Table: 4.4(a), 4.4(b)
- Did teachers consider that in-service training improved their teaching?
Questionnaire: SII: T9
Dummy Table: 9.8

General Policy Concern 8: How did Grade 6 teachers allocate their time among responsibilities concerned with teaching, preparing lessons, and marking?

Specific Research Questions

- How many periods did teachers teach and how long were these periods?
Questionnaire: SI: T11, T12; SII: T14, T15
Dummy Table: 11.4
- How many hours per week did teachers spend in lesson preparation and marking?
Questionnaire: SI: T13; SII: T16

Dummy Table: 8.5

General Policy Concern 9: What were Grade 6 teachers' viewpoints on (a) pupil activities within the classroom (for example, reading aloud, pronouncing, etc.), (b) teaching goals (for example, making learning enjoyable, word attack skills, etc.) (c) teaching approaches/strategies (for example, questioning, whole class teaching, etc.), (d) assessment procedures, and (e) meeting and communicating with parents?

Specific Research Questions

- What did teachers consider to be the most important pupil activities for teaching reading and mathematics?
Questionnaire: SI: T15; SII: T33, T41
Dummy Table: 8.1(a)(i), 8.1(b)(i)
- What did teachers consider to be the most important teaching goals in reading and mathematics?
Questionnaire: SI: T18; SII: T36, T44
Dummy Table: 8.1(a)(ii), 8.1(b)(ii)
- What teaching approaches/strategies were used most frequently by reading and mathematics teachers?
Questionnaire: SI: T19; SII: T37, T45
Dummy Table: 8.1(a)(iii), 8.1(b)(iii)
- How often did teachers give written tests in reading and mathematics?
Questionnaire: SI: T20; SII: T38, T46
Dummy Table: 8.1(a)(iv), 8.1(b)(iv)
- Was there a specific section in pupil school reports for reading and mathematics?
Questionnaire: SI: T22; SII: T31, T39
Dummy Table: 11.5
- How often did teachers meet with parents each year?
Questionnaire: SI: T21; SII: T17
Dummy Table: 9.3
- What percentage of parents met with teachers each year?

Questionnaire: SII: T18

Dummy Table: 11.6

- Did teachers ask parents to sign homework assignments?

Questionnaire: SI: T16; SII: T34, T42

Dummy Table: 11.7

General Policy Concern 10: What was the availability of classroom furniture (for example, sitting/writing places, teacher table, teacher chair, and bookshelves) and classroom equipment (for example, chalkboard, dictionary, maps, book corner, and teacher guides) in Grade 6 classrooms?

Specific Research Questions

- What percentages of pupils were in classrooms with adequate sitting and writing places?

Questionnaire: SI: P24, P25; SII: P22, P23

Dummy Table: 6.3

- What percentages of pupils were in classrooms with adequate classroom furniture and equipment (for example, a teacher table, teacher chair, bookshelves, and chalkboard)?

Questionnaire: SI: T10; SII: T12

Dummy Table: 6.1, 6.2

- How many books did teachers have in their classroom library or book corner?

Questionnaire: SI: T8; SII: T10

Dummy Table: 11.8

- Did teachers have teaching aids (for example, a map, dictionary, geometrical instruments, and teachers' guides)?

Questionnaire: SII: T13.1, T13.2, T13.3, T13.4, T13.5

Dummy Table: 11.9(a), 11.9(b)

General Policy Concern 11: What professional support (in terms of education resource centres, inspections, advisory visits, and school head inputs) was given to Grade 6 teachers?

Specific Research Questions

- Did teachers use education resource centres?
Questionnaire: SII: T24
Dummy Table: 8.6
- How did teachers use education resource centres?
Questionnaire: SII: T24, T24.1, T24.2, T24.3, T24.4, T24.5, T24.6
Dummy Table: 11.10(a), 11.10(b)
- What support did Advisors or Inspectors give to teachers in terms of administrative, professional, and pedagogical matters?
Questionnaire: SII: T20, T21
Dummy Table: 9.9
- Did school heads advise teachers on their teaching?
Questionnaire: SI: T25; SII: T22
Dummy Table: 9.2

General Policy Concern 12: What factors had most impact upon teacher job satisfaction?

Specific Research Questions

- What factors (for example, living conditions, school facilities/equipment, staff relationships, career advancement, salaries, etc.) had most impact upon teachers' job satisfaction?
Questionnaire: SI: T26; SII: T25
Dummy Table: 9.1
- What did teachers rate as the most important factor?
Questionnaire: SI: T27; SII: T26
Dummy Table: 11.11

General Policy Concern 13: What were the personal characteristics of school heads (for example, age and gender)?

Specific Research Questions

- What was the age distribution of school heads?
Questionnaire: SI: S2; SII: S2
Dummy Table: 5.1
- What was the gender distribution of school heads?
Questionnaire: SI: S1; SII: S1
Dummy Table: 5.1

General Policy Concern 14: What were the professional characteristics of school heads (in terms of academic, professional, experience, and specialized training)?

Specific Research Questions

- How many years of academic education had school heads completed?
Questionnaire: SI: S3; SII: S3
Dummy Table: 11.12(a), 11.12(b)
- How many years of teacher training had school heads completed?
Questionnaire: SI: S4; SII: S4
Dummy Table: 5.2
- How many years of teaching experience had school heads completed?
Questionnaire: SI: S5; SII: S6
Dummy Table: 5.2
- How many years of experience had school heads had either as a school head or an acting school head – in the current school and all together?
Questionnaire: SI: S8, S9; SII: S9, S10
Dummy Table: 11.13
- Have school heads received specialized training in school management?
Questionnaire: SII: S5
Dummy Table: 5.2

General Policy Concern 15: What were the school heads' viewpoints on general school infrastructure (for example, electrical and other equipment, water, and basic sanitation) and the condition of school buildings?

Specific Research Questions

- What items of equipment (telephone, fax, photocopier) and general facilities (library, staff room, store room) did schools have?
Questionnaire: SI: S31; SII: S38
Dummy Table: 7.3
- What kind of water supply did schools have?
Questionnaire: SI: S31.10; SII: S38.08
Dummy Table: 7.3
- What was the nature and provision of toilet facilities in schools?
Questionnaire: SI: S30; SII: S37
Dummy Table: 7.1
- What was the general condition of school buildings?
Questionnaire: SI: S29; SII: S36
Dummy Table: 7.1

General Policy Concern 16: What were the school heads' viewpoints on (a) daily activities (for example, teaching, school-community relations, and monitoring pupil progress), (b) organizational policies (for example school magazine, open days, and formal debates), (c) inspections, (d) community input, (e) problems with pupils and staff (for example, pupil lateness, teacher absenteeism, and lost days of school)?

Specific Research Questions

- What amount of teaching did school heads undertake?
Questionnaire: SI: S7; SII: S7, S8
Dummy Table: 5.3
- What level of importance did school heads attach to activities such as community contacts, monitoring pupil progress, administrative tasks, etc.?
Questionnaire: SI: S22; SII: S28
Dummy Table: 9.4
- What was the incidence of school activities such as a school magazine, public speaking day, "open days, etc.?
Questionnaire: SI: S24; SII: S30

Dummy Table: 8.2

- How many school days were lost in the last school year due to non-school events?

Questionnaire: SI: S26; SII: S33

Dummy Table: 7.4

- What were the purposes and frequency of school inspections?

Questionnaire: SII: S24, S25

Dummy Table: 8.7, 11.14

- What was the contribution of the school community (in terms of time and resources for maintaining the school and for providing supplementary funding)?

Questionnaire: SII: S40

Dummy Table: 9.10

- What were the main behavioural problems of pupils?

Questionnaire: SI: S25; SII: S31

Dummy Table: 9.5(a), 9.5(b)

- What were the main behavioural problems of teachers?

Questionnaire: SI: S25; SII: S32

Dummy Table: 9.6(a), 9.6(b)

General Policy Concern 17: Have human resources (for example, qualified and experienced teachers and school heads) been allocated in an equitable fashion among regions and among schools within regions?

Specific Research Questions

- Were qualified and experienced Grade 6 teachers and school heads distributed equitably among regions and among schools within regions?

Questionnaire: SI: T4, T5, T6, T23, S3, S4, S5, S13, S18; SII: T4, T5,

T6, T19, S3, S4, S6, S15, S18

Dummy Table: 11.15(a), 11.15(b)

General Policy Concern 18: Have material resources (for example, classroom teaching materials and school facilities) been allocated in an equitable fashion among regions and among schools within regions?

Specific Research Questions

- Were (a) general school infrastructure, (b) classroom equipment, and (c) classroom teaching materials distributed equitably among regions and among schools within regions?

Questionnaire: SI: T10, T31, S20, S28, S30, S31; SII: T12, T30, S22, S35, S37, S38

Dummy Table: 11.16(a), 11.16(b)

General Policy Concern 19: What were the levels (according to Rasch scores and descriptive levels of competence) and variations (among schools and regions) in the achievement levels of Grade 6 pupils and their teachers in reading and mathematics – for my country and for all other SACMEQ countries?

Specific Research Questions

- What were the overall mean Rasch scores of pupils and their teachers in reading and mathematics across the SACMEQ countries?

Questionnaire: SI: PRT; SII: PRT, PMT, TRT, TMT

Dummy Table: 11.18(a), 11.18(b)

- What were the percentages of between and within school variance associated with pupil Rasch scores in reading and mathematics across the SACMEQ countries?

Questionnaire: SI: PRT; SII: PRT, PMT, TRT, TMT

Dummy Table: 11.19(a), 11.19(b)

- What were the overall percentages of pupils and their teachers across the various levels of competence in reading and mathematics across the SACMEQ countries?

Questionnaire: SI: PRT; SII: PRT, PMT, TRT, TMT

Dummy Table: 11.20(a), 11.20(b)

General Policy Concern 20: What were the reading and mathematics achievement levels of important sub-groups of Grade 6 pupils and their teachers (for example, pupils and teachers of different genders, socio-economic levels, and locations)?

Specific Research Questions

- What were the gender differences in reading and mathematics achievement for pupils and teachers?

Questionnaire: SI: PRT, P3; SII: PRT, PMT, TRT, TMT, P3, T2

Dummy Table: 11.21

- What were the school location differences in reading and mathematics achievement for pupils and teachers?

Questionnaire: SI: PRT, S12; SII: PRT, PMT, TRT, TMT, S14

Dummy Table: 11.22

- What were the socioeconomic differences in reading and mathematics achievement for pupils and teachers?

Questionnaire: SI: PRT, P8; SII: PRT, PMT, TRT, TMT, P7, T27

Dummy Table: 11.23

Appendix B**Reading Test Items Considered to be Central to the
Core Curriculum in Each Country)**

item #	Type	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN
1	Word recognition	Yes		Yes	Yes	Yes	Yes								
2		Yes		Yes	Yes	Yes	Yes								
3		Yes		Yes	Yes	Yes	Yes								
4		Yes		Yes	Yes		Yes								
5		Yes		Yes	Yes	Yes	Yes								
6		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes
7	Sentence completion with a word	Yes													
8		Yes													
9			Yes												
10		Yes		Yes											
11			Yes		Yes	Yes	Yes								
12	Sentence completion with a phrase	Yes													
13		Yes													
14			Yes		Yes										
15	Narrative	Yes													
16		Yes													
17		Yes													
18	Document	Yes													
19		Yes													
20		Yes													
21		Yes													
22	Narrative	Yes													
23		Yes													
24		Yes													
25		Yes													
26	Document	Yes		Yes											
27		Yes		Yes											
28		Yes		Yes											
29	Expository	Yes													
30		Yes													
31				Yes											
32		Yes													
33	Document	Yes													
34		Yes													
35	Document	Yes													
36		Yes													
37		Yes													
38		Yes													
39		Yes													
40		Yes													

Appendix B (Ctd.)

Item #	Type	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN
41	Expository	Yes													
42		Yes													
43		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes
44		Yes													
45	Narrative	Yes													
46		Yes													
47		Yes													
48		Yes													
49		Yes		Yes											
50	Expository	Yes													
51		Yes	Yes		Yes										
52		Yes													
53		Yes													
54	Documents	Yes		Yes		Yes	Yes	Yes	Yes						
55		Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
56		Yes		Yes	Yes	Yes	Yes	Yes	Yes						
57		Yes		Yes	Yes	Yes	Yes	Yes	Yes						
58	Expository	Yes		Yes											
59		Yes		Yes											
60		Yes		Yes											
61	Narrative	Yes													
62		Yes													
63		Yes													
64		Yes													
65	Expository	Yes													
66		Yes	Yes	Yes	Yes		Yes								
67		Yes	Yes	Yes	Yes		Yes								
68				Yes											
69		Yes		Yes		Yes									
70	Expository	Yes	Yes		Yes										
71		Yes	Yes		Yes										
72		Yes	Yes			Yes									
73	Document	Yes		Yes											
74		Yes		Yes											
75		Yes		Yes											
76		Yes		Yes											
77	Expository	Yes	Yes	Yes	Yes		Yes		Yes						
78							Yes		Yes						
79		Yes	Yes	Yes	Yes		Yes		Yes						
80	Expository						Yes			Yes	Yes	Yes	Yes		Yes
81							Yes			Yes	Yes	Yes	Yes		Yes
82		Yes					Yes			Yes	Yes	Yes	Yes		Yes
83							Yes			Yes	Yes	Yes	Yes		Yes

Note: The shaded items were excluded from the final analyses because they failed a Rasch “differential item functioning” test across three groups: SACMEQ I pupils, SACMEQ II pupils, and SACMEQ II teachers.

Appendix C**Mathematics Test Items Considered to be Central to the
Core Curriculum in Each Country)**

Item #	Type	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN
1	Number	Yes		Yes	Yes	Yes	Yes								
2	Number	Yes		Yes											
3	Number	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
4	Number	Yes													
5	Space/Data	Yes													
6	Space/Data	Yes	Yes	Yes	Yes		Yes								
7	Space/Data	Yes	Yes	Yes	Yes		Yes								
8	Number	Yes													
9	Measurement	Yes	Yes	Yes	Yes		Yes								
10	Number	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
11	Number	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	
12	Number	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
13	Number	Yes													
14	Number	Yes	Yes	Yes	Yes		Yes								
15	Measurement	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
16	Measurement	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes
17	Measurement	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
18	Measurement	Yes													
19	Measurement	Yes													
20	Measurement	Yes	Yes	Yes	Yes		Yes								
21	Space/Data	Yes													
22	Number	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
23	Measurement	Yes	Yes	Yes	Yes		Yes								
24	Measurement	Yes	Yes	Yes	Yes		Yes								
25	Space/Data	Yes													
26	Space/Data	Yes		Yes		Yes		Yes		Yes	Yes	Yes	Yes		
27	Number	Yes	Yes				Yes								
28	Number	Yes	Yes		Yes										
29	Number	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
30	Space/Data	Yes	Yes	Yes			Yes								
31	Measurement	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
32	Space/Data	Yes	Yes		Yes	Yes	Yes			Yes		Yes	Yes		
33	Space/Data	Yes													
34	Number	Yes		Yes	Yes	Yes	Yes								
35	Number	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes
36	Number	Yes													
37	Measurement	Yes	Yes	Yes	Yes		Yes								
38	Number	Yes	Yes	Yes	Yes		Yes								
39	Space/Data	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
40	Space/Data	Yes	Yes	Yes			Yes								

Appendix C (Ctd.)

item #	Type	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN
41	Number	Yes													
42	Measurement	Yes	Yes	Yes	Yes		Yes								
43	Number	Yes			Yes	Yes		Yes							
44	Measurement	Yes	Yes		Yes	Yes		Yes							
45	Measurement	Yes													
46	Number	Yes													
47	Measurement	Yes	Yes	Yes	Yes		Yes								
48	Measurement	Yes													
49	Measurement	Yes	Yes		Yes										
50	Measurement	Yes													
51	Measurement	Yes													
52	Space/Data	Yes													
53	Space/Data	Yes	Yes		Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	
54	Measurement	Yes													
55	Measurement	Yes				Yes	Yes			Yes	Yes	Yes	Yes		
56	Number	Yes		Yes	Yes	Yes	Yes	Yes	Yes						
57	Number	Yes													
58	Space/Data	Yes		Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
59	Number	Yes	Yes		Yes			Yes							
60	Number	Yes	Yes		Yes			Yes							
61	Number	Yes	Yes	Yes	Yes		Yes								
62	Number	Yes	Yes	Yes	Yes		Yes								
63	Measurement	Yes				Yes	Yes			Yes	Yes	Yes	Yes	Yes	

Note: The shaded items were excluded from the final analyses because they failed a Rasch “differential item functioning” test across three groups: SACMEQ I pupils, SACMEQ II pupils, and SACMEQ II teachers.

Appendix D**Sample Design Tables for rho = 0.1, 0.2, 0.3**

Cluster Size	95% Confidence Limits for Means/Percentages							
	$\pm 0.05s/\pm 2.5\%$		$\pm 0.1s/\pm 5.0\%$		$\pm 0.15s/\pm 7.5\%$		$\pm 0.2s/\pm 10.0\%$	
b	a	n	a	n	a	n	a	n
<u>rho = 0.1</u>								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	880	1760	220	440	98	196	55	110
5	448	2240	112	560	50	250	28	140
10	304	3040	76	760	34	340	19	190
15	256	3840	64	960	29	435	16	240
20	232	4640	58	1160	26	520	15	300
30	208	6240	52	1560	24	720	13	390
40	196	7840	49	1960	22	880	13	520
50	189	9450	48	2400	21	1050	12	600
<u>rho = 0.2</u>								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	960	1920	240	480	107	214	60	120
5	576	2880	144	720	65	325	36	180
10	448	4480	112	1120	50	500	28	280
15	406	6090	102	1530	46	690	26	390
20	384	7680	96	1920	43	860	24	480
30	363	10890	91	2730	41	1230	23	690
40	352	14080	88	3520	40	1600	22	880
50	346	17300	87	4350	39	1950	22	1100
<u>rho = 0.3</u>								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1040	2080	260	520	116	232	65	130
5	704	3520	176	880	79	395	44	220
10	592	5920	148	1480	66	660	37	370
15	555	8325	139	2085	62	930	35	525
20	536	10720	134	2680	60	1200	34	680
30	518	15540	130	3900	58	1740	33	990
40	508	20320	127	5080	57	2280	32	1280
50	503	25150	126	6300	56	2800	32	1600

Appendix D (Ctd.)**Sample Design Tables for rho = 0.4, 0.5, 0.6**

Cluster Size b	95% Confidence Limits for Means/Percentages							
	$\pm 0.05s/\pm 2.5\%$		$\pm 0.1s/\pm 5.0\%$		$\pm 0.15s/\pm 7.5\%$		$\pm 0.2s/\pm 10.0\%$	
	a	n	a	n	a	n	a	n
rho = 0.4								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1120	2240	280	560	125	250	70	140
5	832	4160	208	1040	93	465	52	260
10	736	7360	184	1840	82	820	46	460
15	704	10560	176	2640	79	1185	44	660
20	688	13760	172	3440	77	1540	43	860
30	672	20160	168	5040	75	2250	42	1260
40	664	26560	166	6640	74	2960	42	1680
50	660	33000	165	8250	74	3700	42	2100
rho = 0.5								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1200	2400	300	600	134	268	75	150
5	960	4800	240	1200	107	535	60	300
10	880	8800	220	2200	98	980	55	550
15	854	12810	214	3210	95	1425	54	810
20	840	16800	210	4200	94	1880	53	1060
30	827	24810	207	6210	92	2760	52	1560
40	820	32800	205	8200	92	3680	52	2080
50	816	40800	204	10200	91	4550	51	2550
rho = 0.6								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1280	2560	320	640	143	286	80	160
5	1088	5440	272	1360	122	610	68	340
10	1024	10240	256	2560	114	1140	64	640
15	1003	15045	251	3765	112	1680	63	945
20	992	19840	248	4960	111	2220	62	1240
30	982	29460	246	7380	110	3300	62	1860
40	976	39040	244	9760	109	4360	61	2440
50	973	48650	244	12200	109	5450	61	3050

Appendix D (Ctd.)**Sample Design Tables for rho = 0.7, 0.8, 0.9**

Cluster Size	95% Confidence Limits for Means/Percentages							
	$\pm 0.05s/\pm 2.5\%$		$\pm 0.1s/\pm 5.0\%$		$\pm 0.15s/\pm 7.5\%$		$\pm 0.2s/\pm 10.0\%$	
b	a	n	a	n	a	n	a	n
<u>rho = 0.7</u>								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1360	2720	340	680	152	304	85	170
5	1216	6080	304	1520	136	680	76	380
10	1168	11680	292	2920	130	1300	73	730
15	1152	17280	288	4320	129	1935	72	1080
20	1144	22880	286	5720	128	2560	72	1440
30	1136	34080	284	8520	127	3810	71	2130
40	1132	45280	283	11320	126	5040	71	2840
50	1130	56500	283	14150	126	6300	71	3550
<u>rho = 0.8</u>								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1440	2880	360	720	161	322	90	180
5	1344	6720	336	1680	150	750	84	420
10	1312	13120	328	3280	146	1460	82	820
15	1302	19530	326	4890	145	2175	82	1230
20	1296	25920	324	6480	145	2900	81	1620
30	1291	38730	323	9690	144	4320	81	2430
40	1288	51520	322	12880	144	5760	81	3240
50	1287	64350	322	16100	144	7200	81	4050
<u>rho = 0.9</u>								
1 (SRS)	1600	1600	400	400	178	178	100	100
2	1520	3040	380	760	170	340	95	190
5	1472	7360	368	1840	164	820	92	460
10	1456	14560	364	3640	162	1620	91	910
15	1451	21765	363	5445	162	2430	91	1365
20	1448	28960	362	7240	162	3240	91	1820
30	1446	43380	362	10860	161	4830	91	2730
40	1444	57760	361	14440	161	6440	91	3640
50	1444	72200	361	18050	161	8050	91	4550

Appendix E

Random Number Tables for the Selection of 20 Grade 6 Students within each Selected School

Case#	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	Case#	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50
1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	3	1	1	1	3	4	2	1	1	2	1	2	
2	2	2	2	2	2	2	2	2	3	3	3	2	3	3	3	2	5	2	5	6	2	2	5	4	5	5	2	2	3	2	4
3	3	3	3	3	3	3	3	3	4	4	6	3	4	4	4	3	6	3	6	7	4	6	6	6	6	3	6	5	6	5	5
4	4	4	4	4	4	5	4	6	5	7	7	5	5	6	6	4	8	4	7	8	7	7	8	10	13	8	4	11	7	9	6
5	5	5	5	5	5	6	5	7	6	8	8	7	7	9	7	5	10	7	10	11	10	8	11	12	15	9	10	12	8	10	8
6	6	6	6	6	6	7	6	8	7	9	9	8	9	12	12	6	11	8	11	13	11	10	13	13	16	10	11	13	10	13	9
7	7	7	7	7	7	8	7	11	8	10	11	9	11	14	13	7	13	9	12	15	14	11	14	15	19	12	15	17	13	15	14
8	8	8	8	8	8	10	8	12	9	11	12	10	12	15	15	8	14	12	16	17	16	12	17	16	22	13	19	18	17	16	21
9	9	9	9	9	12	11	9	13	10	13	13	11	14	17	16	9	17	14	17	18	17	13	18	20	23	15	20	20	18	17	22
10	10	10	11	11	13	13	10	14	12	14	14	13	15	18	17	10	18	15	24	19	18	15	20	26	26	17	21	21	19	23	23
11	11	11	12	12	14	14	11	15	13	15	17	14	16	19	20	11	19	16	25	21	21	17	22	28	28	22	26	27	20	32	24
12	13	13	13	15	15	15	12	16	16	17	18	16	17	21	21	12	23	17	26	23	22	19	23	32	33	23	30	28	21	33	25
13	14	14	15	17	16	16	16	17	19	18	20	17	19	23	22	13	24	19	27	26	23	22	24	33	34	25	31	29	25	34	27
14	15	15	16	18	17	17	18	19	20	19	22	20	21	27	23	14	25	20	29	28	24	23	25	34	35	27	33	30	28	35	29
15	16	16	17	19	18	20	19	20	22	20	24	23	22	28	24	15	26	24	30	31	30	26	29	35	36	29	35	35	30	36	31
16	17	18	18	20	19	21	20	21	24	22	26	25	24	29	25	16	30	28	31	33	32	28	30	36	37	30	37	43	32	38	33
17	18	19	20	21	20	22	22	25	23	27	27	27	27	30	28	17	31	30	32	34	34	29	31	38	38	34	38	44	34	41	34
18	19	20	21	22	21	23	23	23	26	24	28	29	30	31	32	18	33	31	33	35	35	31	33	39	39	36	40	45	39	45	40
19	20	21	22	23	23	24	25	24	27	25	29	30	32	32	33	19	35	32	35	36	37	38	34	42	40	41	44	46	44	48	43
20	21	22	23	24	24	25	26	25	29	27	31	31	33	34	34	20	36	35	38	39	39	41	35	43	41	44	45	47	48	49	50

Case#	R51	R52	R53	R54	R55	R56	R57	R58	R59	R60	R61	R62	R63	R64	R65	Case#	R66	R67	R68	R69	R70	R71	R72	R73	R74	R75	R76	R77	R78	R79	R80
1	1	2	3	3	1	6	2	1	1	1	2	4	8	2	3	1	4	1	4	1	4	3	6	1	2	1	1	4	3	7	6
2	3	3	4	5	8	7	5	3	3	2	5	6	15	6	6	2	10	6	6	7	9	5	8	3	7	3	5	7	4	8	12
3	4	5	5	6	9	8	9	6	5	15	10	8	18	7	8	3	11	9	7	10	10	9	10	4	8	21	7	12	13	11	13
4	10	6	8	15	10	12	13	9	7	16	11	11	20	8	14	4	12	15	9	20	14	12	13	9	10	23	17	15	14	13	14
5	15	12	12	16	11	14	15	10	8	17	21	12	21	9	15	5	16	19	10	21	15	14	14	13	14	28	18	18	16	28	27
6	18	16	17	17	13	16	20	12	12	18	22	19	23	13	17	6	19	22	11	25	18	17	16	14	19	30	19	19	20	29	28
7	19	18	21	18	21	19	22	23	16	19	23	25	26	14	21	7	26	23	13	29	20	22	22	17	23	34	23	20	32	39	30
8	23	21	27	20	24	20	25	25	21	20	24	29	33	18	22	8	27	26	15	30	21	25	23	18	26	37	26	21	34	40	31
9	24	24	29	21	25	21	31	27	24	24	27	33	35	23	25	9	28	30	17	32	27	28	24	19	36	41	28	25	41	41	33
10	28	26	30	23	26	24	33	32	28	25	28	34	36	26	29	10	31	36	25	33	38	29	27	22	38	42	29	26	42	42	35
11	29	27	31	25	27	25	36	33	29	26	31	35	37	28	33	11	34	41	32	35	39	38	30	24	41	44	33	32	48	51	36
12	33	29	32	27	31	26	38	38	31	31	32	36	40	29	35	12	44	48	33	38	43	41	31	29	45	45	41	34	53	53	40
13	35	32	33	34	32	30	39	40	36	35	35	41	43	31	36	13	45	50	35	41	46	46	35	33	47	46	45	41	55	55	45
14	37	33	37	36	34	39	42	43	42	38	40	42	45	33	40	14	46	54	38	47	47	49	38	38	56	50	51	47	56	60	48
15	39	35	38	39	36	41	43	45	45	39	45	46	46	36	41	15	48	60	39	51	51	54	39	39	58	52	52	57	63	62	55
16	42	37	40	41	38	43	44	46	49	41	49	48	49	45	53	16	53	61	47	54	57	55	40	45	62	53	57	60	67	68	58
17	43	39	41	46	39	47	45	48	52	49	55	56	50	54	55	17	55	62	53	55	59	57	43	58	63	56	64	64	70	71	66
18	45	44	43	49	40	49	51	51	53	55	57	57	55	58	61	18	57	63	60	60	60	61	47	64	68	71	65	70	72	73	67
19	47	46	45	51	42	53	54	53	54	56	59	58	60	61	62	19	58	66	65	63	61	70	61	69	70	72	68	74	73	74	73
20	51	48	48	53	51	56	56	55	56	60	61	61	63	64	63	20	59	67	67	68	66	71	71	70	71	73	71	75	75	76	75

Appendix E (Ctd.)

Random Number Tables for the Selection of 20 Grade 6 Students within each Selected School

Case#	R81	R82	R83	R84	R85	R86	R87	R88	R89	R90	R91	R92	R93	R94	R95	Case#	R96	R97	R98	R99	R100
1	2	1	4	8	7	13	2	3	2	2	3	4	3	4	6	1	6	7	4	1	2
2	3	3	10	10	11	16	3	5	7	4	4	6	6	11	11	2	7	11	9	2	5
3	6	4	11	11	13	17	10	11	14	5	6	7	8	14	20	3	9	13	15	3	6
4	8	5	14	12	15	19	18	12	16	12	9	10	12	19	22	4	13	15	32	6	7
5	12	10	15	13	20	20	21	18	19	15	10	15	31	20	23	5	17	16	38	9	30
6	13	13	25	18	21	21	22	19	31	16	14	19	36	21	27	6	26	25	39	11	33
7	16	17	28	24	24	30	29	22	32	19	16	20	45	32	32	7	35	29	42	15	42
8	22	24	29	30	30	43	30	28	33	23	22	27	48	35	34	8	41	33	51	16	47
9	24	26	30	35	32	50	32	31	40	28	29	34	51	36	36	9	45	37	53	36	51
10	33	32	33	42	34	53	33	39	45	31	31	35	53	43	37	10	56	41	54	39	53
11	41	42	34	43	36	54	34	41	49	36	37	41	54	44	49	11	65	43	57	47	57
12	43	47	39	55	47	65	35	48	50	37	49	50	57	46	52	12	66	50	61	53	64
13	44	52	48	56	52	67	46	50	58	48	50	58	67	47	57	13	68	60	78	73	65
14	54	54	53	58	56	72	48	52	61	52	53	62	70	48	66	14	73	62	82	78	67
15	59	60	60	62	58	76	56	53	62	58	56	66	73	55	69	15	76	65	86	81	78
16	60	64	64	64	60	79	57	55	64	59	68	75	74	61	73	16	82	72	91	82	79
17	65	65	67	69	63	80	61	72	73	64	73	81	78	74	74	17	83	76	92	85	81
18	66	68	68	70	74	81	65	77	77	70	76	84	82	80	77	18	84	77	93	89	87
19	79	69	70	75	77	83	68	78	79	78	84	90	86	86	86	19	89	80	96	91	93
20	80	82	75	77	84	85	75	79	82	81	88	92	88	94	93	20	95	96	98	93	96

Case#	R101	R102	R103	R104	R105	R106	R107	R108	R109	R110	R111	R112	R113	R114	R115	Case#	R116	R117	R118	R119	R120	R121	R122	R123	R124	R125	R126	R127	R128	R129	R130
1	10	5	4	6	2	4	12	1	1	3	2	6	10	3	2	1	3	4	3	3	20	7	7	12	8	9	2	1	27	1	6
2	11	16	7	8	10	5	21	9	7	4	8	23	13	13	6	2	5	7	12	6	23	13	17	32	10	12	14	8	28	6	15
3	18	22	11	13	16	6	26	10	11	6	10	32	14	15	17	3	6	12	15	8	26	21	18	35	11	18	17	10	30	17	24
4	19	31	25	20	25	8	28	12	13	13	12	54	18	17	25	4	10	19	23	16	38	22	19	38	16	20	20	12	43	20	25
5	25	37	26	28	27	13	37	17	14	20	13	55	22	20	28	5	15	20	27	17	39	27	24	42	26	23	25	24	47	26	28
6	26	42	28	33	39	14	41	25	19	26	18	59	25	25	29	6	19	22	28	22	41	30	29	49	38	25	37	31	48	41	33
7	29	43	38	37	46	15	43	40	21	35	30	66	26	29	39	7	23	28	42	25	43	36	33	68	46	27	41	35	55	50	35
8	45	46	40	42	51	17	44	43	29	44	38	69	30	55	42	8	27	30	53	28	45	41	35	76	47	28	47	43	63	51	36
9	47	51	45	44	52	33	53	44	32	48	48	74	41	56	52	9	33	33	54	44	49	69	37	86	57	36	67	53	65	53	37
10	62	54	49	57	61	40	60	48	34	49	50	78	44	57	62	10	35	39	55	45	61	89	46	90	60	45	71	62	67	68	38
11	65	58	57	62	65	50	61	56	41	50	52	89	47	62	64	11	41	46	60	47	64	92	56	92	65	57	75	65	71	70	41
12	72	61	60	68	68	61	68	59	42	51	56	90	49	74	66	12	52	48	62	52	67	99	65	95	69	59	79	68	79	84	42
13	79	64	67	80	69	63	73	62	47	54	64	98	50	78	79	13	53	54	63	74	71	104	71	96	70	80	88	73	80	88	57
14	88	70	68	85	70	73	74	64	64	66	66	99	64	90	81	14	56	57	73	77	75	105	75	101	81	86	89	79	96	92	67
15	93	73	69	86	77	80	75	68	65	70	81	100	66	92	86	15	57	97	84	78	80	109	78	102	87	92	100	92	103	96	71
16	95	82	72	87	78	85	81	78	71	75	84	104	69	93	87	16	61	99	90	98	83	111	97	106	88	95	101	98	107	115	83
17	96	93	78	88	82	93	88	81	79	78	86	105	73	97	94	17	64	102	105	106	89	114	102	108	94	100	109	99	108	119	85
18	99	94	97	97	90	95	93	87	86	79	91	109	82	99	96	18	83	110	108	107	110	116	115	114	95	106	117	100	112	125	102
19	100	98	101	98	96	96	104	91	97	89	105	110	103	102	103	19	95	113	109	114	115	117	117	121	116	113	119	117	113	126	106
20	101	102	102	102	104	97	105	102	98	108	109	111	107	104	115	20	113	115	111	119	119	119	121	123	119	115	124	119	125	129	122

Appendix E (Ctd.)

Random Number Tables for the Selection of 20 Grade 6 Students within each Selected School

Case#	R131	R132	R133	R134	R135	R136	R137	R138	R139	R140	R141	R142	R143	R144	R145	Case#	R146	R147	R148	R149	R150	R151	R152	R153	R154	R155	R156	R157	R158	R159	R160
1	4	5	2	3	3	5	20	35	15	1	1	10	9	3	1	1	5	3	6	3	12	4	6	6	6	10	1	1	9	9	8
2	8	8	6	10	17	7	22	36	18	2	7	12	12	12	5	2	6	12	10	7	18	13	9	10	16	13	15	2	18	19	31
3	39	11	13	13	30	12	34	37	24	8	11	34	17	15	27	3	10	21	13	17	25	15	15	18	25	30	17	11	19	30	33
4	43	26	36	33	31	13	37	53	26	14	27	37	20	16	31	4	14	34	14	29	30	19	19	21	26	40	21	38	25	51	35
5	46	33	38	38	55	15	41	73	28	15	28	38	34	21	39	5	15	35	17	41	33	29	20	22	32	56	22	44	26	64	38
6	54	49	42	55	56	23	51	75	29	18	42	39	37	43	46	6	16	43	20	46	41	30	21	26	39	73	25	49	30	67	57
7	71	62	44	57	70	32	52	78	30	34	45	60	52	48	49	7	17	51	40	50	45	36	22	34	49	74	29	50	36	69	60
8	85	64	51	58	92	42	64	83	38	46	49	61	69	68	52	8	29	62	42	52	51	39	34	40	51	75	47	83	39	81	62
9	86	73	58	59	96	51	70	89	53	49	58	67	72	80	62	9	44	68	45	64	53	46	39	44	52	82	55	89	46	89	72
10	100	78	65	61	102	53	74	90	64	58	59	82	85	93	74	10	54	73	53	69	54	51	43	46	54	83	63	104	51	94	74
11	101	79	67	62	103	59	75	93	65	71	67	85	86	96	76	11	55	75	59	71	58	58	65	51	57	90	72	105	52	100	97
12	104	86	77	66	105	62	76	96	77	81	71	86	90	97	82	12	69	83	60	80	60	62	76	55	63	103	80	107	66	101	123
13	106	88	90	73	107	66	78	105	85	96	77	95	93	106	86	13	76	101	71	87	64	77	82	56	73	108	81	108	70	106	124
14	107	90	99	79	108	92	83	115	86	106	79	97	100	115	111	14	84	103	83	93	102	82	91	60	90	110	86	122	75	109	127
15	108	97	100	86	109	94	85	116	96	114	84	107	105	120	114	15	104	107	92	98	103	98	100	67	102	121	93	125	87	124	128
16	113	115	117	98	110	105	93	117	102	116	101	112	106	127	115	16	108	125	102	107	110	103	105	85	104	125	97	142	94	133	149
17	117	119	118	99	113	107	96	121	107	120	126	118	115	133	118	17	111	128	108	110	117	109	113	90	125	129	103	145	119	142	154
18	127	120	119	112	120	115	99	124	114	122	129	124	122	134	132	18	130	130	135	131	127	111	114	94	133	130	128	148	138	149	155
19	129	129	121	113	129	120	105	130	127	123	136	129	131	142	141	19	133	143	136	134	140	112	132	109	134	140	154	149	145	151	156
20	130	131	133	121	131	125	122	137	137	125	138	135	142	143	142	20	140	145	146	139	150	139	147	149	142	153	155	157	152	154	158

Case#	R161	R162	R163	R164	R165	R166	R167	R168	R169	R170	R171	R172	R173	R174	R175	Case#	R176	R177	R178	R179	R180	R181	R182	R183	R184	R185	R186	R187	R188	R189	R190
1	1	10	16	14	3	13	10	7	2	5	1	7	2	19	8	1	5	2	2	1	1	15	1	2	8	12	6	15	1	5	4
2	2	31	21	27	5	15	29	21	6	18	8	9	6	31	11	2	19	15	5	2	15	17	8	4	9	17	10	17	6	10	10
3	4	52	28	36	16	19	35	23	28	40	14	19	24	38	21	3	20	25	9	21	17	35	15	38	16	38	15	18	13	14	27
4	10	54	29	46	33	42	39	36	41	58	23	27	28	44	44	4	22	31	11	29	27	41	19	44	17	39	28	33	15	16	33
5	39	64	41	51	35	46	53	69	48	64	38	59	37	48	48	5	29	37	13	42	37	45	28	52	26	45	39	40	30	20	37
6	56	66	42	54	42	49	54	90	70	86	39	75	53	51	49	6	45	47	22	44	40	55	52	59	54	51	53	52	44	21	45
7	58	69	46	57	49	64	66	91	74	87	43	77	62	62	59	7	67	62	52	46	58	64	65	74	66	57	88	62	61	38	49
8	63	71	49	62	55	67	81	95	84	105	49	89	71	71	64	8	68	67	69	53	73	70	72	88	73	59	91	68	63	44	56
9	64	75	62	72	61	73	103	107	88	109	59	90	91	77	67	9	73	86	76	64	78	80	73	93	75	60	92	78	82	52	71
10	77	77	70	79	63	104	106	115	101	112	72	93	103	79	70	10	80	87	80	70	104	111	74	97	82	61	97	80	85	69	82
11	84	84	75	89	65	107	117	124	106	125	82	94	119	108	72	11	91	96	81	75	116	114	78	115	85	72	112	107	91	81	119
12	85	87	78	98	78	113	122	128	115	126	87	96	127	111	79	12	99	103	88	76	117	115	80	116	90	73	116	109	104	86	122
13	87	91	79	99	105	115	130	133	117	131	95	113	128	113	94	13	110	109	94	82	118	117	98	123	120	76	126	116	119	105	128
14	97	92	111	119	107	116	134	134	121	134	106	123	129	117	122	14	126	117	101	90	119	119	99	124	133	87	130	124	120	109	134
15	107	93	117	128	119	127	136	138	126	139	127	125	133	131	123	15	129	119	106	129	142	127	120	130	148	96	151	132	123	113	139
16	111	96	146	134	131	146	139	142	137	141	137	134	140	142	131	16	133	124	114	141	144	134	122	149	151	126	153	133	138	114	146
17	115	126	147	142	134	148	147	152	158	152	142	141	146	149	132	17	137	146	133	151	163	140	143	155	167	129	159	155	143	131	148
18	125	128	156	147	143	159	152	153	160	159	143	143	151	153	146	18	140	162	136	159	164	159	163	161	168	146	167	157	148	143	164
19	128	153	157	156	161	164	157	161	163	162	146	159	154	156	159	19	154	164	142	167	167	176	164	164	175	151	168	159	153	171	167
20	155	155	161	162	162	165	162	164	168	163	147	172	163	157	163	20	155	173	154	168	176	178	171	170	180	157	182	167	160	184	187

Appendix E (Ctd.)

Random Number Tables for the Selection of 20 Grade 6 Students within each Selected School

Case#	R191	R192	R193	R194	R195	R196	R197	R198	R199	R200	Case#	R201	R202	R203	R204	R205	R206	R207	R208	R209	R210	R211	R212	R213	R214	R215
1	12	5	9	11	21	2	4	4	7	4	1	7	1	7	16	4	11	5	9	8	2	17	1	6	1	5
2	22	10	12	14	22	6	14	8	9	16	2	17	16	8	30	40	15	23	10	15	16	19	26	11	8	9
3	24	13	30	17	35	12	40	27	13	38	3	21	28	21	63	47	37	38	12	19	20	25	40	14	31	25
4	45	15	42	25	39	13	53	28	32	41	4	56	29	22	72	55	41	43	21	29	39	34	42	25	39	31
5	49	23	46	32	45	18	54	41	64	43	5	62	38	31	75	96	46	58	34	69	50	41	65	36	45	32
6	55	26	56	35	54	25	78	49	66	54	6	66	44	32	76	105	49	67	41	72	67	44	69	37	52	38
7	59	35	70	37	75	42	84	77	88	56	7	78	58	44	88	120	50	70	45	84	92	62	73	42	54	39
8	60	52	73	67	79	44	85	80	117	61	8	80	70	57	89	123	52	79	84	90	104	67	75	47	60	55
9	76	57	78	70	100	58	106	89	119	68	9	106	96	59	94	124	70	81	110	95	106	73	110	70	65	58
10	109	84	88	71	109	61	111	94	130	94	10	122	98	71	126	138	73	118	120	114	114	87	113	91	73	60
11	116	86	90	72	111	65	113	95	133	96	11	124	102	78	135	142	94	121	125	117	118	113	114	94	75	71
12	120	105	92	74	113	98	122	104	139	100	12	125	121	86	139	143	121	126	129	118	135	132	158	99	90	79
13	123	123	102	83	115	111	142	105	144	105	13	126	123	87	147	149	139	131	133	124	137	143	159	133	96	92
14	148	126	104	105	132	116	172	111	146	124	14	132	124	90	153	152	142	151	138	148	142	148	163	139	107	93
15	149	132	113	117	144	133	181	151	151	130	15	150	155	146	160	153	151	165	139	149	148	153	164	141	129	107
16	150	140	118	123	154	134	182	154	170	150	16	163	163	147	173	163	155	166	150	152	156	159	177	182	173	115
17	162	152	130	128	156	160	185	166	172	151	17	166	172	164	179	164	166	178	160	155	159	165	187	199	174	118
18	169	154	152	130	162	168	194	175	174	169	18	170	182	172	184	165	179	179	191	176	185	168	191	201	186	160
19	170	160	153	135	167	173	195	196	177	172	19	192	185	178	190	171	201	185	201	198	190	200	208	202	189	210
20	184	166	173	156	173	174	196	198	182	198	20	194	190	180	193	198	204	189	202	199	203	206	211	206	198	213

Case#	R216	R217	R218	R219	R220	R221	R222	R223	R224	R225	R226	R227	R228	R229	R230	Case#	R231	R232	R233	R234	R235	R236	R237	R238	R239	R240	R241	R242	R243	R244	R245
1	10	21	14	1	2	1	10	1	5	1	10	35	2	6	3	1	22	3	14	19	4	43	21	2	1	15	24	4	4	24	12
2	12	31	31	7	5	12	18	3	13	12	14	40	5	12	7	2	24	7	35	31	22	46	24	8	5	36	27	8	67	28	30
3	16	37	32	8	11	13	20	4	35	19	47	70	36	49	24	3	36	23	39	44	28	48	55	31	11	49	30	16	77	38	61
4	20	48	34	12	15	25	24	18	41	29	66	77	44	60	28	4	38	65	55	58	38	55	56	35	42	76	42	30	85	49	62
5	23	71	37	22	68	51	25	37	46	32	71	78	55	78	33	5	54	103	66	62	39	62	66	40	45	79	61	41	109	52	74
6	43	79	46	86	75	54	29	54	54	50	78	79	56	85	75	6	72	106	98	65	46	65	79	45	49	84	79	44	110	56	77
7	51	102	54	87	83	60	31	57	55	70	102	137	57	100	88	7	77	107	112	79	58	66	88	56	68	88	93	45	116	57	89
8	53	109	65	91	94	86	72	77	64	101	108	138	65	110	121	8	94	143	115	80	61	75	89	59	70	120	96	46	122	67	91
9	72	125	69	108	98	98	75	81	81	126	111	139	79	114	126	9	95	144	121	82	77	86	93	63	79	126	101	49	129	70	96
10	87	127	79	122	108	103	82	101	120	135	120	152	82	121	131	10	137	153	126	87	79	87	112	64	116	141	112	96	133	107	101
11	120	147	92	124	124	139	104	115	126	152	125	166	83	123	136	11	149	154	133	89	99	101	117	87	118	143	124	156	138	163	102
12	124	158	104	152	132	158	116	122	141	164	132	172	92	126	137	12	170	155	137	92	103	107	134	99	143	159	171	162	139	177	104
13	140	163	116	157	147	175	118	128	155	167	135	173	109	144	139	13	177	175	141	151	127	145	135	105	145	165	173	163	160	185	114
14	142	164	119	164	150	184	122	144	156	173	142	176	126	151	143	14	180	179	151	159	133	170	145	122	186	172	174	174	163	188	128
15	146	170	135	169	159	185	131	152	159	179	147	179	152	162	148	15	185	180	160	181	168	190	155	143	200	201	184	178	170	191	150
16	169	185	137	178	160	186	143	182	171	187	171	184	166	163	182	16	186	184	174	184	182	196	183	178	207	206	197	191	197	207	190
17	171	188	139	180	168	188	148	196	183	210	189	196	173	177	201	17	201	195	180	189	191	199	202	187	208	208	201	209	199	209	196
18	176	199	145	205	171	193	167	199	193	213	203	200	179	178	209	18	209	208	210	213	203	222	210	204	213	218	223	220	200	221	198
19	186	203	159	206	197	217	174	207	205	214	218	214	203	217	218	19	217	216	217	218	217	227	211	225	221	222	229	229	219	232	235
20	199	214	165	219	209	219	210	216	216	225	219	219	205	224	221	20	228	223	228	233	230	230	236	229	228	240	241	241	228	243	240

Appendix F**The 148 Test Items (and their Sources) that were Used in
the “Hypothetical Test” for Calibrating the Reading Test Items**

Section	RUMM VarName	SPSS VarName	KEY	S2P	S2T	S1P	Zim91	IEA Pop1	IEA Pop2
Section A	I0001	RA01XXXX	2	pread01					
	I0002	RA02XXXX	2	pread02					
	I0003	RA03XXXX	3	pread03					
	I0004	RA04XXXX	1	pread04					
	I0005	RA05XXXX	2	pread05					
	I0006	RA06XXXX	1	pread06					
	I0007	RA07XXXX	2	pread07					
	I0008	RA08XXXX	2	pread08					
	I0009	RA09XXXX	2	pread09					
	I0010	RA10XXXX	3	pread10					
	I0011	RA11XXXX	2	pread11					
	I0012	RA12XXXX	2	pread12					
	I0013	RA13XXXX	4	pread13					
	I0014	RA14XXXX	4	pread14					
	I0015	RA22XXXX	3	pread22					
	I0016	RA23XXXX	3	pread23					
	I0017	RA24XXXX	1	pread24					
	I0018	RA25XXXX	1	pread25					
	I0019	RA26XXXX	4	pread26					
	I0020	RA27XXXX	2	pread27					
	I0021	RA28XXXX	2	pread28					
	I0022	RA33XXXX	2	pread33					
	I0023	RA34XXXX	1	pread34					
	I0024	RA35XXXX	1	pread35					
	I0025	RA36XXXX	2	pread36					
	I0026	RA37XXXX	2	pread37					
	I0027	RA38XXXX	2	pread38					
	I0028	RA39XXXX	2	pread39					
	I0029	RA40XXXX	1	pread40					
	I0030	RA41XXXX	1	pread41					
	I0031	RA42XXXX	4	pread42					
	I0032	RA43XXXX	1	pread43					
	I0033	RA44XXXX	1	pread44					
	I0034	RA45XXXX	3	pread45					
	I0035	RA46XXXX	1	pread46					
	I0036	RA58XXXX	1	pread58					
	I0037	RA59XXXX	2	pread59					
	I0038	RA61XXXX	2	pread61					
	I0039	RA62XXXX	2	pread62					
	I0040	RA63XXXX	4	pread63					
	I0041	RA64XXXX	1	pread64					
	I0042	RA70XXXX	1	pread70					
	I0043	RA71XXXX	4	pread71					

Section	RUMM VarName	SPSS VarName	KEY	S2P	S2T	S1P	Zim91	IEA Pop1	IEA Pop2
	I0044	RA72XXXX	2	pread72					
	I0045	RA73XXXX	4	pread73					
	I0046	RA74XXXX	3	pread74					
	I0047	RA75XXXX	3	pread75					
	I0048	RA76XXXX	2	pread76					
	I0049	RA80XXXX	4	pread80					yes
	I0050	RA81XXXX	2	pread81					yes
	I0051	RA82XXXX	4	pread82					yes
	I0052	RA83XXXX	4	pread83					yes
Section B	I0053	RA29XX20	4	pread29		porange1			
	I0054	RA30XX21	1	pread30		porange2			
	I0055	RA31XX22	3	pread31		porange3			
	I0056	RA32XX23	4	pread32		porange4			
	I0057	RA47XX08	4	pread47		pbird3	bird3	yes	
	I0058	RA48XX10	2	pread48		pbird5	bird5	yes	
	I0059	RA49XX06	3	pread49		pbird1	bird1	yes	
	I0060	RA54XX12	3	pread54		pisland2	island2	yes	
	I0061	RA55XX11	1	pread55		pisland1	island1	yes	
	I0062	RA56XX14	4	pread56		pisland4	island4	yes	
	I0063	RA57XX13	2	pread57		pisland3	island3	yes	
Section C	I0064	RA160304	2	pread16	tread03	ptembo4	tembo4		
	I0065	RA170405	2	pread17	tread04	ptembo5	tembo5		
	I0066	RA180524	1	pread18	tread05	pmaria1	maria1	yes	
	I0067	RA190625	2	pread19	tread06	pmaria2	maria2	yes	
	I0068	RA200726	4	pread20	tread07	pmaria3	maria3	yes	
	I0069	RA651456	1	pread65	tread14	ptree1	tree1	yes	
	I0070	RA661557	1	pread66	tread15	ptree2	tree2	yes	
	I0071	RA671658	1	pread67	tread16	ptree3	tree3	yes	
	I0072	RA691860	2	pread69	tread18	ptree5	tree5	yes	
	Section D	I0073	RA1501XX	2	pread15	tread01			
I0074		RA2108XX	3	pread21	tread08				
I0075		RA5031XX	1	pread50	tread31				
I0076		RA5132XX	3	pread51	tread32				
I0077		RA5233XX	3	pread52	tread33				
I0078		RA5334XX	1	pread53	tread34				
I0079		RA6035XX	2	pread60	tread35			yes	
I0080		RA6817XX	3	pread68	tread17				
I0081		RA7741XX	4	pread77	tread41				
I0082		RA7843XX	1	pread78	tread43				
I0083		RA7944XX	2	pread79	tread44				
Section E	I0084	RAXX02XX	3		tread02				
	I0085	RAXX09XX	4		tread09				
	I0086	RAXX13XX	1		tread13				
	I0087	RAXX19XX	2		tread19				yes
	I0088	RAXX20XX	3		tread20				yes
	I0089	RAXX21XX	2		tread21				yes
	I0090	RAXX22XX	2		tread22				yes
	I0091	RAXX23XX	2		tread23				
	I0092	RAXX24XX	3		tread24				yes

Uganda Appendix

Section	RUMM VarName	SPSS VarName	KEY	S2P	S2T	S1P	Zim91	IEA Pop1	IEA Pop2
	I0093	RAXX25XX	1		tread25				
	I0094	RAXX26XX	4		tread26				
	I0095	RAXX27XX	2		tread27				
	I0096	RAXX28XX	2		tread28				
	I0097	RAXX29XX	2		tread29				
	I0098	RAXX30XX	1		tread30				
	I0099	RAXX36XX	3		tread36			yes	
	I0100	RAXX37XX	2		tread37			yes	
	I0101	RAXX38XX	4		tread38				
	I0102	RAXX39XX	3		tread39				
	I0103	RAXX40XX	3		tread40				
	I0104	RAXX42XX	2		tread42				
	I0105	RAXX45XX	3		tread45				
	I0106	RAXX46XX	1		tread46				
	I0107	RAXX47XX	1		tread47				
	I0108	RAXX48XX	1		tread48				
	I0109	RAXX49XX	3		tread49				
Section F	I0110	RAXX1027	1		tread10	pquick1	quick1	yes	
	I0111	RAXX1128	4		tread11	pquick2	quick2	yes	
	I0112	RAXX1229	3		tread12	pquick3	quick3	yes	
	I0113	RAXXXX01	4			ptembo1			
	I0114	RAXXXX02	3			ptembo2			
	I0115	RAXXXX03	4			ptembo3			
	I0116	RAXXXX07	3			pbird2		yes	
	I0117	RAXXXX09	3			pbird4		yes	
	I0118	RAXXXX15	4			pjoseph1	joseph1		
	I0119	RAXXXX16	4			pjoseph2	joseph2		
	I0120	RAXXXX17	1			pjoseph3	joseph3		
	I0121	RAXXXX18	2			pjoseph4	joseph4		
	I0122	RAXXXX19	4			pjoseph5			
	I0123	RAXXXX30	4			pempty1	bottles1	yes	
	I0124	RAXXXX31	3			pempty2	bottles2	yes	
	I0125	RAXXXX32	4			pempty3	bottles3	yes	
	I0126	RAXXXX33	1			pempty4	bottles4	yes	
Section G	I0127	RAXXXX34	3			pcarrot1	carrots1		
	I0128	RAXXXX35	4			pcarrot2	carrots2		
	I0129	RAXXXX36	1			pcarrot3	carrots3		
	I0130	RAXXXX37	1			pcarrot4	carrots4		
	I0131	RAXXXX38	4			pcarrot5	carrots5		
	I0132	RAXXXX39	2			ptempra1	temper1		
	I0133	RAXXXX41	2			ptempra3	temper3		
	I0134	RAXXXX42	4			ptempra4	temper4		
	I0135	RAXXXX43	2			ptempra5	temper5		
	I0136	RAXXXX44	3			pmaize1			
	I0137	RAXXXX45	3			pmaize2			
	I0138	RAXXXX46	3			pmaize3			
	I0139	RAXXXX47	2			pmaize4			
	I0140	RAXXXX48	3			pmaize5			
	I0141	RAXXXX49	1			pmaize6			

Uganda Appendix

Section	RUMM VarName	SPSS VarName	KEY	S2P	S2T	S1P	Zim91	IEA Pop1	IEA Pop2
	I0142	RAXXXX50	3			pgrandp1			
	I0143	RAXXXX51	4			pgrandp2			
	I0144	RAXXXX52	2			pgrandp3			
	I0145	RAXXXX53	3			pgrandp4			
	I0146	RAXXXX54	4			pgrandp5			
	I0147	RAXXXX55	3			pgrandp6			
	I0148	RAXXXX59	1			ptree4			

Appendix G**The 91 Test Items (and their Sources) that were Used in the “Hypothetical Test” for Calibrating the Mathematics Test Items**

Section	RUMM VarName	SPSS VarName	KEY	S2P	S2T	TIMSS Pop1	TIMSS Pop2
Section A	I0001	MA01XX	2	pmath01			
	I0002	MA02XX	2	pmath02			
	I0003	MA03XX	3	pmath03			
	I0004	MA04XX	2	pmath04			
	I0005	MA05XX	2	pmath05			
	I0006	MA06XX	3	pmath06			
	I0007	MA07XX	4	pmath07			
	I0008	MA08XX	2	pmath08			
	I0009	MA09XX	2	pmath09			
	I0010	MA10XX	4	pmath10			
	I0011	MA11XX	1	pmath11			
	I0012	MA12XX	3	pmath12			
	I0013	MA13XX	2	pmath13			
	I0014	MA14XX	4	pmath14			
	I0015	MA15XX	3	pmath15			
	I0016	MA16XX	2	pmath16			
	I0017	MA17XX	2	pmath17			
	I0018	MA18XX	2	pmath18			
	I0019	MA19XX	1	pmath19			
	I0020	MA20XX	1	pmath20			
	I0021	MA21XX	2	pmath21			
	I0022	MA22XX	1	pmath22			
	I0023	MA23XX	3	pmath23			
	I0024	MA24XX	2	pmath24			
	I0025	MA25XX	2	pmath25			
	I0026	MA31XX	2	pmath31			
	I0027	MA34XX	3	pmath34			
	I0028	MA35XX	2	pmath35			
	I0029	MA36XX	2	pmath36			
	I0030	MA37XX	2	pmath37			
	I0031	MA38XX	1	pmath38			
	I0032	MA39XX	3	pmath39			
	I0033	MA40XX	2	pmath40			
	I0034	MA41XX	4	pmath41			
	I0035	MA42XX	1	pmath42			
	I0036	MA43XX	4	pmath43			
	I0037	MA45XX	3	pmath45			
	I0038	MA46XX	3	pmath46			
	I0039	MA47XX	2	pmath47			L-10
	I0040	MA48XX	2	pmath48			
	I0041	MA49XX	1	pmath49			
	I0042	MA50XX	2	pmath50			P-17
	I0043	MA51XX	3	pmath51			

Section	RUMM VarName	SPSS VarName	KEY	S2P	S2T	TIMSS Pop1	TIMSS Pop2
	I0044	MA52XX	3	pmath52			
	I0045	MA53XX	2	pmath53			
	I0046	MA54XX	3	pmath54			
	I0047	MA59XX	1	pmath59			
	I0048	MA60XX	2	pmath60			
	I0049	MA61XX	3	pmath61			
	I0050	MA62XX	1	pmath62			
Section B	I0051	MA2616	2	pmath26	tmath16		
	I0052	MA2701	4	pmath27	tmath01	I-3	
	I0053	MA2803	1	pmath28	tmath03	I-8	
	I0054	MA2905	3	pmath29	tmath05	K-6	
	I0055	MA3007	3	pmath30	tmath07	L-5	
	I0056	MA3212	3	pmath32	tmath12		
	I0057	MA3315	2	pmath33	tmath15		
	I0058	MA4411	2	pmath44	tmath11		
	I0059	MA5514	2	pmath55	tmath14		
	I0060	MA5602	4	pmath56	tmath02	I-7	
	I0061	MA5706	3	pmath57	tmath06	K-9	
	I0062	MA5833	1	pmath58	tmath33		
	I0063	MA6328	1	pmath63	tmath28		N-17
	Section C	I0064	MAXX04	2		tmath04	I-9
I0065		MAXX08	3		tmath08		
I0066		MAXX09	4		tmath09		P-8
I0067		MAXX10	4		tmath10		
I0068		MAXX13	3		tmath13		
I0069		MAXX17	3		tmath17		I-8
I0070		MAXX18	4		tmath18		J-14
I0071		MAXX19	2		tmath19		J-18
I0072		MAXX20	2		tmath20		K-4
I0073		MAXX21	2		tmath21		
I0074		MAXX22	2		tmath22		K-6
I0075		MAXX23	3		tmath23		L-11
I0076		MAXX24	2		tmath24		K-8
I0077		MAXX25	1		tmath25		L-14
I0078		MAXX26	2		tmath26		L-17
I0079		MAXX27	3		tmath27		M-6
I0080		MAXX29	2		tmath29		Q-1
I0081		MAXX30	2		tmath30		R-7
I0082		MAXX31	4		tmath31		R-9
I0083		MAXX32	3		tmath32		S-2
I0084		MAXX34	3		tmath34		V-3
I0085	MAXX35	3		tmath35			
I0086	MAXX36	3		tmath36			
I0087	MAXX37	3		tmath37			
I0088	MAXX38	3		tmath38			
I0089	MAXX39	2		tmath39			
I0090	MAXX40	3		tmath40			
I0091	MAXX41	3		tmath41			

Appendix H

Example Test Items for Each Level of Competence in Reading

Level 1: Pre Reading (Linked with Level 1 in the Test Blueprint)

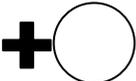
(a) Skills: Matches words and pictures involving concrete concepts and everyday objects. Follows short simple written instructions.

(b) Example Test Items

- locate familiar words in a short (one line) text
- match words to pictures
- follow short and familiar instructions

In the questions on this page, choose the diagram that matches the word or sentences.

2. This cross is inside the circle.

A. (1) 	B. (2) 	C. (3)  (*)	D. (4) 
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Source: SACMEQ II Pupil Test.

Rasch Difficulty: -1.895

Comment: In this item the pupil needs to match the words “cross” and “circle” with the two items in each diagram – and then match the word “inside” with the diagram that illustrates the meaning of the word.

Appendix H (Ctd.)

Level 2: Emergent Reading (Linked with Level 2 in the Test Blueprint)

(a) Skills: Matches words and pictures involving prepositions and abstract concepts; uses cuing systems (by sounding out, using simple sentence structure, and familiar words) to interpret phrases by reading on.

(b) Example Test Items

- read familiar words and identify some new words
- use simple and familiar prepositions and verbs to interpret new words
- match words and very simple phrases

The Indian Tailor Bird

One of the most interesting birds I have seen is the Indian Tailor Bird. It is a small olive green bird that doesn't look at all unusual, yet it has a most unusual way of making its nest. The birds work together in pairs. First they find a leaf, the right size, and make holes along the edges with their beaks. Through these holes they thread grass. One bird pushes the thread from the outside, while the other bird sits in the nest and pushes it back until the edges of the leaf are sewn together to make a kind of bag, still hanging on the tree, in which the Tailor Bird lays its eggs.

50. What does the Tailor Bird use in place of thread?

- A. (1) Grass (*)
- B. (2) String
- C. (3) Spider web
- D. (4) Thorns

Source: SACMEQ II Pupil Test and SACMEQ II Teacher Test.

Rasch Difficulty: -1.634

Comment: In this item the words "thread" and "grass" are adjacent in both the question and in the text. The pupil needs to match a word in the question to a word in the text and then use the text immediately adjacent to it by reading on - but only within a very restricted range of text. The skill involved is essentially a word matching skill.

Appendix H (Ctd.)

Level 3: Basic Reading (Linked with Level 3 in the Test Blueprint)

(a) Skills: Interprets meaning (by matching words and phrases, completing a sentence, or matching adjacent words) in a short and simple text by reading on or reading back.

(b) Example Test Items

- use context and simple sentence structure to match words and short phrases
- use phrases within sentences as units of meaning
- locate adjacent words and information in a sentence

The Bird And The Elephant

A large tree grew in the middle of the jungle. At the top, a small bird had made a nest for her family of three baby birds. One day, an elephant came by. He leaned against the trunk, and scratched his back. The tree started to crack and sway. The baby birds, full of fear, huddled against their mother. She stuck the tip of her beak out of the nest, and said: "Hey, big animal, there are many trees around here! Why shake this one? My children are afraid, and could fall out of their nest."

The elephant said nothing, but he looked at the bird with his small eye, flapped his large ears in the wind, and left.

The next day, the elephant returned and scratched against the trunk once more. The tree began to sway. The frightened baby birds once again huddled against their mother's wings. Now Mother Bird was angry. "I order you to stop shaking our tree," she cried, "or I will teach you a lesson!"

"What could you do to a giant like me?" laughed the elephant. "If I wanted to, I could give such a push to this tree that your nest and your children would be flung far and wide."

The mother bird said nothing.

The next day, the elephant returned and scratched again. Quick as a flash, the mother bird flew into one of the elephant's enormous ears, and there, tickled the elephant by scratching him with her feet. The elephant shook his head ... nothing happened. So he begged the bird to leave and promised to stop scratching against the trunk.

The bird then left the elephant's ear and returned to her nest, beside her children. Never again did the elephant return to scratch his back.

45. Where exactly did the large tree grow?

- A. ₍₁₎ In the thick jungle
- B. ₍₂₎ In the forest
- C. ₍₃₎ In the middle of the jungle (*)
- D. In the garden

Source: SACMEQ II Pupil Test.

Rasch Difficulty: -1.049

Comment: This item is similar to those in the previous level - but in this instance the pupil needs to first match phrases, and then locate the adjacent phrase by reading on in the text.

Appendix H (Ctd.)**Level 4: Reading for Meaning (Linked with Level 4 in the Test Blueprint)**

(a) Skills: Reads on or reads back in order to link and interpret information located in various parts of the text.

(b) Example Test Items

- interpret sentence and paragraph level texts
- match phrases across sentences
- read forwards and backwards in order to locate information in longer texts

Grandpa

Once upon a time, there was a very old man. His eyes had become weak. His ears were deaf, and his knees would shake. When he sat at the table, he was hardly able to hold the spoon. He spilled soup on the tablecloth, and he often slobbered.

He lived with his son and daughter-in-law. They also had a small boy who was four years old, so the old man was a grandfather.

His son and his son's wife found it disgusting to see him spilling food at the table. And so they finally ordered him to sit in a corner behind the stove. Here, they served him his food on a small earthenware plate. Now, Grandpa didn't even get enough to satisfy his hunger. He sat there feeling sad. He looked at the table, where the others were eating, and his eyes filled with tears.

Then, one day his shaking hands could not even hold the plate. It fell to the floor, and was broken into many pieces. The young wife scolded him. But the old grandfather said nothing. He just sighed. Then the young wife bought him a very cheap wooden bowl. Now he had to eat from that.

One day, while they were having dinner, the grandchild sat on the floor, and was very busy with some small pieces of wood.

"What are you doing?" asked his father.

"I am making a bowl," the boy answered.

"What is it for?"

"It is for my father and mother to eat from when I grow up."

The man and wife looked at each other for a long time. Then, they started crying. At once, they asked the old grandpa back to the table, and from then on he always ate with them. After that, even if he sometimes spilt his food, they never said a word about it.

54. How did grandfather feel when he sat by the stove?

- A. (1) Bored.
- B. (2) Tired.
- C. (3) Pleased.
- D. Unhappy (*)

Source: SACMEQ I Pupil Test

Rasch Difficulty: -0.544

Comment: In this item the pupil needs to be able to read on and read back once the key idea is located in the text. The pupil needs to read for meaning and then to link and interpret information from various parts of the text - not simply adjacent to the central idea of the task.

Appendix H (Ctd.)

Level 5: Interpretive Reading (Linked with Level 5 in the Test Blueprint)

(a) Skills: Reads on and reads back in order to combine and interpret information from various parts of the text in association with external information (based on recalled factual knowledge) that “completes” and contextualizes meaning.

(b) Example Test Items

- locate, interpret, and read forward to join two pieces of adjacent information
- use multiple pieces of information to interpret general purpose of a document
- paraphrase and interpret a single non-adjacent piece of information

Read the following passage and then answer the questions below.

What Is Quicksand?

Quicksand is a special kind of sand. Quicksand can swallow a pig, or a human, or an elephant.

Quicksand often looks like plain wet sand. But it is really soupy sand with so much water between the grains that you can't stand on it.

If you step onto quicksand, you will slowly sink up to your knees. If you thrash and squirm, you will sink deeper and deeper. But, if you lie flat on your back with your arms stretched out, you can float on the sand, as you can float in water.

Watch out for quicksand on sand bars, on the bottom of streams, or along sandy seacoasts.

You can test for quicksand by poking it with a long stick or pole. If the sand shakes and quakes, don't try to walk on it! It may be quicksand.

10. What is the main purpose of the passage?

- A. (1) To tell people how to avoid the dangers of quicksand. (*)
- B. (2) To encourage people to protect the beauty of nature.
- C. (3) To describe how people and animals have been swallowed by quicksand.
- D. (4) To explain how quicksand got its name.

Source: SACMEQ I Pupil Test and SACMEQ II Teacher Test.

Rasch Difficulty: 0.073

Comment: The pupils need to read on and read back in order to combine and interpret information from different parts of the text – and then use this to interpret the general purpose of the document.

Appendix H (Ctd.)

Level 6: Inferential Reading (Linked with Level 5 in the Test Blueprint)

(a) Skills: Reads on and reads back through longer texts (narrative, document or expository) in order to combine information from various parts of the text so as to infer the writer’s purpose.

(b) Example Test Items

- interpret, and make inferences from, different types of texts by reading backwards and forwards to confirm links between widely separated information pieces
- extract information from a non-traditional (left to right) document
- make judgments about an author’s intentions or purpose beyond the text content

Photography

Read the comic strip and then answer the questions below.

72. Why should you take the lens cap off?

A. (1) To let a lot of light into the camera.

B. (2) So that it doesn't get in the way of the aperture. (*)

C. (3) To move the camera closer to you.

D. (4) So the camera will be quiet.

Source: SACMEQ II Pupil Test.

Rasch Difficulty: 0.453

Comment: The pupil needs to examine and interpret information related to different pictures and words in a non-traditional (comic strip) instructional document, and then make a judgement about the purpose of a particular instruction made by the author.

Appendix H (Ctd.)

Level 7: Analytical Reading (Linked with Level 5 in the Test Blueprint)

(a) Skills: locates information in longer texts (narrative, document or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices, and/or biases).

(b) Example Test Items

- combine several pieces of information from a range of locations in complex and lexically dense text or documents
- analyse detailed text or extended documents for an underlying message
- identify meaning from different styles of writing

<p>Vacancy Read the following advertisement and then answer the questions below.</p>
<p>Vacancy - Job opportunity Post - Clerical Assistant</p>
<p>A vacancy exists for the post of a clerical assistant in a large farm located in Mbweve.</p>
<p>Qualifications:</p> <p>The applicant,</p> <ul style="list-style-type: none">• Should be a female of between 20 and 25 years of age;• Must have successfully completed Primary 6;• Should be fluent in either of the following languages: Kiswahili, English, or Portuguese;• She must have a minimum work experience of three years in clerical duties.
<p>Application should be sent to: The General Manager Mbweve Farm P.O. Box 70 Mbweve</p>
<p>The deadline for application is 15 October 1999.</p>

50. The job opportunity is for ...

A. (1) a female clerk.

B. (2) the general manager.

C. (3) a large pineapple farm.

D. (4) a clerical assistant. (*)

Source: SACMEQ II Teacher Test.

Rasch Difficulty: 1.348

Comment: In this item the pupil needs to read on and read back in order to combine information from various parts of a document, and then to decide upon the kind of person that the writer has in mind for the position.

Appendix H (Ctd.)**Level 8: Critical Reading (A New Level Generated from the Skills Audit)**

(a) Skills: Locates information in a longer texts (narrative, document or expository) by reading on and reading back in order to combine information from various parts of the text so as to infer and evaluate what the writer has assumed about both the topic and the characteristics of the reader – such as age, knowledge, and personal beliefs (value systems, prejudices, and/or biases).

(b) Example Test Items

- use text structure and organisation to identify an author's assumptions and purposes
- identify an author's motives, biases, beliefs in order to understand the main theme
- link text to establish multiple meanings including analogy and allegory

Effective Thinking

Effective thinking, while starting with logic, goes further so as to include broad mental skills. It includes the understanding of complex and fluid situations, in dealing with which logical methods are inadequate as mental tools. Of course, thinking must never violate the rules of logic, but it may use techniques beyond those of exact mathematical reasoning. In the fields of social study and history, and in the problems of daily life, there are large areas where evidence is incomplete and may never be completed. Sometimes the evidence may also be untrustworthy; but if the situation is practical, a decision must be made. The scientist has been habituated to deal with properties which can be abstracted from their total background and with variables which are few and well defined.

Consequently, where the facts are unique and unpredictable, where the variables are numerous and their interactions too complicated for precise calculation, the scientist is apt to throw up his hands in despair and perhaps turn the situation over to the sentimentalists or the mystics. But surely he would be wrong to ignore both this type of problem and this type of thinking; for the methods of logical thinking do not exhaust the resources of reason. In coping with complex and fluid situations we need thinking which is relational and which searches for cross bearings between areas; this is thinking in a context. By its use it is possible to reach an understanding of historical and social materials and of human relations, although not with the same degree of precision as in the case of simpler materials and recurring events. As Aristotle says, "It is the mark of an educated man to expect no more exactness than the subject permits."

46. The author believes scientists should widen their field of work by undertaking problems that are ...
- A. (1) less specific and less precise. (*)
- B. (2) more exact.
- C. (3) more abstract.
- D. (4) less complex and fluid.

Source: SACMEQ II Teacher Test

Rasch Difficulty: 3.372

Comment: In this task the pupil needs to read through the entire passage, to locate information relevant to scientists' thinking processes, and to distinguish this from alternative thinking styles. Then the pupil needs to identify the beliefs of the author by inference.

Appendix I
Example Test Items for Each Level of Competence in Mathematics

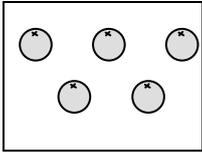
Level 1: Pre Numeracy (Linked with Level 1 in the Test Blueprint)

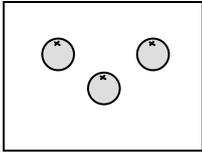
(a) Skills: Applies single step addition or subtraction operations. Recognizes simple shapes. Matches numbers and pictures. Counts in whole numbers.

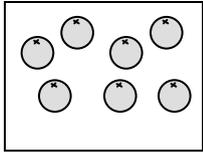
(b) Example Test Items

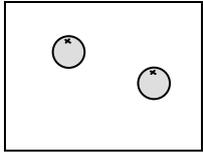
- count illustrated objects
- recognise basic numbers and shapes
- carry out simple single operations of addition and subtraction

1. Which box has 7 oranges? Tick the correct box.









A. (1) B. (2) C. (3) (*) D. (4)

3. $73 + 27 =$

A. (1) 46

B. (2) 90

C. (3) 100 (*)

D. (4) 110

Source: Both from SACMEQ II Pupil Test.

Rasch Difficulty: -4.584 and -2.717

Comment: In the first item the pupil needs to match the numeral with the picture representing the same number. This skill represents the ability to count and recognise numerical representations. In the second item the pupil needs to demonstrate the ability to perform a simple single arithmetic operation.

Appendix I (Ctd.)

Level 2: Emergent Numeracy (Linked with Level 1 in the Test Blueprint)

(a) Skills: Applies a two-step addition or subtraction operation involving carrying, checking (through very basic estimation), or conversion of pictures to numbers. Estimates the length of familiar objects. Recognizes common two-dimensional shapes.

(b) Example Test Items

- link simple verbal, graphic, and number forms with single arithmetic operations on whole numbers up to four digits
- recognise common shapes or figures in two dimensions
- estimate accurately lengths of simple shapes

4. Subtract ...

$$\begin{array}{r} 6,000 \\ - 2,369 \\ \hline \\ \hline \end{array}$$

- A. ₍₁₎ 3,531
- B. ₍₂₎ 3,631 (*)
- C. ₍₃₎ 3,742
- D. ₍₄₎ 4,369

Source: SACMEQ II Pupil Test and SACMEQ II Teacher Test.

Rasch Difficulty: -2.043

Comment: The pupil needs to perform the task of subtraction - with carrying.

Appendix I (Ctd.)

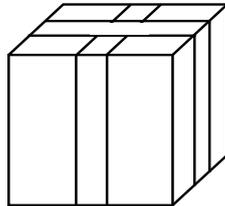
Level 3: Basic Numeracy (Linked with Level 2 in the Test Blueprint)

(a) Skills: Translates verbal information presented in a sentence, simple graph or table using one arithmetic operation in several repeated steps. Translates graphical information into fractions. Interprets place value of whole numbers up to thousands. Interprets simple common everyday units of measurement.

(b) Example Test Items

- recognise three-dimensional shapes and number units
- use a single arithmetic operation in two or more steps
- convert in single step units using division

40. What shape is this present?



- A. (1) sphere
- B. (2) cube (*)
- C. (3) cylinder
- D. (4) pyramid

Source: SACMEQ II Pupil Test.

Rasch Difficulty: -1.26

Comment: The pupil needs to know the names of 3 dimensional regular shaped objects, and then to be able to link them to everyday objects (for example, gifts).

Appendix I (Ctd.)

Level 4: Beginning Numeracy (Linked with Level 3 in the Test Blueprint)

(a) Skills: Translates verbal or graphic information into simple arithmetic problems. Uses multiple different arithmetic operations (in the correct order) on whole numbers, fractions, and/or decimals.

(b) Example Test Items

- convert units in two steps and count tabulated data
- analyse a visual prompt and interpret triangular shapes
- translate verbal to arithmetic form using two operations on fractions

11. A cake was shared among four pupils as follows: John gets $\frac{1}{2}$, Peter gets $\frac{1}{8}$,

Sarah gets $\frac{1}{4}$ and Janet gets $\frac{1}{16}$. Who gets the largest share?

- A. (1) John (*)
- B. (2) Janet
- C. (3) Sarah
- D. (4) Peter

Source: SACMEQ II Pupil Test

Rasch Difficulty: -0.356

Comment: The pupil needs to translate the verbal description of a problem into an arithmetic problem – and then use several operations with fractions to obtain an answer.

Appendix I (Ctd.)**Level 5: Competent Numeracy (Linked with Level 3 in the Test Blueprint)**

(a) Skills: Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem. Solves multiple-operation problems (using the correct order of arithmetic operations) involving everyday units of measurement and/or whole and mixed numbers. Converts basic measurement units from one level of measurement to another (for example, metres to centimetres).

(b) Example Test Items

- convert basic measurement units
- understand the order of magnitude of simple fractions
- conduct multiple steps with a range of basic operations in a strict sequence using an analysis of a short verbal or visual prompt

37. On a trip a bus driver keeps a record of how far he travels each day and the time taken. Here is the first part of his record. How far did the driver most likely travel on Day 3?

Day	Distance travelled (km)	Time taken (hours)
1	42	6
2	63	9
3		8
4	49	7

- A. (1) 23 km
- B. (2) 56 km (*)
- C. (3) 64 km
- D. (4) 84 km

Source: SACMEQ II Pupil Test and SACMEQ II Teacher Test.

Rasch Difficulty: -0.024

Comment: The pupil needs to translate tabular information into an arithmetic form and then solve the problem using multiple steps and multiple arithmetic operations in the correct sequence.

Appendix I (Ctd.)**Level 6: Mathematically Skilled (Linked with Level 4 in the Test Blueprint)**

(a) Skills: Solves multiple-operation problems (using the correct order of arithmetic operations) involving fractions, ratios, and decimals. Translates verbal and graphic representation information into symbolic, algebraic, and equation form in order to solve a given mathematical problem. Checks and estimates answers using external knowledge (not provided within the problem).

(b) Example Test Items

- perform complex and detailed mathematical tasks (involving considerable abstraction of verbal, visual, and tabular information into symbolic forms and algebraic solutions) using knowledge not supplied with the task
- use of an extended verbal or graphic prompt (involving an analysis of steps) to identify the correct sequence of calculations
- convert, and operate on, units of measurement (time, distance, and weight)

The chart below shows some temperature readings made at different times on four days. Use the chart to answer questions 47 to 50.

	6 a.m.	9 a.m.	12 noon	3 p.m.	8 p.m.
Monday	15°C	17°C	20°C	21°C	19°C
Tuesday	15°C	15°C	15°C	10°C	9°C
Wednesday	8°C	10°C	14°C	13°C	15°C
Thursday	8°C	11°C	14°C	17°C	20°C

49. What was the average temperature on Wednesday?

- A. (1) 12° C (*)
- B. (2) 13° C
- C. (3) 14° C
- D. (4) 15° C

Source: SACMEQ II Pupil Test.

Rasch Difficulty: 0.710

Comment: The pupil needs to identify appropriate information expressed as temperatures in tabular form, and then to convert this into numbers, and then translate these into an arithmetic form in order to solve a problem.

Appendix I (Ctd.)**Level 7: Concrete Problem Solving (Linked with Level 5 in the Test Blueprint)**

(a) Skills: Extracts and converts (for example, with respect to measurement units) information from tables, charts, visual and symbolic presentations in order to identify, and then solves multi-step problems.

(b) Example Test Items

- use multiple verbal order of steps with conversion of time units
- translate verbal to arithmetic form, apply units conversion with long division
- convert from mixed number fractions to decimals

24. The table shows the values of x and y , where x is proportional to y . What are the values of P and Q ?

x	3	6	P
y	7	Q	35

- A. ₍₁₎ $P=15$ and $Q=14$ (*)
- B. ₍₂₎ $P=14$ and $Q=31$
- C. ₍₃₎ $P=10$ and $Q=14$
- D. ₍₄₎ $P=14$ and $Q=15$

Source: SACMEQ II Teacher Test.

Rasch Difficulty: 1.573

Comment: The pupil needs to extract information from several places in a table of figures and then apply proportionate calculations in order to solve a multi-step problem involving fractions and conversions into whole numbers.

Appendix I (Ctd.)

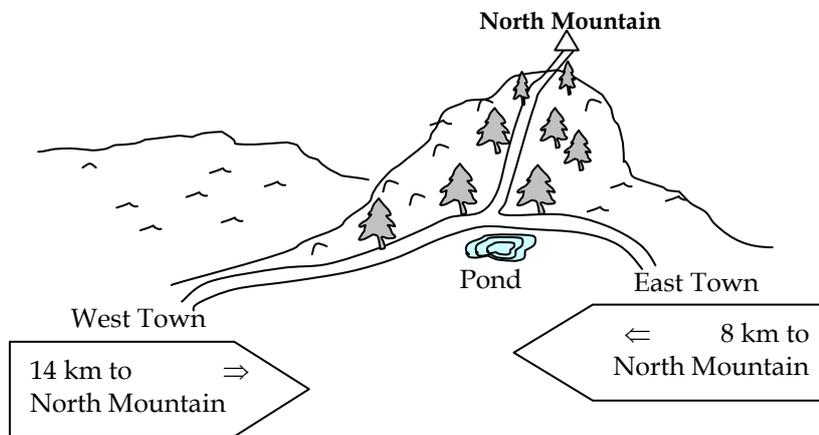
Level 8: Abstract Problem Solving (A New Level Generated from the Skills Audit)

(a) Skills: Identifies the nature of an unstated mathematical problem embedded within verbal or graphic information, and then translate this into symbolic, algebraic, or equation form in order to solve the problem.

(b) Example Test Items

- identify the nature of a problem, translate the information given into a mathematical approach, and then identify the correct mathematical strategies to obtain a solution a solution

35. There are two ways to go to North Mountain. One is from East Town and the other is from West Town. The distance from East Town to the pond in the map below is $\frac{1}{3}$ of the distance from West Town to the pond. What is the distance from West Town to the pond?



- A. (1) 7 km
- B. (2) 8 km
- C. (3) 9 km (*)
- D. (4) 10 km

Source: SACMEQ II Teachers Test.

Rasch Difficulty: 1.934

Comment: The pupil needs to translate the information given into a form of mathematical thinking and then search for a solution strategy. The pupil needs to link the unknown distances to variables and then solve simultaneous equations. The key skills are the identification of the problem, its translation into a symbolic form, and the solution of the equations.