



EdQual

A Research Programme Consortium on
Implementing Education Quality in Low Income Countries

**Research Project –
School Effectiveness and Education
Quality in Southern and East Africa**

WORKING PAPER No. 12

**RESEARCH EVIDENCE OF
SCHOOL EFFECTIVENESS
IN SUB-SAHARAN AFRICA**


Guoxing Yu

July 2007



EdQual

A Research Programme Consortium on
Implementing Education Quality in Low Income Countries

EdQual RPC is a Research Consortium led by the University of Bristol UK and sponsored by the Department for International Development, UK. 

The Consortium comprises:

- The Graduate School of Education, University of Bristol, UK
- The Department of Education, University of Bath, UK
- The Institute for Educational Planning and Administration, University of Cape Coast, Ghana
- The Faculty of Education, University of Dar es Salaam, Tanzania
- The Kigali Institute of Education, Rwanda
- The Education Policy Unit, University of the Witwatersrand, Johannesburg, South Africa.

EdQual also collaborates with the Institute for Educational Development, The Aga Khan University, Pakistan and the Instituto de Informática Educativa, Universidad de La Frontera, Chile.

EdQual runs research projects mainly in Africa, aimed at improving the quality of formal basic education for disadvantaged groups. Our projects include:

- Implementing Curriculum Change to Reduce Poverty and to Increase Gender Equity
- Leadership and Management of Change for Quality Improvement
- Literacy and Language Development through Primary Education
- School Effectiveness and Education Quality in Southern and Eastern Africa
- The Use of ICT to Support Basic Education in Disadvantaged Schools and Communities in Low Income Countries.

For more information and other papers in this series, visit www.edqual.org.

This document was prepared by Dr Guoxing Yu of Graduate School of Education University of Bristol. The author acknowledges comments from other members (Dr Sally Thomas, Dr Angeline Barrett) of the School Effectiveness and Education Quality (SeeQ) project within the DFID-funded Research Programme Consortium on Implementing Education Quality in Low Income Countries (EDQUAL) directed by Professor Leon Tikly. It has been prepared to serve as a basis to facilitate ongoing discussions on school effectiveness research in Sub-Saharan African countries, in particular, the member countries of Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ).

The views and opinions expressed in this document are those of the authors and should not be attributed to DFID, to its members or affiliated organizations or to any individual acting on behalf of DFID.

This Paper has been published by EdQual RPC and funded by the UK Department for International Development, although the views expressed are those of the Author[s].

Extracts from this Working Paper may only be reproduced with the permission of the Author[s]. ©EdQual 2008

ISBN: 978-1-906675-11-0

CONTENTS

| | |
|---|-----------|
| Abstract | iv |
| 1. Introduction | 1 |
| 2. School Effectiveness Research: an Overview..... | 2 |
| 2.1 School Effectiveness Research in Developed Countries | 2 |
| 2.2 School Effectiveness Research in Developing Countries | 5 |
| a) Fuller and Clarke | 6 |
| b) Hanushek | 7 |
| c) Heneveld | 9 |
| d) Kellaghan and Greaney | 9 |
| e) Lockheed and Levin | 10 |
| f) Pennyquick | 10 |
| g) Scheerens..... | 11 |
| h) Velez et al. | 11 |
| i) World Bank Primary Education Policy Paper and Boissiere (2004)..... | 12 |
| 3. School Effectiveness Research in Sub-Saharan Countries..... | 14 |
| 3.1 Strategies for searching and identifying literature: inclusion and exclusion criteria..... | 14 |
| 3.2 In-depth Review of the Empirical Studies..... | 14 |
| a) Abraha et al. in Ethiopia | 15 |
| b) Carrim and Shalem in South Africa | 15 |
| c) Eisemon et al. in Burundi..... | 16 |
| d) Fuller et al. in Botswana’s junior secondary school | 17 |
| e) Harber in South Africa and Tanzania | 18 |
| f) Lee and Lockheed in Nigeria..... | 19 |
| g) Lee et al. in fourteen SACMEQ countries | 20 |
| h) Lloyd et al. in Kenya | 21 |
| i) Michaelowa in PASEC countries | 22 |
| j) Nyagura and Riddell (1993) and Riddell and Nyagura (1991) in Zimbabwe..... | 23 |
| k) Urwick and Junaidu (1991) in Nigerian primary schools..... | 26 |
| 4. Context matters..... | 27 |
| 5. SeeQ Project in the DFID RPC..... | 28 |
| 5.1 Research Questions..... | 28 |
| 5.2 Research methods: Multilevel modelling and case studies..... | 29 |
| 6. Conclusions..... | 29 |
| Appendix 1: A comprehensive model of educational effectiveness (Creemers, 1994a) | 31 |
| Appendix 2: Scheerens and Bosker (1997): The foundations of Educational Effectiveness.... | 33 |
| Appendix 3: Conceptual Framework: Factors that Determine School Effectiveness (Heneveld & Craig 1996, Heneveld 1994)..... | 42 |
| Appendix 4: An integrated model of school effectiveness (from Scheerens, 1990)..... | 43 |
| Appendix 5: The Slavin/Stringfield model of school effectiveness (1992)..... | 44 |
| Appendix 6: School Functions and School Effectiveness | 45 |
| Appendix 7: A model of secondary school academic effectiveness (Sammons, Thomas and Mortimore (1997)..... | 47 |
| Appendix 8: Dimensions of school quality, Kenya (Lloyd et al. 2000)..... | 48 |
| Appendix 9: A summary of the key outcome variables in the school effectiveness studies in Sub-Saharan African countries from 1990s..... | 50 |
| Appendix 10: A summary of the school effectiveness studies in Sub-Saharan African countries from 1990s..... | 51 |
| References..... | 58 |

Abstract

This document consists of four parts. In the first part, the history of school effective research (SER) is presented briefly in terms of the epistemological evolution of SER and its methodological advancement, focusing on the key indicators/features for effective schools as demonstrated in the knowledge base of SER from both developed and developing countries. The second part reports the in-depth review of empirical studies of SER conducted in Sub-Saharan countries since 1990s. The third part discusses the importance of contexts in understanding transferability of school effectiveness indicators from one context to another. In the fourth and final part, this document introduces the conceptualisation, context and potential contribution of the SeeQ (School Effectiveness and Education Quality in low income countries) project to the knowledgebase of SER in Sub-Saharan countries.

1. Introduction

The universalization of basic education is neither achievable nor sustainable without the continuous delivery of quality education by school systems. Demand for educational quality is also increasing, as governments view the satisfactory performance of their basic education systems not only instrumentally but also strategically in relation to economic development and international competitiveness. Arrangements to monitor the effectiveness of schooling and accountability of the school systems are in place for every government to improve educational quality to meet the challenges of the global economy. Sadly, many governments of Sub-Saharan Africa have to face an additional challenge – the increasing number of pupils and teachers with HIV/AIDS that is causing dramatic changes to the school systems and the delivery of basic education and its quality.

Intensive school effectiveness research (SER) is needed to identify strategies for achieving the goals of quality *Education for All* in Sub-Saharan countries (see various initiatives to develop and enhance quality education in Verspoor 2005) . The success and usefulness of any school effectiveness research to be conducted in the Sub-Saharan countries rely first and foremost on the understanding of the existing knowledge base of SER in developing as well as developed countries¹ in general and the Sub-Saharan African countries in particular. However, previous (critical) synthetic literature reviews to this end have unduly treated, either explicitly or implicitly, developing countries as a single entity, which renders such reviews less meaningful or relevant to assist the identification of the foci of SER studies *in* and *for* Sub-Saharan countries due to the differences and the multi-complexity of the cultures and educational systems of the countries concerned. By saying this, we are not denying the significant value of such reviews, but instead pointing out the necessity of similar systematic reviews to be conducted for a specific research context like Sub-Saharan countries. While many features of effective schools identified in developed countries such as USA and UK and those in developing countries in Asia and Latin America and Caribbean are clearly relevant and useful to the understanding of school effectiveness in Sub-Saharan African countries, it is equally evident that the journey towards effective schooling in Sub-Saharan African countries is unique to the African context, the national cultures, and various local conditions. It is essential to review the school effectiveness research studies conducted in Sub-Saharan settings in order to identify those unique factors that promote or prohibit effective schooling relevant to the specific contexts. However, in a similar vein, it should be pointed out that Sub-Saharan countries *per se* are not a single entity either; and this is exactly the reason why this current review will treat each empirical study case by case (see **3.2**), rather than try to draw too much generalized conclusions. It is also an attempt to avoid the common pitfalls in reviewing SER studies, as those lamented by Purkey and Smith: "Reviews do not always find the same features to be characteristics of effective schools, even when considering basically the same literature" (Purkey and Smith 1983: 429). The prophecy of Purkey and Smith (1983) is clearly evidenced in the controversial different conclusions, drawing from the same sets of empirical studies, on the relationships between school resources and student academic achievement (e.g. Hanushek 1995; Hanushek 1997; Hedges *et al.* 1994).

The primary focus of this document is to (a) review the empirical studies on school effectiveness conducted in Sub-Saharan African countries since the 1990s, *case by case*, and (b) to present the conceptualisation and context of the SeeQ project (School Effectiveness and Education Quality in low income countries) – one of the large-scale projects within EdQual – a Research Programme Consortium funded by the Department for International Development (UK), and how the SeeQ project can contribute to the knowledge base of SER in Sub-Saharan countries and its relation to the other large-scale projects in the DFID-funded RPC.

¹ In this review, low income and developing countries, and Western and developed countries are used interchangeably.

This document consists of four parts. In the first part, the history of SER is presented briefly in terms of the epistemological evolution of SER and its methodological advancement, focusing on the key indicators/features for effective schools as demonstrated in the knowledge base of SER from both developed and developing countries. The second part reports the in-depth review of empirical studies of SER conducted in Sub-Saharan countries. The third part discusses the importance of contexts in understanding transferability of school effectiveness indicators from one context to another. In the fourth and final part, this document introduces the conceptualisation, context and potential contribution of the SeeQ project.

2. School Effectiveness Research: an Overview

2.1 School Effectiveness Research in Developed Countries

School effectiveness research started in the mid-1960s with the Coleman Report (Coleman *et al.* 1966) in the United States and the early IEA studies. Since then, there are three distinct but inter-related branches of school effectiveness research, namely, (a) school effects research – i.e. scientific properties of school effects, e.g. the size of school effects, (b) effective schools research – i.e. process oriented study of characteristics of effective schools, and (c) school improvement research – focusing and limiting its test of specific models of effective schools². Most of school effectiveness research studies have traditionally come from USA, UK and some continental European countries, in particular, the Netherlands.

Various systematic reviews of literature in school effectiveness have been conducted ever since school effectiveness research (SER) took its shape when the Coleman Report was published which found that school differences accounted for only 5-9% difference in pupils' attainment. As commented by Sammons *et al.* (1995), "the number of empirical studies which focus directly on the characteristics of effective schools is exceeded by the number of reviews of the area" (p.1). Both synthetic reviewers of literature in SER and researchers of empirical studies have been trying to come up with lists of factors affecting school effectiveness and subsequently making recipe-like³ suggestions for implementing school improvement initiatives. For example, as early as in 1970s, researchers had devoted enormous efforts searching for such recipes for school effectiveness and improvement. In the

² There were different ways of categorizing/clustering school effectiveness research. For example, Clark *et al.* (1984) divided the corpus of literature into "two lines of inquiry", namely, "instructionally effective schools" which focused on a measure of student achievement, and "school improvement" which focused on the extent to which a school adopted innovation/change. Purkey and Smith (1983) distinguished four groups of school effectiveness research: outlier studies, case studies, programme evaluations, and other studies that do not fit into the first three. Ralph and Fennessey (1983) provided another categorization: study of effective schools and study of school effects. Scheerens (1992) identified five areas of research as pertinent to school effectiveness, (a) research into equality of opportunity and significance of school in this, (b) economic studies of education production function, (c) evaluation of compensatory programmes, (d) studies of effective schools and evaluation of school improvement programmes and (e) studies of effectiveness of teachers and teaching methods. These five types of school effectiveness research operate with different conceptual and methodological focuses. There are further issues in terms of the conceptualisation of school effectiveness research, due to some nomenclature confusions in school effectiveness and associated concepts such as efficiency and school quality (see Jansen 1995: 194). In the current review, we do not intend to disentangle the black box of concepts, but treat them as "integrated school effectiveness research" and education quality, the central theme of the Research Programme Consortium funded by DFID of the United Kingdom.

³ Or even worse as Cohn and Rossmiller (1987) lamented in the late 1980s, "the research on effective schools has produced a list of ingredients but has not, to this point, produced a recipe for an effective school. The research does not specify the precise ingredients necessary for an effective school nor identify the relative importance of the various ingredients." (p.399).

USA, Weber (1971) listed a number of characteristics for successful schools such as strong leadership, high expectations, and good atmosphere. Similarly, Edmonds (1979) listed five characteristics of an effective school:

- (a) strong administrative leadership,
- (b) high expectations for students' achievement,
- (c) an emphasis on basic skills instructions,
- (d) a safe and orderly climate conducive to learning, and
- (e) frequent evaluation of pupil progress.

In the UK, Rutter *et al.* (1979) found a number of factors such as (a) the reward system of the school, (b) the school physical environment and (c) the use of home work in the school were connected with levels of school effectiveness⁴. When more complex research methods and data analysis tools were applied, Mortimore *et al.* (1988) identified twelve characteristics of effective schools and classroom practices covering a range of facets in the life of a school:

- (a) a purposeful leadership,
- (b) involvement of deputy head,
- (c) involvement from the part of the teachers,
- (d) consistency among teachers,
- (e) structured sessions,
- (f) sharp focus within sessions,
- (g) intellectually challenging teaching,
- (h) a work-centred environment,
- (i) maximum communication between teachers and pupils,
- (j) record keeping,
- (k) parent involvement, and
- (l) a positive climate.

Besides the lists of characteristics of effective schools provided by scholars of primary studies, reviewers of SER studies of developed countries (Fraser 1989; Fraser *et al.* 1987; Purkey and Smith 1983; Reynolds *et al.* 1994; Reynolds and Cuttance 1992; Rutter 1983; Sammons *et al.* 1995) also endeavoured to come up with many similar recipes.

Purkey and Smith (1983), focusing on US SER literature, identified nine organizational/structural and four process characteristics fostering school effectiveness:

- (a) emphasis on school-site management, with considerable autonomy given the school leadership and staff
- (b) strong instructional leadership provided by the school head teacher, other administrators, or teachers
- (c) staff stability and continuity are valued, thus facilitating agreement and cohesion
- (d) curriculum articulation and organization are used to achieve agreement on goals, to develop a purposeful programme of instruction coordinated across grade levels, and to provide sufficient time for instruction
- (e) school wide staff development, based on the expressed needs of teachers, involving the entire school staff and closely related to school's instructional programme
- (f) parental involvement and support of school goals and student responsibilities, especially with regard to homework
- (g) school wide recognition of academic success, thereby encouraging students to adopt similar norms and values
- (h) maximized effective learning time
- (i) district support
- (j) collaborative planning and collegial relationships to help break down barriers, develop consensus and promote a sense of unity
- (k) sense of community

⁴ See also later on Rutter's 10 questions that matter for policy and practice in school effectiveness and improvement (Rutter and Maughan 2002).

- (l) clear goals and high expectations, including clearly defined purposes and agreement in priorities
- (m) order and discipline are based on clear rules enforced fairly and consistently.

The organizational/structural (a-i) and process variables (j-m) are interrelated and interdependent. The organizational/structural variables provide the essential framework within which the process variables can be operated and developed.

Sammons *et al.* (1995), in an OFSTED-commissioned literature review focusing mainly on the studies conducted in the UK, while comparing and contrasting with US and Dutch ones, listed 11 factors for effective schools which were not necessarily independent of each other:

- (a) professional leadership: firm and purposeful
- (b) shared vision and goals: unity of purpose, consistency of practice, collegiality and collaboration
- (c) a learning environment: orderly atmosphere, attractive working environment
- (d) concentration on teaching and learning: maximisation of learning time, academic emphasis, focusing on achievement
- (e) purposeful teaching: efficient organization, clarity of purpose, structured lessons, adaptive practice
- (f) high expectations: communicating expectations, providing intellectual challenge
- (g) positive reinforcement: clear and fair discipline, feedback
- (h) monitoring progress: monitoring pupil performance, evaluating school performance
- (i) pupil rights and responsibilities: raising pupil's self-esteem, control of work, positions of responsibility
- (j) home-school partnership: parent involvement in their children's learning
- (k) a learning organization: school-based staff development

Indeed, many other more comprehensive, and probably more systematic, models of school effectiveness (see Appendices 1-8 for examples) have been proposed, mainly based on research evidence from developed countries (e.g. Creemers 1994a; Sammons *et al.* 1997; Scheerens and Bosker 1997). Although the models focus on different contexts and may have different rationales behind them, there seems to be more one-way flows from *input* → *process* → *output* than interactions and dynamics within and between the three key elements *per se*. All the models also seem to suggest, though implicitly, that *output* is the end product of schooling. In none of the models (except Sammons *et al.* 1997) can we see whether/how an output of schooling may affect reciprocally the factors of input and process.

Various properties associated with effective schools have been generated in the individual empirical studies and research syntheses; however, as Purkey and Smith (1983: 427) commented on the existing literature then, the school effectiveness research (and the syntheses of research evidence) tends to "*present narrow, often simplistic, recipes for school improvement derived from non-experimental data*". In addition, the recipes suggested by the empirical studies and the research syntheses may well be specific to the research contexts and the purposes of the research syntheses, as demonstrated from the different focus and order of the essential characteristics of effective schools listed by Purkey and Smith (1983) and Sammons *et al.* (1995), although there does seem to be some consensus on the effectiveness enhancing conditions of schooling, with respect to:

- (a) achievement orientation or high expectations,
- (b) educational leadership,
- (c) frequent monitoring and evaluation, and
- (d) time and opportunity to high quality learning (see Purkey and Smith 1983; Sammons *et al.* 1995; Scheerens 1992; Scheerens 2000b for example).

However, the direct or off-the-shelf usefulness and relevance of the recipes derived from SER literature in developed countries to the developing countries (i.e., transferability) **still** calls into question, although there have been huge efforts to carry out the *trans-national planting* of the characteristics of effective schools from the developed to the less developed countries,

in practice as well as in research syntheses (e.g. Cohn and Rossmiller 1987)⁵. See our further discussion on the importance of contexts in understanding school effectiveness indicators in Section 4. The following section reviews school effectiveness research in developing countries.

2.2 School Effectiveness Research in Developing Countries

This section focuses more on the existing research syntheses of SER than on individual empirical studies since it is beyond the scope of this paper to review the studies country by country in the developing world (see in-depth review of empirical studies in Sub-Saharan countries in Section 3). To some extent, this section is therefore a review of reviews to illustrate various general issues that may be pertinent to Sub-Saharan African contexts. Originally, we planned to review only the reviews of SER studies published after 1990, but due to the small number of such reviews available, we therefore also reviewed some of the seminal reviews that were published in the 1980s and still frequently cited in the SER literature in developing countries (in particular, Fuller 1987 which has been cited over 60 times according to the journal citation statistics based on ISI Web of Knowledge as at 17 July 2006).

Reviews of SER literatures had traditionally focused on developed countries. Similar endeavours/attempts, driven by the concept of educational production function and cost-effectiveness were started (mainly) in the late 1970s (e.g., Simmons and Alexander 1978) to review SER literature in developing countries. Reviews of a specific factor of school effectiveness (e.g. drop outs) in developing countries started earlier (e.g., Levy 1971).

Jansen (1995) identified two generations of SER in developing countries: the first generation in the 1970s studies were modelled on the methodologies of the Coleman Report (Coleman *et al.* 1966) and informed by the concept of production function in econometrics; the second generation in the 1980s used more sophisticated statistical techniques and were financed exclusively by the World Bank to identify **which** school factors were stronger determinants of academic achievement and therefore better cost-effective investments in developing countries (see a recent World Bank paper on "determinants of primary education outcomes in developing countries" by Boissiere 2004). SER studies supported financially by World Bank have by far been the most influential in educational policy systems of the developing world. The "third wave" of SER of developing countries (Riddell 1989; Riddell 1997) that applied multilevel analyses to questions of school effectiveness⁶ started in the late 1980s (e.g., Lockheed and Longford 1989) and has increasingly gained momentum since then (e.g., Fuller *et al.* 1994; Lee *et al.* 2005; Nyagura and Riddell 1993).

Below are the key factors fostering school effectiveness, as suggested in school effectiveness research syntheses that covered mainly the first two generations of school effectiveness research in developing countries. In particular, this paper focuses on the reviews, in alphabetical order, by Fuller (Fuller 1987; Fuller and Clarke 1993; Fuller and Clarke 1994), Hanushek (1995), Heneveld (1994; Heneveld and Craig 1996), Kellaghan and Greaney (1992; 2001; 2004), Lockheed and Levin (1993), Pennycuik (1993), Scheerens (2000a; 2000b; 2001a), Velez *et al.* (1993), and World Bank Primary Education Policy Paper and Boissiere (2004). We then discuss briefly the differences and similarities in SER research foci and findings between the developing and the developed countries.

⁵ It is unfair to say that the two reviewers were completely unaware of the importance of economic and cultural background of the individual less developed countries (LDCs) in designing, conducting and monitoring educational reform to improve school effectiveness. They rightly pointed out "policies to improve education in LDCs must be carefully designed and monitored to tailor the reform to the economic and cultural background of the individual countries" (p.399).

⁶ See Section 5 for discussion on the advantages of using multilevel modelling techniques over ordinary least square regression analyses.

a) Fuller and Clarke

Fuller and Clarke (1994) who reviewed the SER studies that adjusted achievement for students' family background concluded that "rather consistent school effects" emerged in three major areas:

- availability of textbooks and supplementary reading materials,
- teacher qualities (teacher's subject knowledge and verbal abilities)
- instructional time and work demands on students

Around 50% of the SER studies [i.e. those reviewed in Fuller (1987), Lockheed and Hanushek (1988), Lockheed and Verspoor (1991), plus some 40 studies conducted from 1987-1993] in developing countries showed significant positive associations between academic achievement and school input as well as process variables (e.g., classroom pedagogy and organisation, school management, see Table 1 below). However, it is interesting to note that class size and teacher salaries had inconsistent or no effects on student academic achievement.

| School/teacher factor | Number of significant effects/number of analyses | |
|--|--|-------------------|
| | Primary Schools | Secondary Schools |
| <i>School spending</i> | | |
| Expenditure per pupil | 3/6 | 3/5 |
| Total school expenditure | 2/5 | - |
| <i>Specific school inputs</i> | | |
| Average class size | 9/26 | 2/22 |
| School size | 7/8 | 1/5 |
| Availability of textbooks | 19/26 | 7/13 |
| Supplementary readers | 1/1 | 2/2 |
| Exercise books | 3/3 | - |
| Teaching guides | 0/1 | - |
| Desks | 4/7 | 0/1 |
| Instructional media | 3/3 | - |
| Quality of facilities | 6/8 | 1/1 |
| School library | 16/18 | 3/4 |
| Science laboratories | 5/12 | 1/1 |
| Child nutrition and feeding | 7/8 | 1/1 |
| <i>Teacher attributes</i> | | |
| Total years of schooling | 9/18 | 5/8 |
| Earlier measured achievement | 1/1 | 1/1 |
| Tertiary or teacher college | 21/37 | 8/14 |
| In-service teacher training | 8/13 | 3/4 |
| Teacher subject knowledge | 4/4 | - |
| Teacher gender (female) | 1/2 | 2/4 |
| Teacher experience | 13/23 | 1/12 |
| Teacher salary level | 4/11 | 2/11 |
| Teacher social class | 7/10 | - |
| <i>Classroom pedagogy and organization</i> | | |
| Instructional time | 15/17 | 12/16 |
| Frequent monitoring of pupil performance | 3/4 | 0/1 |
| Class preparation time | 5/8 | ½ |
| Frequency homework | 9/11 | 2/2 |
| Teacher efficacy | 1/1 | 0/1 |
| Cooperative learning task student | - | 3/3 |
| <i>School Management</i> | | |
| School cluster membership | 2/2 | - |
| Principal's staff assessment | 3/4 | 0/1 |
| Principal's training level | 3/4 | 1/2 |
| School inspection visits | 2/3 | 0/1 |
| Tracking or pupil segregation | 1/1 | - |

Table 1: Effects of school and teacher factors on student achievement
(Source: Fuller and Clarke 1994, p.126)

b) Hanushek

School effectiveness research in developing countries (especially those financed by the World Bank) has been driven by the concept of production function in econometrics (see the special issue of *Economics of Education Review*, 1996, vol. 15 (4) on educational production function research in developing countries, e.g. Chile, Philippines). Educational production function research has been interested in understanding the relationship between student academic achievement and school spending [for a review and analysis of 35 years of educational production function research see Verstegen and King (1998), and also reviews by Hanushek (1995; 1997; Harbison and Hanushek 1992)], in terms of teacher-pupil ratio, teacher's

education, salary, experience, and per pupil expenditure, etc. School effectiveness research in the tradition of educational production function has been much concerned with the econometric notion of cost-effectiveness. Awareness of cost-effectiveness is a focus in many school effectiveness studies in developing countries.

In a vote tally method (see Table 2 below), Hanushek (1995) suggests that “there are no clear and systematic relationships between key inputs and student performance” (p.232). Inefficiency was pervasive.

| Input | # of studies | Statistically significant | | Statistically insignificant |
|-----------------------|--------------|---------------------------|----------|-----------------------------|
| | | Positive | Negative | |
| Teacher-pupil ratio | 30 | 8 | 8 | 14 |
| Teacher’s education | 63 | 35 | 2 | 26 |
| Teacher’s experience | 46 | 16 | 2 | 28 |
| Teacher’s salary | 13 | 4 | 2 | 7 |
| Expenditure per pupil | 12 | 6 | 0 | 6 |
| Facilities | 34 | 22 | 3 | 9 |

Table 2: Relationship between inputs and student performance
(Source: Hanushek 1995 from Harbison and Hanushek 1992)

The central theme of his argument was that the traditional approach to providing quality education by simply providing more inputs was frequently ineffective. He therefore called for some “natural policy measures” (p.228) to alleviate the existing inefficiencies such as:

- the introduction of substantially stronger performance incentives in schools, such as merit pay that rewards teachers for what their students learn as a simple example.
- decentralized decision making
- systematic monitoring and evaluation of student performance (see also **2.2.c** below).

In one of his recent publications using educational production function analyses of TIMSS data (Hanushek and Luque 2003), Hanushek again attested his earlier findings about the inefficiency of school resources in both developed (Hanushek 1997) and developing countries (Hanushek 1995). The inefficiency of resource was not related to the income level of the country or level of resources in the schools. It again challenges the conventional view that school resources are relatively more important than families in developing countries than in rich countries, as demonstrated in other empirical studies using similar international assessment data (e.g. Heyneman and Loxley 1982; Heyneman and Loxley 1983) and also in research syntheses (e.g. Scheerens 2000a, 2000b, 2001a, see **2.2.g** below). The abundant or lack of school resources may play a less important role than the efficiency in the use of such resources. In a similar production function analyses of TIMSS data, Wößmann’s (2003) found that student-level international differences in achievement in science and mathematics could not be attributed to resource differences but were considerably related to institutional differences such as a centralized examination system and school autonomy (see also **2.2.i** below). However, it is noteworthy that the sampled countries/regions in the analyses of TIMSS data by Hanushek and Luque (2003) and Wößmann (2003) are all relatively wealthy. For instance, no African countries that participated in TIMSS (e.g. South Africa, Morocco) were included in Hanushek and Luque’s (2003) analyses. We argue that the generalization of their findings to developing countries could be problematic and dangerous for policy making, particularly for African contexts, although we value Hanushek and Luque’s (2003) suggestion that “looking beyond simple resource policies appears necessary” (p.498).

The findings from educational production function studies are further complicated by the methodological difficulties in evaluating school effectiveness from behavioural data due to measurement errors (Behrman 1996) and the strikingly diverse views on their usefulness and applicability in developing countries. As Farrell and Oliveira suggests “Concern must be not simply with effectiveness, but also with cost-effectiveness or efficiency” (Farrell and Oliveira

1993: 28). "In poor nations ... one cannot consider the effectiveness of schools in isolation; one must consider the effectiveness of various schooling alternatives in relation to their cost. One must be concerned not with school effectiveness as such, but with the internal efficiency of schooling, searching for ways of increasing the total learning output of the system without increasing total system costs" (p.29). However, Riddell (1997: 186) holds very different views on production function analyses in school effectiveness: "Crude production-function analyses neither answer questions about school effectiveness nor shed light on the narrower issues of educational efficiency because the effects that purportedly are related to the identified 'inputs' cannot be separated from the pre-existing conditions of student populations. Therefore, the greater differentiation between schools in developing countries could be attributed to the differentiation in access to schools by different social groups as much as to the differentiation in school resources."

c) Heneveld

Heneveld proposes a conceptual framework (see Appendix 3) of school effectiveness (Heneveld 1994; Heneveld and Craig 1996) which consists of an interrelated network of 16 factors that influence student outcomes which are characterized in four ways: participation, academic achievement, social skills and economic success. The 16 factors are organized in four groups:

- Supporting inputs including both hardware (e.g. textbooks and other learning materials, facilities) and software (e.g. support from parent, community and nation-wide education system);
- Enabling conditions such as effective leadership, capable teaching force, flexibility and autonomy, high time-in-school;
- School climate including high expectations of students, positive teacher attitudes, order and discipline, organized curriculum, rewards and incentives;
- Teaching/learning process including high learning time, variety in teaching strategies, frequent homework, student assessment and feedback.

However, as Heneveld (1994) points out the factors that determine school effectiveness have to be understood and imbedded in a particular context including institutional, cultural, political and economic factors. The particular strength of this conceptual framework lies exactly in its marriage between the policy-mechanics approach in the earlier SER studies as noted by Fuller and Clarke (1994) and the process-oriented classroom culturalist and also in its detailed definitions and indicators **relevant to** sub-Saharan African context, although the formation of the conceptual framework relied mainly on research evidence in school effectiveness and improvement in industrial countries. For example, two particular quality indicators of classroom equipment (as part of *Supporting Inputs: adequate material support*) such as "usable blackboard and sufficient chalk" and "enough desk places so that all students enrolled in the class have a place" may have been taken for granted in wealthy countries, but could be essential indicators of school facilities that may affect student learning outcomes.

The conceptual framework, as demonstrated by Heneveld (1994), can be used for three interrelated purposes: (a) as a planning tool to determine the conditions that a country wishes to achieve in its schools, (b) as an evaluation tool to analyse individual primary schools in Africa in order to formulate more general pictures of school quality in a given education system, and (c) as a tool to monitor and evaluate the implementation of activities aimed at improving the effectiveness of African primary schools.

d) Kellaghan and Greaney

Assessing and monitoring student academic progress/achievement is considered an important factor in promoting school effectiveness in both developed countries (see Edmonds 1979; Sammons *et al.* 1995 in Section 2.1 above) and developing countries (see the review by Fuller and Clarke 1994 in Section **2.2.a**). From the perspectives of developing countries, Kellaghan and Greaney (1992; 2001; 2004) have been the key proponents of singling out the use of assessment/examinations reforms to engineer change at the levels of educational policy and teaching practice to enhance quality, for example, through national assessment

reform and participation in international assessment (see also Beaton *et al.* 1999). Various recommendations were made by the authors at their series of publications by the World Bank (1992; 2001; 2004) to enhance the positive impacts (i.e. backwash effects) of examination and assessment on improving student academic achievement. For example:

- Examinations should reflect the full curriculum, not merely a limited aspect of it.
- Higher-order cognitive skills should be assessed to ensure they are taught.
- Skills assessed should not be limited to academic areas but be relevant to out-of-school tasks.
- A variety of examination formats should be used, including written and oral, and classroom assessment
- In evaluation of test results, account should be taken of factors other than teaching effort.
- The number of public high-stakes examinations should be reduced to help diminish grade repetition and dropout rates and sense of failure experienced by students.
- More time for teaching than for teaching to the public examinations.
- Detailed and timely feedback should be provided to schools on their pupils' performance and areas of difficulty in public examinations.
- Examination board should have a research capacity and should work closely with curriculum organisations.

However, we think that the desired impacts of educational assessment reform to improve classroom instruction and ultimately students' academic achievement may be achieved, but not guaranteed (see also Chapman and Snyder 2000).

e) Lockheed and Levin

Lockheed and Levin (1993) argued that creating effective schools in developing countries requires three elements or solutions:

- necessary inputs in terms of curriculum, instructional materials, quality time for learning, and teaching practice promoting students' active learning;
- facilitating conditions: community and parent involvement, school-based professionalism in leadership, collegiality, commitment and accountability, flexibility and adapting to local needs such as curricula relevance, adjustment in level or pace, organizational and pedagogical flexibility; and
- the will to change and act

f) Pennycuick

Pennycuick (1993) on behalf of DFID reviewed several interventions considered essential for promoting school effectiveness, for example:

- pre-primary education
- school physical facilities
- interactive radio instruction
- provisions of textbooks and learning materials
- pupil's health status
- curriculum content
- teacher effectiveness
- examination reform

To Pennycuick (1993), there seems to be a certainty as evidenced in his comment that "*it is clear that developing countries must concentrate their resources on those improvements that are known to enhance student learning*" (p.2). However, this kind of certainty is clearly challenged by Fertig (2000). What works in one context may well fail in another context due to various reasons. It should also be pointed out that Pennycuick's review was less systematic than most of the other research syntheses that we have reviewed so far (e.g. Fuller and Clarke 1994, Hanushek 1995, Scheerens 2000a, 2000b, 2001a).

g) Scheerens

Scheerens (2000a; 2000b; 2001a), in a series of reviews comparing findings of SER studies in developing and developed countries, on behalf of World Bank and UNESCO IIEP, draws three major conclusions (2001a: 361):

- considerably larger between school-variation in developing than developed countries;
- a more consistent and stronger positive effects of material and human resource input factors in developing countries
- inconclusive and weak evidence on the effect of instructional factors that have received empirical support in industrialized countries.

h) Velez et al.

Velez et al. (1993) reviewed 18 empirical quantitative studies at the primary level conducted at Latin America and the Caribbean mainly in the 1980s. Using vote tally method to review the 88 regression equations or models of education production functions in the 18 studies, they examined the "alterable" factors in the studies. These "alterable" factors referred to school and teacher characteristics that were subject to policy interventions. In particular:

- school characteristics such as class size, student/teacher ratio, school size, school funding (private/public), school location (urban/rural), co-education/non-coeducation, male teacher/male student, female teacher/female student, and shifts (morning/afternoon);
- educational materials such as access to textbooks and reading materials, other instructional materials, and infrastructure;
- teacher characteristics such as years of schooling, years of teaching experience, in-service teacher training, economic incentives, socio-economic status, distance of living place to school, subject knowledge, expectation of pupil performance, time spent for class preparation, sex, job satisfaction, employment status (part/full time) and additional job;
- pedagogical practices such as homework practices, evaluation and follow-up, hours of curriculum, teacher absenteeism, and emphasis on math and language;
- management and leadership such as head teacher's years of schooling, years of experience as head teacher, years of teaching experience, number of supervisory visits, number of services offered, and extra curricular activities;
- student learning experience such as preschool education, grade repetition, number of schools attended, attitudes towards learning, parents' help with homework, distance to school, opinion about teacher and school, self-esteem, attitudes towards parents, hours of reading per week, and work/house chores;
- student health/nutrition status such as height by age, weight by height, vision and auditory health.

Among these "alterable" factors, they identified a dozen "alterable" factors that were related to academic achievement: 10 factors for positive association with high academic achievement, and 2 negative:

- active teaching methods
- access to textbooks and other instructional materials
- pre-service formal education was more effective than traditional in-service teacher training;
- provision of basic infrastructure such as electricity, water and furniture;
- teacher experience, subject knowledge and closeness to school;
- time on task and coverage of curriculum (while teacher absenteeism was negatively related);
- student attitudes;
- preschool;
- homework practices, including parent involvement;
- school size (Note: class size did not seem to have effects on learning)

The following 2 factors were negatively related to academic achievement:

- distance to school;

- grade repetition and overage pupils

In addition to the identification of the “alterable” factors, they also listed several “non-alterable” factors that were exogenous to the school environment, e.g., student socio-economic background. We argue that although these factors are out of control of schools, it is essential to include them in any SER study in order to gain better understanding of how they function in the school system and therefore better understanding of school effectiveness net of effects of out-of-school variables.

i) World Bank Primary Education Policy Paper and Boissiere (2004)

World Bank’s Primary Education Policy Paper (1990) identified five principal contributors to primary education effectiveness:

- curriculum,
- learning materials
- instructional time
- classroom teaching, and
- student learning capacity

World Bank Operations Evaluation Department’s review on the “*determinants of education quality in developing countries*” (Boissiere 2004) further confirmed the five “golden” contributors to school effectiveness at primary level. Boissiere (2004) reviewed the dominant and alternative approaches to determinants of schooling outcomes of developing countries. Educational production function approach has been predominant in understanding the relationships between outcomes and inputs. Two alternatives, namely, randomized trials and natural experiments which are oftentimes used for impact evaluation of educational policy and programme interventions, also shed valuable light on how input, such as resources, school and student characteristics can influence schooling outcomes. The aforementioned approaches that are very often quantitative in nature are gradually being complemented by qualitative methods, for example, classroom observation and interviews to understand the “what’s actually happening” – i.e. the process variables. These approaches **together** shed light on the black box of school effectiveness. Five categories of “determinants of primary education outcomes in developing countries” are identified:

- **Hardware**, such as school building, classroom and furniture, sanitation.
In relation to sub-Saharan contexts, White’s (2004) case study in Ghana about the effects of hardware input on students academic achievement documents some evidence of the strong and positive relationships between hardware inputs and student outcomes.
- **Software**, such as curriculum, pedagogy, textbooks, writing materials
 - The single most important cost-effective factor was textbooks⁷ and other material inputs as demonstrated in the literature (e.g. Fuller 1987; Fuller and Clarke 1994; Fuller and Heyneman 1989; Lockheed and Verspoor 1991), in particular, in the educational production function literature. This is also documented in Bossiere’s review (2004), as well as in White’s (2004) case study in Ghana.
 - However, curriculum factors such as proportion of instructional time for literacy and numeracy, teaching methods and teaching preparation received less attention in educational production function research.
 - Language for instruction and assessment has been a politically sensitive issue in many developing countries, as pointed out by Kelleghan and Greaney (see **2.2.d** above).

⁷ World Bank textbook initiatives have found significant and consistent effects of providing textbooks and other learning materials on student academic achievement. However, it may not always be the case. Glewwee *et al.* (2001) provides some caveats in Kenya. Crossley and Murby (1994) further elaborate issues of textbook provisions, by arguing that the provision of textbooks is not the end of product in itself, it does not guarantee the proper and full use. They suggest that “*increased attention should be given to the planning and co-ordination of the multiplicity of issues relating to textbook development and utilisation*” (p.99), based on their experience in the Papua New Guinean case study.

- **Teacher** - teacher effectiveness forms an increasingly important part of school effectiveness research. The World Bank policy paper in 1990, based on extensive literature review, identified three key issues for teacher effectiveness, namely, knowledge of subject matter, pedagogical skills and teacher motivation (including salary and other performance incentives).
- **Management and institutional structure** - The World Bank has been promoting decentralization and school autonomy as part of the reforms for school- or site-based management in developing countries⁸. Wößmann's (2003) production function analyses of TIMSS data suggest that the presence of central examination system (see also **2.2.d**) and central control of curriculum and textbooks were positively correlated with students' mathematics and science achievement, so was autonomy at school level in formulating budgets and hiring teachers. However, it should be noted that TIMSS data were collected mainly from relatively wealthy countries, with only few Sub-Saharan African countries involved (see also **2.2.b** for our comments on Hanushek and Luque 2003).
- **Context and background variables** such as student nutrition and health status, academic ability, family and community background.
 - Students' nutrition and health status can be considered both as input factors and an outcome of schooling.
 - Improvement of girls' primary education would in turn affect the learning capacity of the next generation, as indicated by Glewwe's (2002) literature review on the influence of mother's education on the health and nutrition status of their children.

Our review of SER literature in both developed (**2.1**) and developing countries (**2.2**) documents the evidence of the differences **and** the similarities in research foci and findings between the developed and developing countries. The different focus of SER in developing countries to some extent reflects researchers' awareness of the importance of contextual and cultural factors in SER studies in developing countries. The similarity might well reflect, on the one hand, the efforts of Western researchers (e.g. World Bank staff) in *trans-national planting* the findings and methodology of SER in developed countries to the developing world; and on the other hand, the shared understanding, consensus and unity of SER as an evolving discipline. It may also well reflect the fact that both sides are talking about exactly the same concept – schooling – though in different educational and social contexts. "*This is not surprising since the basic elements of a school – teachers, pupils, prescribed content, an organized timetable, a building – are accepted in Africa as in the rest of the world*", as Heneveld (1994: 4-5) comments on the potential transferability of findings. We view that this kind of interaction between the developing and developed countries provides a bilateral learning platform for researchers from both sides. However ignoring the different contexts when interpreting and implementing research findings would be irresponsible and unlikely to achieve intended outcomes.

As we argued at the end of the review of SER literature of developed countries in **2.1**, context matters. Just like developed countries, developing countries are not a single unity either. Each single country operates its own education system embedded in their specific cultural and political values. The generalization of the findings from SER studies at the level of developing countries as a single unity may not have direct relevance to the Sub-Saharan African context which itself operates in very different educational mechanisms. (see Section **4** for further discussion on *Context Matters*). What complicates further the direct usefulness and relevance of findings from one context to another is the fact that "*the research on effective schools has produced a list of ingredients but has not, to this point, produced a recipe for an effective school. The research does not specify the precise ingredients necessary for an effective school nor identify the relative importance of the various ingredients.*" as Cohn and Rossmiller (1987: 399) lamented in the late 1980s. The following

⁸ However, it should be noted that rigorous studies on the effects on learning outcomes of school- or site-based management in developing countries are rare, though some promising findings are already emerging (see Fullan and Watson 2000).

section reports the detailed reviews of empirical SER studies conducted in Sub-Saharan African countries, highlighting the research context and the specific focuses (i.e., the so-called “various ingredients” in the recipes) of each study.

3. School Effectiveness Research in Sub-Saharan Countries

3.1 Strategies for searching and identifying literature: inclusion and exclusion criteria

Identification of relevant literature was conducted systematically at several steps.

- Initial searches in

- bibliographical databases including Australian Education Index (AEI), British Education Index (BEI), Educational Resources Information Center (ERIC), and ISI Web of Knowledge (social science citation index only), using key words: educational effectiveness, school effectiveness, school effect, effective schooling, and effective school (see Footnote 2);
- library catalogues including University of Bristol and British Library integrated catalogue;
- full text publications in UNESCO and World Bank websites

- Creation of a bibliographic database by importing/inputting all the references into EndNote reference management programme;

- Visualization of the EndNote database, using RefViz to map the field of SER: a clear pattern of literature in school effectiveness emerged, e.g., who are the major scholars and what are the main research topics/focuses (e.g. sociological/philosophical debates on the ethical and moral issues of SER, methods and approaches of data collection and analyses such as multilevel modelling and value added measures).

- Applying the following five criteria to exclude irrelevant references in the order of: all pre-1990 references, not in English, non-empirical studies (but publications of research syntheses were kept in another database for future use to gain overall understanding of school effectiveness research in general), empirical studies in developed countries, empirical studies which were not conducted in Sub-Saharan African countries.

- Collection of full texts of the empirical studies that were included in the EndNote database

- Collection of full texts of the research syntheses (in another EndNote database (see above))

- Skimming the citations of the research syntheses on SER in developing countries, and further empirical studies in Sub-Saharan African countries were identified.

- Collection of full texts of Sub-Saharan empirical studies identified through the citations of research syntheses

- Reading and reviewing the empirical SER studies conducted in Sub-Saharan African countries (few more empirical studies were cross-identified from the citations of these empirical studies)

3.2 In-depth Review of the Empirical Studies

Although we did systematic searching and identification of empirical studies conducted in Sub-Saharan African countries, the empirical studies reviewed below in detail in alphabetic order are not meant to be exhaustive. However, it does suggest the paucity of research conducted from 1990s compared to 1970s-1980s, and also the urgent need for more empirical studies to be conducted for sustainable and sufficient understanding of issues surrounding school effectiveness in this area.

a) Abraha et al. in Ethiopia

Abraha et al. (1991) first looked at how girls' *persistence* (i.e. retention rate) through primary schools and their *performance* in Ethiopian national examination varied across 182 sample schools in urban and rural communities. Second, they assessed the relative influence of community characteristics versus school qualities or characteristics on girls' educational achievement. The central aim of this research was to understand how school-based interventions could boost female enrolment and achievement.

Data were collected from the 182 schools randomly selected from two provinces from each of the 13 regions randomly selected. The outcomes measures included female students' *persistence* through school and their test *performance* in national examination. The persistence measure was simply the number of girls enrolled in grades 4-6 divided by the number of boys. Two measures of female performance were used: (a) simple percentage of girls passing the national examination (i.e. pass rates) and (b) ratio of female/male pass rates. The community factors included:

- Economic status (commercial, surplus-rural, or subsistence farming)
- Dominant language group
- Urban or rural status (urban, village located on main road, or in a remote area)

The school characteristics data included:

- Indicators of school size and formalization (e.g., number of classrooms, shifts, teachers, and year the school was established, ratio of pupils per teacher)
- Sessions offered
- Teacher qualities (e.g., number of teachers by gender, length of teaching experience, teacher schooling experience, formal teacher training)

The researchers found that there were wide variations in girls' persistence throughout the primary schools. Girls attending schools in urban areas persisted at a higher rate and did better in the national examination. Girls attending larger, more formalized schools persisted longer, after controlling for the influence of community factors. Crowded school conditions did not hinder girls' persistence. Girls tended to persist at higher rates if attending schools with more experienced teachers. The percentage of female teachers and teachers' level of pre-service training were not related to girls' persistence. It seemed that indicators of school qualities/characteristics such as age of the school, number of class shifts tended to have positive correlation with female persistence. However, the discrete influence of school characteristics on girls' performance remained unclear. Class size, number of shifts did not relate to girls' performance in any consistent manner.

b) Carrim and Shalem in South Africa

Carrim and Shalem (1999) reported findings of two school effectiveness research projects conducted in the Johannesburg area of the Gauteng province in South Africa. The first project was the School Effectiveness in South Africa (SESA) initiated by Advancing Basic Education and Literacy and some members of the Education Department of the University of the Witwatersrand in 1992. The second project was initiated by the Gauteng education minister via the establishment of a Committee of the Culture of Learning and Teaching in 1995. The two projects were different in many respects, but they shared the same theme of the black schooling in South Africa. In the paper, the authors provided detailed accounts, from "insider perspectives" in the tradition of qualitative research methodology, of the seven schools involved in the two projects. Instead of listing "various ingredients" of school effectiveness, they described in a holistic manner the discourse of the schools' reported experiences in relation to issues such as administration and control, school governance, discipline, motivation of students and teachers, and community relations. These reported experiences demonstrated that schools operate in complex and sometimes contradictory contexts, though the schools may have similar socio-economic background as defined in many monetarist quantitative school effectiveness studies. The authors argued for a shift from educational production function emphasis to qualitative approaches to capture "the nuances and differences in contexts, diversities of school actors' perspectives and interests, and the plurality of tensions and conflicts in the social relations of the school" (p.81), so as to better

understand the intricacies of everyday school realities and various issues surrounding school effectiveness.

The most significant contribution of this paper to SER, we think, goes beyond its detailed account of the intricacies of South Africa's black schools *per se* and the various functional effectiveness of different schools, but in its convincing arguments on the necessity of using ethnographic methods and case studies to capture the school realities in order to shed light on various issues of school effectiveness, particularly for South Africa "*because of the fragmented nature of the educational system and the vastly different contexts and experiences of schooling for various racial groups in South Africa*" (p.81).

c) Eisemon et al. in Burundi

The central concern of Eisemon *et al.* (1993) was how language may affect the measurement of literacy, mathematics, and science achievement⁹. In addition, the paper also addressed questions like what contributed to effective instruction at classroom level, and whether and how grade repetition affected students' academic achievement.

Sixth-grade students and teachers in predominantly rural areas of Burundi were the focus of data collection. A multi-stage stratified cluster sample was drawn by probability methods from twenty-one cantons of the country (there were altogether 31 cantons in the country, 10 were excluded: three as predominantly urban, two because of ethnic violence, five because of containing too many inaccessible schools). A total of 1946 students in 47 classes in 24 clusters were surveyed during a two-month period prior to administration of the *concours national*. The sample ranged in age from 11-19 years. Over ½ of the students were 14 or 15 years old; only 10% started school at age 6 and progressed to the sixth grade without repeating. 55% were repeating the sixth grade, 50% had repeated previous grades. The majority (59%) were male students. All but one school director and most (80%) of the grade 6 teachers were male.

Tests were developed to assess student achievement in the domains of reading comprehension, written composition in narratives, mathematics and science (including elements of agriculture and health as well). The tests were initially developed in English and then translated into French and from French to Kirundi. Five versions of the tests were administered to sub-samples as follows: French comprehension and composition (with standard French) to 1/8 of the students; French comprehension and composition (simplified, colloquial French), 1/8; Kirundi comprehension and composition, 1/4; French mathematics, science and agriculture 1/4; Kirundi mathematics, science and agriculture 1/4. Students were given two hours to finish one of the five versions.

The questionnaire for school directors collected information with respect to (a) the number, qualifications, experience, supervision of staff, size of instructional groups and incidence of repetition in the sixth-grade, (b) double shifts, coverage of school curricula, application of using French as the medium for instruction, and (c) test preparation for the *concours national*.

The questionnaire for teachers used an adapted version of the IEA (International Association for the Evaluation of Educational Achievement) opportunity-to-learn ratings, plus questions on curricular coverage, teachers' test preparation strategies, and understanding of the knowledge and skills elicited in the assessment tasks similar to those in the student instruments.

The main findings of the research are summarized as follows:

- Language of assessment, French or Kirundi, profoundly influenced the measurement of achievement in most of the subjects tested. In Kirundi versions of comprehension,

⁹ See also the closely related issue – language for instruction (Brock-Utne 2001).

composition and science/agriculture, students achieved significantly higher scores; and the difference was the greatest in science/agriculture test. Comprehension skills and science/agriculture were more poorly measured in French than in Kirundi. In addition, the performance of the most able students was the most affected by being tested in French. Only in mathematics, the results in French and Kirundi versions were nearly identical.

- Whether a student had repeated grade 6 had the greatest impact, among the variables such as student social and educational background, school management and teacher supervision, implementation of national curricular, and teacher experience and skills, on test scores. Repeaters scored significantly higher on all tests, especially in mathematics. The differences were greatest for the French tests.
- The model of school effectiveness using path analyses demonstrated that the most powerful feature of school effectiveness had to do with school management in terms of school director visits, the direct impact of visits on learning outcomes as well as the indirect impact through teacher punctuality. Some instructional practices such as providing extra hours of instruction had a relatively weak impact on learning outcomes, both directly and indirectly as estimated in the path models.

d) Fuller et al. in Botswana's junior secondary school

Fuller *et al.* (1994) studied Botswana's junior secondary schools (4948 Form 1 and Form 2 pupils, i.e. grades 8 and 9), using two-level analyses: pupil-level and school- and teacher-level. Level 1 included pupil and family factors such as pupils' earlier achievement, unmeasured family background characteristics, pupil gender, time in school (also in school-level), and class stream. Level 2 factors were categorized in four blocks or models.

- Model A: material conditions, school inputs and time in school. In particular, Model A predictors included supplies of textbooks, exercise books, teacher guides, supplemental reading materials (non-textbook readers, magazines, and reference books), class size, and one policy-relevant organizational practices: the frequency of inspector visits to classrooms.
- Model B: teacher characteristics and training. Model B predictors included teacher gender, social class background, pre-service training, and frequency of in-service training, length of teaching experience, tenure in the current school, and nationality.
- Model C: teaching practices and classroom social rules. Model C predictors included a number of pedagogical behaviours in terms of task complexity and vertical character of authority by the teacher. In particular, Model C covered factors such as the complexity of instructional tools utilised by the teachers, task demands on pupils by the teachers (e.g. frequency of active reading and writing exercises), frequency and complexity of questions asked of pupils, consistency of teachers' pedagogical technology, distribution of teacher time, basic structure of class period, disciplinary utterances by teachers, proportion of teacher talk in English or Setswana, and indicators of teacher affect.
- Model D: teacher effort and pedagogical beliefs. Model D predictors included teacher's self-perception of competence in different areas, job satisfaction, level of efficacy in shaping both pupils' learning and school-wide policies and practices.

Data were collected using observation and questionnaire survey. Several empirical issues addressed in the study were:

- What is the magnitude of the school's overall influence on learning gains?
- How much do youths really learn at the junior-secondary level?
- Does the influence of time in school on learning gains differ for girls relative to boys?
- Does this effect vary between language and math achievement?
- In addition to the overall influence of time in school, do teacher characteristics and pedagogical practices help to explain learning gains?
- Do these more specific factors (i.e. school, teacher, and classroom) operate differently on girls, which, thus, would help to explain their advantage in language achievement?

In the analyses, the researchers clustered the teacher-form data due to the fact that it was "difficult to argue that students' English proficiency is influenced only by their English teacher, since this is the language of instruction in all classes except their Setwana course" (p.361). It was found that girls outperformed boys statistically significantly on both the pre- and post-tests in English. However, in math, achievement levels were roughly equal between boys and girls, with girls having slightly higher scores but the difference was not significant. Models A and B explained significant proportions of the variance in achievement across the teacher-form clusters. However, Models C and D held little explanatory power. Furthermore, several other interesting findings were noted:

- School location (i.e. urban) made a positive difference in students' post-test scores as well as learning gains over a year or so.
- Teacher gender was related to learning gains: both female and male students attending forms with a higher proportion of female teachers in their grade level show significantly higher learning gain scores. Female pupils did better in math when their teacher-form cluster had a greater proportion of male teachers.
- Girls' advantage in post-test scores was less for pupils in teacher-form clusters where teachers ask more open-ended questions.

The authors concluded that pupil-level variation in achievement remained substantial and unequal and that the range of variability in student achievement *within* schools was far greater than *between* schools and communities. What features of the schools and the micro-processes in classrooms that could raise student achievement however remained "somewhat of a mystery", although the findings of this research did seem to suggest that, beyond time spent in school, other factors such as supplementary reading materials, in-service teacher training may help to boost student achievement and help to explain variations among pupils. The authors also noted "English proficiency holds important spillover effects for learning in other subjects, including math" (p.375).

e) Harber in South Africa and Tanzania

Harber argues at various publications (e.g. Harber 1993; Harber unknown; Harber and Trafford 1999) on the values of democratic school management in developing countries (Africa, in particular) towards the improvement of school effectiveness, and he holds that effective schools should be democratic in the first place.

Harber and Trafford (1999) reported a case study in a girls' high school in Durban, South Africa. The case study school embarked on the process of desegregation in 1991, with the end of the apartheid in sight. The desegregation of the school and the first national democratic election in 1994 set the culture for the process of the democratic management of the school. Several changes were made to the institutional structures and the organizational culture of the school, for example, an elected Students' Representative Council which met regularly and debated on every aspect of school life. The purpose of the student council was to improve communication in the school, to involve students in democratic decision making, and to develop leadership and responsibility. Non-student members of the council were from school's governing body, parents, teachers, and the community the school served. After democratic debates, a set of basic values and rules, mission statements, and code of practices, which reflected strong support for the development of multicultural democracy, was agreed.

The qualitative data of interviews with students documented that trust in the school was much increased, and there was much less tension and frustration due to the improved communication, mutual understanding and sense of belonging and responsibility. There was much less trouble in the school, almost no physical and verbal violence between pupils and far fewer discipline problems. The stress on mutual respect and equality helped to decrease racist comments. More interracial mixing during lesson breaks. The elected student members of the council felt that they learned a lot from the experience. They felt that the experience enhanced their self-awareness and broadened their mind and skills in problem solving. The

qualitative data of interviews with teachers further confirmed the significant improvement of the school life. They thought there was a much stronger collegiate ethos among staff, much better staff morale and better teacher/student relationships. The school community became more "vibrant", "caring", "supportive" and "interactive". The authors argue that the involvement of student participation in school democratic management as a lever for the process of change, and a means of improving school effectiveness.

In Tanzania, Harber (1993) examined whether school councils assisted school effectiveness. Data were collected through principally interviews, collection of documents pertaining to school councils such as constitutions and records of meetings, and short periods of observation over a period of two-and-a-half weeks in April 1992, in two secondary schools. School A was located about 35 km outside of Dar es Salaam, while school B (an all-girls school) was near to Moshi in northern Tanzania. Interviews were conducted with the headteacher, three other teachers, and two senior pupils at school A; and with two teachers and two senior pupils at School B. It was found that in both schools the advantages of having school councils outweighed the disadvantages.

In School A, the interviewees mentioned the following advantages:

- School Council enabled problems to be discussed before they got out of hand. In this way, it improved communication and increased understanding;
- it was a good way of piloting new policies;
- it reduced the workload on teachers, especially in their non-teaching functions, as they were helped by the pupils.
- discipline problems were reduced, because of closer relationship between staff and students
- it provided quite a number of pupils with experience of leadership and increased confidence and discussion skills generally.

In School B, the benefits mentioned included:

- (having school councils) trained students to be self-disciplined, responsible and self-reliant. School was cleaner and better organized.
- the school worked more smoothly, problems were solved by discussion.
- (having school councils) eased the work of the teacher and allowed them to concentrate more on student academic development.
- (having school councils) improved communication
- there was a friendlier relationship all around.

Similar to the Western literature, the democratic management in the two case study schools in Tanzania also demonstrated the same pattern of benefits of involving students' participation in creating smooth management and therefore better schooling environment. As Harber argues, democratic management "*may well therefore not only be a way of mitigating some of the difficulties of school management in a context of severe financial stringency but it might also be a way of avoiding the risk of violent disturbances in secondary schools*" (p.230).

f) Lee and Lockheed in Nigeria

Lee and Lockheed (1990) examined the effects of single-sex and coeducational schooling on ninth grade students in the public school sector of Nigeria. In particular, the study compared the effects of these two school organizational types on students' academic achievements and stereotypic views of mathematics.

Data were drawn from the Second International Mathematics Study conducted by IEA in Nigeria during the 1981-1982 academic year. 1012 students comprised the analytic sample; they were given a mathematics test covering five curriculum content areas (arithmetic, algebra, geometry, statistics, and measurement). Students also completed a background questionnaire including both conventional demographic variables and indicators of student educational aspirations and attitudes. The number of years of additional education that the student expected to have, was the measure of educational aspiration. Four attitudinal factors,

namely, self-perception of ability, perceived parental support, motivation with respect to mathematics, and gender-stereotypic views about mathematics were used as the attitudes measure. Teachers completed several questionnaires about their background, their general classroom practices, their teaching practices, and characteristics of their class. Two teacher-background characteristics were used in the paper (teaching experience, and number of semesters of post-secondary mathematics education studied). School administrator provided data on the school characteristics such as school size, length of school year in days, single-sex or coeducational school type, student/teacher ratio, and percentage of students with fathers in professional occupations.

Students were divided into four sex-by-school-type groups: girls in girls' schools, girls in coeducational schools, boys in boys' schools, and boys in coeducational school, which were the key independent variables under investigation of interest. The two dependent variables are mathematics achievement and stereotypic views of mathematics. The main findings of the paper with respect to school effects are summarized as follows:

- **Mathematics achievement**

- After adjustments of student background and attitudes, attendance at a girls' school was significantly related to mathematics achievement, while boys' attendance was not related.
- After controlling both student characteristics (background and attitudes) and school characteristics such as school location, student/teacher ratio, teacher and teaching experiences variables, both single-sex school effects were significant, albeit in different directions (beta = .12 for girls schools and -.11 for boys schools). In other words, girls of single-sex schools evidenced higher mathematics achievement than their female counterparts in coeducational schools. Conversely, boys of single-sex schools scored significantly below their male coeducational school counterparts.
- In addition to school sex grouping, other three school-level factors were strongly and positively associated with higher mathematics achievement: rural location, schools with higher proportion of fathers in professional jobs (i.e. higher-SES schools) and schools with lower ratios of students to teachers (i.e. smaller classes).
- Teachers' time use (whole-class instruction introducing new material and reviewing old material, students listening to teacher lectures) was significantly and negatively related to mathematics achievement.
- There was no relationship between student mathematics achievement and the mathematics teacher's gender and teaching experience.

- **Stereotypic views of mathematics**

Girls' schools appeared to instil in their students less stereotypic views of mathematics as a male domain than do their coeducational school counterparts, whereas, boys schools seemed to foster more stereotypic views in their male students than do coeducational schools.

The findings indicated that single-sex schooling affect the Nigerian girls positively in increasing mathematics achievement and in engendering less stereotypic views of mathematics learning. It seemed that such schools had powerful and positive effects on their female students.

g) Lee et al. in fourteen SACMEQ countries

Lee, Zuze and Ross (Lee *et al.* 2005) analysed the effects of several school-level factors on sixth-graders' reading achievement, using the SACMEQ II data collected from around 42,000 students in 2,294 schools in 14 countries in Africa¹⁰. The students reading achievement was

¹⁰ We assume that readers of the current review are familiar with SACMEQ II. Further information about SACMEQ can be found at www.sacmeq.org

measured using standard reading comprehension test in English or their native language. Information on the school characteristics was collected from questionnaires administered to subject teachers and head teachers (principals). Many school-level measures were collected in SACMEQ II, the authors focused on three school-level characteristics, namely, school composition, school context, and physical and human resources. In particular, the authors tried to identify what features of each country's schools were associated with their students' literacy/reading achievement net of students' social and academic background (i.e. whether had history of grade repetition). Two-level modelling (i.e., school and student), using HLM, was used to analyse such school effects for **each** country.

The main findings are summarized as follows:

- In all countries, student SES was strongly and positively associated with their literacy achievement. School's average social background (i.e. school composition) was significantly and positively linked to school average literacy achievement in 8 out of the 14 countries.
- In all countries (except Seychelles and Mozambique), grade repetition had a statistically significant and negative association with achievement in literacy. In case of Seychelles and Mozambique, the insignificant relationships may well be due to the fact that very few Seychelles students repeated a grade and most students repeated in Mozambique.
- Schools with smaller sixth grades exhibited higher achievement in Kenya, Botswana, Namibia and Swaziland. In Mauritius, however, schools with larger sixth grades evidenced higher achievement. In other countries, grade size was not significantly related to achievement.
- There was a consistent pattern of lower achievement for schools practising shifts.
- Schools located in urban areas have higher average achievement, compared to rural areas, especially in Botswana, Zambia, Namibia, South Africa and Lesotho.
- Larger schools, if offering education in shifts and if in rural areas, tended to have lower average literacy achievement than schools that were smaller, operating full-day programmes and were located in towns and cities.
- Students in schools that were better physically resourced achieved higher; however, teaching resources were unrelated to achievement.
- There was a strong and positive association between the quality of teachers and student achievement in Botswana, Mozambique, Namibia and Seychelles.

Another important message from this paper is that one model of school effectiveness does not fit all. As the authors argue, local contexts do matter, and they encourage further research to pursue rich patterns of school effects by taking into account local contexts.

h) Lloyd et al. in Kenya

Lloyd *et al.* (2000) examined the likelihood of dropout and academic achievement of adolescent girls and boys in rural areas of three districts in Kenya (Kilifi, Nakuru, and Nyeri), as the outcome measures of the effects of school quality (see also Appendix 8), such as its curriculum beyond the core (e.g. puberty, sexual biology, sexually transmitted diseases), teachers' treatment of students, teachers' attitudes towards male and female students, school policies with gender implications (e.g. policies on issues of sexual harassment), and the overall school atmosphere in terms of its organization, rules, and student-to-student interaction.

Data were collected from the aforementioned three areas in May-August 1996. A purposeful sampling strategy was used to select the widest range of schools within the limits of sample size in order to have some representation for the very best and very worst school examples in Kenya. Two to three days visits were made to each primary school selected for the sample. Each school visit consisted of an interview with the head teacher, the observation of school facilities and activities in the school yard, the observation of four English and four mathematics classes for standards 7 and 8 (two per teacher), interviews with the two English and two mathematics teachers who were observed, and a self-administered questionnaire filled out by a random sample of 30 boys and girls enrolled in standards 7 and 8. The Kenyan

Certificate of Primary Education (KCPE) was the outcome measure of student academic achievement. As can be seen, both quantitative and qualitative data about school quality and schooling outcomes were collected; however, this paper only used quantitative data.

The main findings directly relevant to school effectiveness research are summarized as follows:

- More than half (23/43) of the variables of school characteristics were negatively associated with KCPE score. Among the remaining variables of school characteristics, only three correlation coefficients approached 0.4. They were total school fees, the facilities index, and the proportion of students not reporting a teacher's absence last week.
- Substantial differential effects on boys' and girls' likelihood of dropout of the 11 school characteristics were noted. These 11 variables were daily school hours, total school fees, teacher credentials, number of family life education subjects taught, response to teacher/student sex (severe or not), teacher in-service training, teachers' perceptions of the importance of mathematics for girls, instruction on-time/not interrupted, only English spoken in classes, average number of "good events" in classroom observation **together** added significantly to the fit of the previous model (including only the individual and family characteristics such as religion, parents' marriage status, mother's education background), for boys alone. However, these school variables did not appear to add to the explanatory power of the model for girls.
- For boys, a greater percentage of classes where only English (the language for the KCPE examination) was spoken reduced significantly the probability of dropout.
- The higher the percentage of teachers with in-service training in the last couple of years, the greater the likelihood of dropout for boys. This might be due to the fact that poorer schools were targeted for in-service teacher training.
- Overall, it seemed that school quality **did not matter** much for school dropout, particularly in the case of girls.

However, when the authors concentrated only on the experience of boys and girls in coeducational primary schools, and added several variables capturing the differences in the school experiences of boys and girls (e.g., presence of advisor, equal gender treatment, sexual harassment) to the logistic regression models mentioned above, a different picture was presented. The dropout of girls was much better predicted with the new model including students' school experiences in particular relation to various issues on sexual harassment and gender bias.

The authors concluded:

...there is more to school effectiveness than the development of academic competency, and there is more to the quality of the school environment than time to learn, materials resources for the basic curriculum, and pedagogical practices. Various features of schools beyond the traditional elements previously defined in the literature that either serve to encourage or discourage students from continuing are potentially salient as well. (p.143)

i) Michaelowa in PASEC countries

Similar to SACMEQ in English-speaking Sub-Saharan African countries, the Conférence des Ministres de l'Éducation des Pays ayant le Français en Partage (COFEMEN) manages educational surveys in the framework called PASEC (Programme d'Analyse des Systèmes Educatifs des Pays de la CONFEMEN)¹¹. Michaelowa (2001) analysed the data which were collected from a stratified random sample of classrooms at 5th grade of primary education in five Francophone Sub-Saharan African countries Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar and Senegal. Data included student achievements in French and mathematics in standardized tests, their socio-economic background and school characteristics which were

¹¹ See <http://www.confemen.org> for further details (in French).

collected through questionnaires administered to teachers and directors. A three-level hierarchical linear modelling, using HLM, was employed to analyse the effects on student academic achievement in French and mathematics of *student and family characteristics* (level 1), *teacher, classroom and school characteristics* (level 2) and *national characteristics* in terms of public primary education expenditure per student.

The key findings in relation to the effects on student academic achievement of *teacher, classroom school characteristics* are summarized below:

- Teachers' initial education and regular training seemed to be important.
- Teachers' knowledge of the local language had a positive and significant effect on students' academic achievement.
- Teachers' knowledge of French, the language for instruction, had no significant effect.
- Teachers' non-school activities such as farming and running a small business had positive and significant effects.
- The number of days teachers were absent from school and teachers' self-reported job satisfaction had significant negative and positive effects respectively on student learning outcomes.
- Neither the exchange between teachers nor the correction of students' written homework had a significant effect.
- The availability of textbooks had strongly significant and positive impact on learning outcomes.
- The availability of classroom equipment such as desks, blackboard and chalk, and teachers' manuals also showed positive effects, though less pronounced than availability of textbooks.
- A surprisingly positive relationship between class size and student achievement was noted.
- Double shifting had negative and significant impact on learning outcomes.
- Multi-grading had positive and significant impact on learning outcomes.
- The effects of active school association were not clear.
- Students in schools visited by inspectors achieved significantly higher scores.
- Teachers' contract status (whether a civil servant or a teacher engaged on a "voluntary" basis) had significant effect. Despite low payment, students of "voluntary" contract teachers and their achievements were positive, strongly significant.

Michaelowa (2001) also analysed the effects on student academic achievement of a few rather simplified indicators of national characteristics such as public primary education expenditure per student, GNP per capita, and overall illiteracy level of a country. It was found that the overall illiteracy level of a country had significant and negative effect on the students' achievement. The author attributed this to the "virtuous cycles" that education creates "due to intergenerational externalities, not only within the family, but for the whole society" (p. 1709). As for the effects of the other two indicators, we think that the findings were not that convincing due to the fact that they were rather simplified and that the effects might (or might not) have worked via other variables such as standard of living and school equipment which were already included in other models.

j) Nyagura and Riddell (1993) and Riddell and Nyagura (1991) in Zimbabwe

Nyagura and Riddell (1993) collected data from Grade 7 pupils, their teachers and the heads of their schools which were stratified into five school types of different academic and physical status. Group A and B schools were funded predominantly by the government. Group A schools were those catering for the European community prior to Independence and have well-trained teachers, well-resourced physical plants and active teacher-parent association. Group B schools were also central government funded, but catering to the less-well-off African urban population and had less resources than Group A schools. Distinct from the central government funded Group A and B schools, the three alternative school types were: *high-fee-paying schools* (mission schools), *low-fee-paying schools* catering to the African

urban population not served by the insufficient numbers of central government schools, and *district council schools* serving similarly under-provided, rural African communities. Both the low-fee-paying schools and the district council schools derived from local government sources and were new since Independence. All five school types received central government funding for their operation in teachers' salaries. However, the central government funded schools (Group A and B) had all of their major running costs met by the central government; and the rest had to make up the difference from parents pockets or other sources.

In order to have a fair representation of Ndebele and Shona children, and a fair representation of both urban and rural schools, three regions (Harare, Mashonaland, and Matabeleland) were selected from which schools were randomly sampled from randomly selected districts. A stratified random sample proportional to the size the schools and the size of the districts in the selected regions were drawn. As a result, the final sample consisted of 6927 students from 86 schools.

The outcome variables included Grade 7 students' examination scores in English and mathematics obtained from the Examinations branch of the MoE. The student variables also included gender, age, years spent in pre-school, years taken to complete primary education, days absent from school, time devoted to English and mathematics homework, home language, and number of children in the family and parents' education levels.

The class level variables included teachers' information such as gender, age, qualification, and experience, teachers' use of time for academic activities and games and sports, class size, class textbook availability in English and mathematics, and teaching load.

The school level variables included organizational information (e.g. streaming of pupils, number of sessions, teacher stability, distribution of time to academic and sports activities, school size, time for school-based inservice activities), material and non-material inputs (text availability, library books, teacher experience, percentage of trained teachers, head teacher professional supervision to teachers), social composition (ethnic and gender composition of the school, boarding status), and head teacher information (e.g. gender, qualification, teaching and administrative experience, and whether received training as a head teacher).

Multilevel modelling procedure, using ML3, the predecessor of MLWin was applied to understand the percentage of variance attributable to the types of schools and classes attended, differences between schools in students' achievement in English and mathematics, and the underlying reasons for this, in relation to school types. It was founded that students in Type A schools and high-fee-paying schools outperformed those in Type B schools, low-fee-paying schools and district council schools in both English and mathematics. The school type differences in English persisted even after controlling for student intake variables, while for mathematics the differences disappeared. In other words, school type was not a significant discriminating factor for mathematics achievement.

Textbooks and trained teachers were highly significant variables for both subjects, at both the class and school levels. In addition, availability of textbooks and trained teachers were more important for mathematics achievement than English.

Two additional class level variables: the amount of instructional time and the number of hours of supervised study proved of significant importance for mathematics achievement, but not for English.

Three school level variables: the pupil-teacher ratio, the availability of textbooks, and the percentage of trained teachers were highly significant for both subjects. They explained more between school differences in mathematics, but accounted for more of the total variance in English.

Slightly different from Nyagura and Riddell (1993) for the study on Zimbabwe's primary schools, Riddell and Nyagura's (1991) study on Zimbabwe's secondary school categorized schools in six types, namely, (1) former Group A government schools which had catered for the European population before Independence, (2) former Group B urban government schools, (3) former Group B rural government schools, both of Group B schools catered solely for the African population before Independence, (4) high-fee-paying (trust) schools similar to UK independent schools, (5) mission schools, and (6) new local authority run district council schools. Unlike the more sophisticated sampling procedures in Nyagura and Riddell (1993), this research chose quite arbitrarily at least four schools per school type, due to time constraints. Altogether 48 schools were selected from four regions: Harare, Mashonaland West, the Midlands, and Metabeleland North. Like Nyagura and Riddell (1993), a stratified random sample proportional to the size of the districts in the chosen regions was drawn, as well as to the size of the secondary schools by the six school types. A three-level data was collected: student, class and school. Students' test scores in Zimbabwe Junior Certificate in English and mathematics, as well as their matched Grade 7 English and mathematics examinations scores in 1989 were collected for each student sampled (N=5293) from 138 classes in 33 schools (actual number of schools). Besides the four grades for each student, the two subjects for the two examinations, other pupil-level variables included in the study were sex and age of the students. Class-level variables included English and mathematics teachers' qualifications and years of teaching experience, and class size. The school-variables included ratio of English and mathematics books to students, the percentage of teachers in the four different qualification bands ranging from untrained to certificated graduate, the average years of teaching experience (see also the class-level variables) and the average years of teaching experience at the particular school, whether the school was day or boarding, the size of the school, the overall teacher-pupil ratio, total enrolment and percentage of Africans at the school. These school-level data were collected from the statistical returns by the schools to the Ministry of Education and Culture.

Multilevel modelling techniques, controlling the prior ability of the students, were applied to identify factors that accounted for variation in Form II exam scores. A sample of schools was then identified as outliers in terms of student achievement on national examinations. That is, those schools that performed better or worse than expected given their students' prior academic achievement and certain basic school resource input such as textbooks and teachers.

The key findings of the study are summarized below:

- Students in high-fee paying (trust) schools, former group A (elite government) schools and mission school had higher levels of English and mathematics achievement than students in government group B (less well-endowed government) schools and those in district council schools.
- Student achievement was higher when schools had a greater availability of textbooks, a larger percentage of trained teachers and teachers who had taught at that particular school for a longer period of time. The availability of textbooks and length of teacher tenure at the particular school together accounted for 50% and 72% of the variation attributable to the school in mathematics and English, respectively, after controlling the variation due to the students' prior academic intake/achievement.
- School rankings based on raw test results aggregated at the school level were misleading.
- After controlling statistically for students' prior academic achievement and for basic school resources inputs (i.e. textbooks availability and teacher tenure), some district schools were found more effective than expected given their level of resources. And some high fee paying and mission schools were less effective than what would be predicted given their resource inputs.
- There were more experienced teachers in the set of less effective schools, compared with the more effective schools, which may to some extent suggest that newly trained recruits had much to offer and that longer experience in teaching was not necessarily a good indicator of teacher effectiveness.

- Boarding schools and single-sexed schools had higher level of academic achievement, according to the outlier analyses.

k) Urwick and Junaidu (1991) in Nigerian primary schools

Unlike other SER studies that oftentimes focus on the product of schooling such as students' academic achievement and attitudes, Urwick and Junaidu analysed the effects of school physical facilities on the process variables of teaching and learning. Although it would have been desirable as the authors admitted, there was no reliable data available to them on students' academic performance. The authors viewed the processes both as aspects of the quality of education in themselves and as links between school physical inputs and pupils' academic achievement. The research was carried out during 1988 in eight primary schools in the Sokoto Local Government of northwestern Nigeria. The schools varied substantially in the quantity and quality of their facilities. Exploratory qualitative data were collected using in- and out-of-classroom observations and semi-structured interviews with teachers observed, head teachers of the schools observed, and officials of the local government education department. Two teachers, who had 5-8 years of teaching experience, of the most senior grades were selected for classroom observations in each school. Two lessons of each teacher were observed, using pre-defined schedule covering various aspects of classroom management and pupil behaviour. The systematic comparisons between the sampled schools revealed that a number of important process factors of teaching and learning were strongly influenced by the quantity and quality of school physical inputs (e.g. provision of textbooks, maintenance of classroom furniture). Three areas of effects were observed:

- Effects on teaching processes
Four aspects of teaching affected were the extent to which teacher methods were pupil-centred, the variety of activities organised during the lessons, the variety of methods of communication used in the lessons and the frequency with which assignment and homework were set.
- Effects on time, behaviour and the opportunity for literacy
The classroom learning conditions affected were the time required for learning activities to take place, orderliness and ease of movement in the classroom, pupil's attentiveness and their opportunities for developing reading and writing skills.
- Effects on breadth of curriculum and on the teacher commitment
Effects were also noted at school level: the breadth of the basic curriculum, the range of co-curricular activities, and teacher morale. However, the effects on the curriculum and co-curricular activities seemed to be indirect ones – through the effects on teacher morale. Teachers' morale was influenced by the physical conditions and appearance of their school.

The authors argued for the existence of the multiple links between the quality of school facilities and a number of educational process variables. They called for a systematic provision of "basic technology" such as classrooms and furniture, which richer countries had long taken for granted, to improve school effectiveness. It is interesting to note that the authors seemed to hold a quite explicit assumption that good process of teaching and learning lead to better schooling outcome. However, research studies showed that it might well in combination of the physical inputs and the school processes of teaching and learning *together* that they could make a difference, either direct or indirect, in school effectiveness. It is never a one-way dimension. The interactions of the aforementioned factors are at least as important as their presence in the school system.

In this section, we reviewed in-depth several empirical studies conducted in Sub-Saharan African countries (see Appendix 9 for a summary of the key outcome variables of these empirical studies). Different focuses but an overarching theme were apparent: whether and how school matters in students' academic achievement and retention/persistence in schooling. Few studies also looked at the affective side of school effectiveness such as students' attitudes towards mathematics and democratic participation and management of school life through school councils. Although the studies shared the overarching theme of

school effectiveness, they also remind readers the myriad of factors relating to school effectiveness and the enormous national and international research endeavours already devoted to gain further understandings and interpretations of the problems, practices, and promises of school effectiveness in this region. However, the compromises in the SER studies in Sub-Saharan contexts, probably due to logistical, political and ideological restraints on the scale, focus and methodology of the research studies, are also noteworthy.

4. Context matters

We've already pointed out the different research focus of SER studies in developing and developed countries and the problems of *trans-national planting* of the school effectiveness characteristics from one context to another (see the last paragraphs in Section 2.1 and 2.2). In this section, we reiterate and further develop our position that "context matters".

As many researchers have argued (e.g. Creemers 1994b; Fuller and Clarke 1994; Hannaway and Talbert 1993; Sammons *et al.* 1995; Wimpleberg *et al.* 1989), it is important to recognize that SER findings do not provide a blueprint or recipe for the creation of more effective schools and should not be applied mechanically without reference to the particular contexts of a school or country. The complexity of local conditions should receive much more attention in interpreting and understanding school effectiveness indicators. Fertig (2000) posits a contextually-related view of school effectiveness and calls for incorporating the perceptions of different stakeholders into the examination of school effectiveness, rather than in simple relation to an "objective" checklist(s) derived from research in different cultural contexts and often done years earlier. As Fertig (2000) argues that "*school effective research in developing countries needs to move towards a more contextual model, one which takes account of the internal processes within the school, the socio-economic, political and cultural contexts in which the organisation operates, and the perspectives which different stakeholder groups bring to bear on the activities of the school*" (p. 395), and "*to move towards a more qualitative approach to research in the developing world, one which looks clearly at the perspectives and contexts in which different groups of actors in the process operate*" (*ibid.*). Scheerens (2001a) envisages that integration of school process indicators as the most "responsible" way to improve school effectiveness. In a broader context, Fuller and Clarke (1994) urged to pay more attention to cultural contingencies when conducting SER studies in developing countries, such as family demand for schooling, school's capacity to transmit "foreign knowledge" (i.e. "foreign to the community's indigenous knowledge", p.136) to respond family demand, and cultural meaning of pedagogical practices (e.g. roles and responsibilities of teachers and students in a classroom).

Each country has its own educational policies and goals/functions (e.g. Heneveld and Craig 1996 highlighted the different educational goals of primary education of Madagascar and Swaziland), and these system-wide differences in educational goals emphasizes that the criteria for judging/determining school effectiveness should take into account the contextual factors within which each school/nation operates. Lockheed and Levin (1993), in the introductory chapter of the edited book (Levin and Lockheed 1993) which reported eight case studies to improve school effectiveness at various aspects, suggested that the success of the initiatives of the case studies was attributable to their *flexibility* and *adaptation* to local circumstances. Cheng (1996) makes a systematic analyses on the interactions between the goals and functions of schooling and judgement of school effectiveness from the perspectives of organizational management (see also Appendix 6). Simple comparison of literacy or numeracy scores between the countries/schools as a single criterion of school effectiveness is flawed. Scheerens (2001b), similarly, calls for "*the importance of taking into account the macrolevel context when study school effectiveness in developing countries, both in the sense of structural and cultural conditions*" (p.356). Elsewhere researchers have been persistently arguing for the importance of educational contexts and goals of a specific system when considering the effectiveness of a school. Various questions remain such as effectiveness for whom, for what, and at what (Slee *et al.* 1998). As Harber and Davies

(1997) argue: "Ineffective schools are usually effective someone or for some interest" (p.167), and therefore school effectiveness indicators/dimensions should be understood contextually due to the significant material and ideological differences between schools (Harber and Muthukrishna 2000). For example, South African's educational ideology aimed at fostering a non-violent, non-racist and democratic society are rarely featured "in the indexes of Western books on school effectiveness" (Harber and Muthukrishna 2000: 430). "Great care is needed in the automatic international transfer of school effectiveness characteristics." (*ibid.*, 432).

5. SeeQ Project in the DFID RPC

As demonstrated in the detailed review of the empirical studies above (see also Saunders 2000; Verspoor 2005), various research attempts have been made to improve school effectiveness in Sub-Saharan African countries, huge challenges and obstacles remain, however, impeding meeting students' basic learning needs and achieving the quality *Education for All* objectives (World Conference on Education for All 1990). From research perspectives, the paucity and complexity of school effectiveness in this region calls for holistic attitudes and approaches to SER studies, in terms of not only broadening research focus (i.e., variables to be scrutinized) but also improving methodological applications. The richness of the SACMEQ II data¹² (Lee *et al.* 2005; Murimba 2005a; Murimba 2005b) provides us with good opportunities to understand many variables of school effectiveness (including school effectiveness in raising students' awareness and knowledge of the HIV/AIDS risks and prevention) and to employ multilevel modelling techniques in one single research project. However, the SACMEQ data is not flawless (see Lee *et al.* 2005; Riddell 1997). The multilevel modelling of the quantitative SACMEQ data is able to present what has happened, but may well miss the essential part of the process of schooling, and fail to understand what is going on. The SeeQ project uses qualitative methods to observe the schooling process in order to gain better, fuller and more up-to-date understanding of issues surrounding school effectiveness in Sub-Saharan countries. This section presents the research questions and methods of the SeeQ project.

5.1 Research Questions

The overall research question to be addressed at the stage of secondary analyses of the SACMEQ datasets is:

What are the relative impact of different in- and out-of-school factors contributing to effective schooling for academic achievement (literacy and numeracy) and awareness of the risks and prevention of HIV/AIDS?

In particular, the secondary analyses of SACMEQ datasets will address the following key research questions:

- What statistical and modelling approaches are appropriate to create school effectiveness and improvement measures in the African context?
- What pupil assessment data is appropriate to measure educational progress?
- What current and new outcome and explanatory variables are appropriate to examine school effectiveness and improvement in the African context?

Further key research questions to be addressed at the stage of case studies are:

¹² Apart from the traditional academic achievement data in literacy and numeracy, SACMEQ is currently collecting data on students' knowledge and awareness of HIV/AIDS risks and prevention. This, we think, is particularly essential to the understanding of school effectiveness in Sub-Saharan countries.

- What school characteristics, conditions and contexts (e.g. teaching and evaluation strategies, community involvement) can be identified to explain the differences in effectiveness (i.e. between more/less/mixed effective schools)?
- What evidence of school evaluation and self-evaluation can be identified in the African context? Can opportunities for school evaluation and self-evaluation be improved in the African context?

5.2 Research methods: Multilevel modelling and case studies

Schooling systems usually group, nest or cluster students within classes and schools, which themselves may be clustered within education authorities and countries. This is exactly the case for the SACMEQ datasets. The SACMEQ consists of 14 member countries, and data were/are collected from different schools, areas and countries. In the SACMEQ data, students were nested in different classrooms that were nested in different schools that were nested in different district/region/country. Ordinary least squares estimation is based on the assumptions that observations are truly independent and, thus, the error terms are uncorrelated. These assumptions are rarely true in SER studies. The traditional least squares regression analyses suffer from a lack of validity through failing to take account of the school level clustering of students. An analysis that explicitly models the manner in which students are grouped within schools has several advantages. First, it enables data analysts to obtain statistically efficient estimates of regression coefficients. Secondly, by using the clustering information it provides correct standard errors, confidence intervals and significance tests, and these generally will be more "conservative" than the traditional ones that are obtained simply by ignoring the presence of clustering. Thirdly, by allowing the use of covariates measured at any of the levels of a hierarchy, it enables us to explore the extent to which difference in average academic achievement test results (including the HIV/AIDS knowledge tests) between schools are accountable for by factors such as school climate, teaching practice or possibly in terms of other characteristics of the student inputs, resource allocation and school management – all of which are of interest to the SeeQ project. It also makes it possible to study the extent to which schools differ for different kinds of students, for example to see whether the variation between schools is greater for initially high scoring students than for initially low scoring students (Goldstein *et al*, 1993) and whether some factors are better at accounting for the variation for the former students than for the latter. Finally, it provides sophisticated quantitative evidence that can be used to inform the evaluation and screening of individual schools, using the performances of their students after adjusting for intake achievements. This can be done straightforwardly using a multilevel modelling approach. In some cases, some of the schools from the SACMEQ datasets may have very few students, fitting a separate model for each of these schools will not yield reliable estimates. The multilevel modelling approach can help us to obtain more precision by regarding the schools as a sample from a population and using the information available from the whole sample data when making estimates for any one school.

We agree with Riddell (1997) and Scheerens (2001a) on the advantages of using multilevel modelling in school effectiveness research in developing countries. However, the benefits of having case study approach to tap into the real process of school life as it is going on is equally essential to gain better understanding of issues surrounding school effectiveness (see Fertig 2000; Saunders 2000). A seemingly effective school based on simple measure of students' academic achievement may well deviate from the central purpose of education and may also have been achieved at the expense of teachers' rights and professional conduct (see Cele 2005 as a case in South Africa).

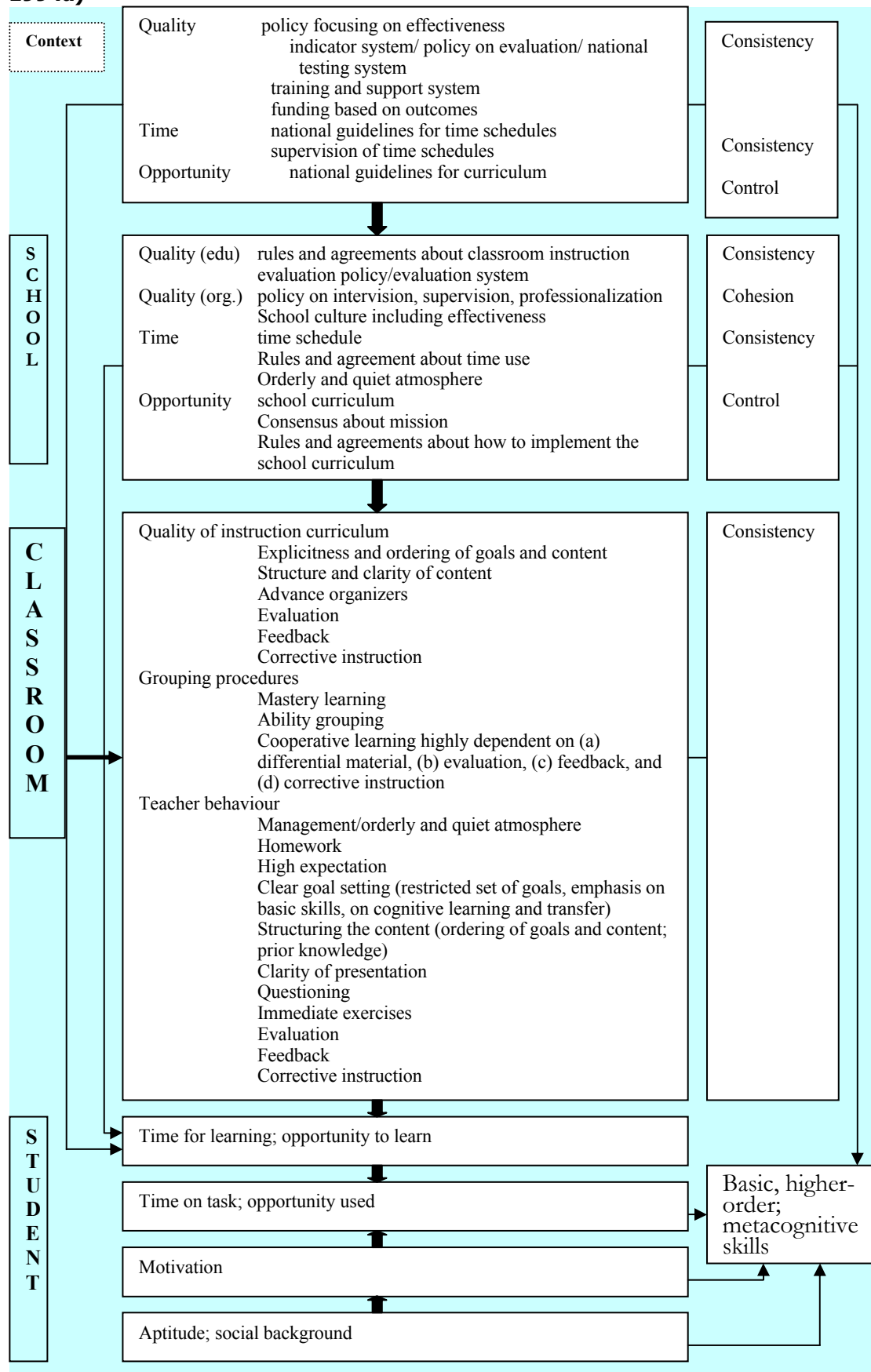
6. Conclusions

As stated in the preamble (p.2), this document is prepared to "serve as a basis to facilitate ongoing discussions on school effectiveness research in Sub-Saharan African countries, in particular, the member countries of Southern and Eastern Africa Consortium for Monitoring

Educational Quality (SACMEQ)". The literature review is therefore ongoing and open-ended. We leave the conclusions deliberately open and welcome suggestions and advice from the EDQUAL Advisory Board and researchers in the other four large-scale research projects within EDQUAL who are working on the central themes of school effectiveness, i.e., language and literacy, leadership and management, ICT and curriculum change. We, the SeeQ team, are also open-minded in terms of research methods and focuses. However, through the literature review so far and our experience and knowledge in school effectiveness research, we do hold that (a) it is of critical importance to take into account contextual factors in understanding and interpreting the problems, practices, promises and compromises of school effectiveness research in different educational contexts, (b) and that schooling is a system of multi-facets and requires systematic approaches to understand its (in)effectiveness from different perspectives and stakeholders in the whole system. Views from parents, teachers, and education policy makers are particularly welcome to inform our interpretations of the SeeQ model on school effectiveness that we are aiming to develop through analysing the existing and future SACMEQ data (II and III) on students' achievements in reading and mathematics, using multilevel modelling techniques. The secondary data analyses are informed by the findings from the ongoing literature review, consultations with various stakeholders and researchers of the other four large scale projects of EDQUAL, as well as findings from our case studies (see 5.2) which forms the second phase of the SeeQ project.

APPENDICES

Appendix 1: A comprehensive model of educational effectiveness (Creemers 1994a)



Appendix 2: Scheerens and Bosker (1997): The foundations of Educational Effectiveness

Thirteen general effectiveness-enhancing factors (p.100)

1. Achievement orientation/high expectations/teacher expectations
2. Educational leadership
3. Consensus and cohesion among staff
4. Curriculum quality/opportunity to learn
5. School climate
6. Evaluative potential
7. Parental involvement
8. Classroom environment
9. Effective learning time (Classroom management)
10. Structured instruction
11. Independent learning
12. Differentiation, adaptive instruction
13. Feedback and reinforcement

1. Achievement oriented school policy and high expectations

A clear focus on the mastery of basic subjects

- A stronger curricular emphasis on basic subjects than on other subjects
- A stronger curricular emphasis on basic subjects than on general pedagogical aims such as personal, cultural and social development
- More emphasis on basic subjects now than five years earlier
- Emphasis on value added or progress
- In which areas has progress been made during the last five years?
- Knowledge transfer and academic development have precedence over general development
- Explicit statement of minimum competency levels in basic subjects
- Explicit measures to improve quality of education in basic subjects

High expectations (school level)

- School policy is aimed at reaching minimum competency objectives for all pupils
- All teachers stimulate pupils to reach the highest possible score on an assessment test in the highest grade
- Pupils do as well today as previously
- Stating relatively ambitious achievement levels motivates teachers and pupils
- Explicit statement of high expectations on pupils' achievement in policy plans, in communications between head teachers and teachers and by means of rewarding pupils for outstanding performance or good progress at each level of achievement
- Becoming an effective school is the central mission of the school

High expectations (teacher level)

- Teachers believe that high expectations on pupils' achievement stimulate school effectiveness
- The degree to which teachers strive for pupils' high achievement
- The degree to which teachers believe that their own perceptions influence achievement
- Teachers' attitude towards the degree to which pupils' performance can be improved
- The degree to which teachers strive for minimum competency levels

- The degree to which teachers require high achievement of each pupil
- The degree to which teachers believe that objectives and standards can be reached
- Teachers emphasize that performance can always be improved
- Teachers stimulate pupils to work harder
- Teachers pay attention to good performance and reward good achievement
- The degree to which pupils experience that teachers have high expectations of their performance

Keeping and using records on pupils' achievement

- The school keeps achievement records on all pupils
- The school uses achievement records to compare itself with other schools and with earlier performance

2. Educational leadership

(a) General leadership skills

Articulated leadership

- the school leader has a clear and explicit view on how the school has to be managed
- the school leader provides clear and unambiguous leadership
- the degree to which head teachers take the lead
- the school leader has considerable discretion
- the school leader plays a major role in hiring new teachers, initiating new policy, initiating new curricular options and teaching methods

The school leader as an information provider

- degree, timeliness, and quality of information provision
- adequate dissemination of information
- the head teacher regularly informs parents, parents' association and board
- the head teacher channels information so that it reaches the relevant people involved
- the head teacher ensures that there is enough information on the work of colleagues in order to reach sufficient coordination of tasks
- the school leader informs the teaching staff about the board's decisions

The school leader as an orchestrator of participative decision making

- The school leader uses a clear decision-making procedure
- Decisions are taken on the basis of sound and well-grounded information.
- Decisions are supported by a sufficient number of staff
- The time needed to take decisions is fair
- It is clear in the school who decides on what subject
- Decisions are taken by the whole team
- Head teachers feel they can control matters at school.
- The school leader engages teachers in the choice of new subject matter and teaching methods.
- The classroom teacher has a say in decisions about his/her classroom.
- The school leader engages personnel in the school's policy making.
- The school leader engages parents in decision making
- The school leader ensures that decisions taken are carried through
- Innovation is not hindered by decision making.
- The head teacher ensures that clear decisions are made in staff meetings.
- The school leader is firm in adhering to rules and agreements.
- The school leader feels that engaging teachers in decision making stimulates school effectiveness.
- The school leader engages the staff in drawing up the guidelines for running the school.

- The school leader engages department heads in matching teachers and classes, staff appraisal, and policy decisions.
- The school leader engages teachers in decisions on matching teachers and classes, provision of teaching aids and materials, the development of school guidelines, and the recruitment of new personnel.
- There are forums in the school to express views and opinions.
- Procedures for teacher appraisal are developed in conjunction with the staff.
- Ease of communication with the school leader as seen from the perspective of the staff.

The school leader as a coordinator

- The school leader as an initiator of staff meetings.

(b) Instructional leadership

Time devoted to educational versus administrative tasks

- The number of hours as a head teacher teaches
- Total number of hours for managerial, non-teaching activities
- Division of school leader activities over administrative/organizational, instructional leadership, contacts with parents, own professional development.
- The number of times per year/month a head teacher attends lessons, and discusses pupils' functioning with teachers.
- Teachers are content with the relative emphasis the head teacher places on instructional versus other leadership tasks.
- The degree to which teachers are satisfied with stimulating effectiveness-enhancing leadership.

The school leader as a meta-controller of classroom processes

- The school leader is aware of pupils' progress
- The school leader initiates consultations about the progress of individual pupils.
- The school leader uses records on pupils' progress as a basis to set teaching priorities, modification of curricula and methods, adaptation of teaching methods and placing pupils in ability groups.
- The school leader stimulates the systematic counselling of pupils with learning and behavioural problems throughout the school.
- The degree to which the school leader takes corrective action on the basis of test results.
- The degree to which the school leader emphasizes specific attention to be given to weak pupils.
- The school leader requires that teachers keep records on pupils' progress.

The head teacher as a counsellor and quality controller of classroom teachers

- Teachers are happy with their relationship with the school leader
- Teachers experience support, appreciation, counselling and feedback from the school leader.
- The school leader knows about educational practice in each classroom.
- The school leader regularly asks teachers about their work.
- The school leader attends lessons and talks about them with teachers.
- The school leader appraises teachers
- The school leader shows his/her appreciation if teachers do a particularly good job.
- The school leader encourages teachers to exploit their talents.
- The school leader supports teachers who need help in carrying out improvement measures.
- The school leaders guides and counsels teachers during staff meetings by enquiring about how things go in classrooms in a detailed way, by discussing strong and weak points with teachers, by advising them on how to optimise instruction, by setting successful teachers as examples, and by stimulating the further development of teachers.
- The school leader stimulates teachers to improve their professional craftsmanship.

- The school leader may try to modify teaching strategies.
- The degree to which the school leader encourages teachers and gives them feedback and recognition.
- The number of times the head teacher informally communicates with one or more staff members.
- Frequency of counselling contacts with beginning teachers.
- The school leader uses records on pupils' achievement in appraisal reviews with teachers.
- Frequency of the school leader attending lessons.
- Any type of information gathering with respect to the quality of teachers.

The school leader as a facilitator of work-oriented teams

- The school leader encourages the staff to work as a team.
- The school leader encourages a clearly established divisions of tasks among staff
- Special skills of teachers are taken into account when tasks are divided among staff
- The school leader monitors the general orientation of the various subject matter areas.
- The school leader ensures that different learning routes are aligned.
- The school leader monitors the attainment of educational objectives.
- The school leader has an open mind with respect to initiatives to improve the quality of education
- The school leader takes appropriate action when desired educational and organizational aspects are not fulfilled.
- The school leader and team talk about desired changes at school
- The school team is invited to put forward improvement proposals.
- A supportive attitude of the head teacher with respect to the implementation of new methods of work

The school leader as an initiator and facilitator of staff professionalization

- The school leader emphasizes the importance of team development and further education
- The school leader tries to educate him/herself further by means of courses and study of literature
- The head teacher encourages further education of teachers in a selective, targeted way.
- There is an explicit policy for furthering training of teachers.
- Who decides about further training of teachers?
- Percentage of staff that has followed courses for further training as a teacher
- Percentage of staff that has followed courses during out of school hours/during school hours
- Has the school leader taken part in courses aimed at his/her own professionalization?

3. Consensus and cohesion/cooperation among staff

Types and frequency of meetings and consultations

- Number of formal staff meetings with the head teacher
- Frequency of informal meetings among groups of teachers
- Informal contacts between staff

The contents of cooperation

Items considered important in cooperation at school:

- Pedagogical mission
- Educational concept
- School aims, objectives
- Pedagogic actions
- Planning and implementation of lessons
- Acquiring teaching methods and materials
- Discussing pupils' achievement
- Establishing entrance behaviour at the beginning of the school year

- Treatment of pupils with learning difficulties
- Educational change and innovation
- Subject matter choice, assignments, achievement test, homework, preparation of lessons, observation of lessons
- Counselling of beginning teachers

Satisfaction about cooperation

- Satisfaction in relation to colleagues with respect to allocation of duties and coordination, concerning:
 - variety of interests
 - professional competence
 - supporting school improvement
 - involvement in pupils' learning and satisfaction
 - the amount of curriculum/techniques discussion in team meetings
 - acceptance, support and opportunity to cooperate
 - cooperation at school and with the team

The importance attributed to cooperation

- To what degree do head teachers agree on the importance of the following activities as effectiveness-enhancing conditions?
 - the necessity of aligning the curriculum of subsequent grade levels
 - similarity in teaching approach among grades and classrooms
 - a common policy with respect to pupils with special learning and behavioural problems
 - the use of pupil records to be passed from one grade level teacher to the next
 - the importance of cooperation among departments

Other indicators of successful cooperation

- Explicit policy aimed at furthering cooperation among staff
- Encouragement of consultations on lesson goals, teaching strategies and use of equipment
- Explicit division of tasks and coordination activities
- An established practice of team teaching
- Consensus among staff, with departments
- Frequent discussions about curriculum and teaching approach

4. Curriculum quality and opportunity to learn

How curricular priorities are set

- The extent to which subject matter provision is determined (i.e. guidelines are developed) by the ministry, the school board and the school team
- Knowledge about core objectives, arithmetic/math and science, the school work plan
- The importance of a good range of extracurricular activities for the school's effectiveness
- The importance of: provision improvement for extending special needs in ordinary schools, improving preparation for the postgraduate course/profession-oriented education.
- Attention to
 - acquiring unconventional behaviour
 - subject integration, factual subjects
 - realistic math education
 - introducing computers
 - the attainment targets
- Attention to learning study skills

Choice of methods and textbooks

- Availability of books for language and math

- Well-functioning methods for spelling, decoding, reading comprehension, composition writing and math, meaning:
 - A clear line with regard to subject matter content
 - Clear directives for instruction and testing
 - A step-by-step approach for the low achievers
 - A clear distribution of minimum competency goals over school years
- Which language methods (in which group)
- Which arithmetic/math methods (in which group)
- Method for science

Application of methods and textbooks

- Knowledge of the manual for arithmetic/math/science methods
- The time the method is used
- Considering transfer to other methods
- Which part and which chapter in the beginning of the school year
- Which part and which chapter now
- Keeping sequence in the method
- Percentage of subject matter dealt with at the end of the school year
- Progress in method at the end of the school year
- Material for arithmetic/math language/science other than prescribed in method
- Use of a calculator
- Percentage of pupils in a position to use a calculator

Opportunity to learn

- Percentage of time for arithmetic/math/science spent on method
- Division of lessons to subject matter components
- Other subject matter areas (with the subject)
- Number of lessons per subject matter area
- Which test items link up with education taught so far (for arithmetic/math and science)

Satisfaction with the curriculum

- Education gets shape and content in accordance with the school's vision and goals
- The extent of satisfaction with the curriculum now and five years ago
- Satisfaction with the curriculum and the teaching materials
- Satisfaction with the choice of subjects offered.
- Effectiveness of the curriculum's coordination within the school
- Successes with respect to extracurricular activities and curriculum development over the past five years
- The degree to which the work at school is considered interesting
- The extent to which a curriculum is modern
- Lessons: number of lessons that stir the imagination, diversity of subjects.

5. School climate

(a) Orderly atmosphere

The importance given to an orderly climate

- Good discipline, pupil behaviour and an orderly and safe learning environment are effectiveness-enhancing conditions
- Inconsistent approach of pupil behaviour and discipline are bad pupil behaviour impede the school's effectiveness
- The school has a corresponding philosophy with respect to an orderly climate
- The school head finds it important to create a quiet, orderly environment
- The extent to which a school head attaches importance to a task-oriented atmosphere
- The extent to which a teacher pursues an orderly climate

Rules and regulations

- Clear rules for pupils; pupils know where they stand
- Clear (written) rules for: clothing and physical care of pupils, pupils doing paid jobs
- Formally recording and applying rules with respect to a.o. lateness, disturbing the lesson, absenteeism
- The extent to which school rules are recorded per subject
- Rules and sanctions with respect to discipline are well understood by staff and pupils and are not consistently broken
- The extent to which behavioural rules are honest and are being maintained.
- Proportion of teachers using the following behavioural rules (a.o. looking after pupils, leaving the classroom orderly, seeing to it that the classroom is left behind clean).
- The way rules are applied in case of lateness, disturbing the lesson, cheating and truancy
- Improving and maintaining behavioural rules is an important objective for the school.

Punishment and rewards

- Percentage of pupils receiving disciplinary punishment last year
- Number of rewards mentioned by the school head
- Number of punishments mentioned by the school head
- Rewards/punishment ratio
- Teacher rewards work more than punishment
- Teacher rewards behaviour more than punishment
- Forms of rewards by school head (e.g. praise)
- Forms of punishment by school head (e.g. verbal warnings, confinement)
- A clearly applied system of punishment and rewards at the school

Absenteeism and drop-out

- Registration of pupils' presence/absenteeism
- Control of absentee registration by teachers
- The frequency of school heads or teams are being confronted with the following behaviour
- Measures to avoid structural cancelling of lessons as much as possible
- Policy in case a teacher is absent
- Measures with respect to truancy
- Policy aimed at preventing early school leaving
- Measures to prevent early school leaving

Good conduct and behaviour of pupils

- Other pupils do not encourage a child teasing another child
- Teachers and pupils ensure that teaching-learning processes are undisturbed
- Teachers create a learning environment in which pupils can work in task-oriented way
- Ensure that nobody disturbs a teacher during the lesson
- The pupils behave well when the teacher leaves the classroom
- The lessons are not often disturbed by noise down the hall
- Level of pupil noise in the classroom
- Level of pupil movement in the classroom
- Teachers' audibility in the classroom
- Pupil's behaviour around the school
- Strengthening pupils' behaviour
- The level of pupils' unaccepted behaviour now and 5 years ago
- Important successes and problems with respect to pupils' behaviour and discipline now and 5 years ago
- The school's high standards of pupil behaviour
- The frequency school heads or team are being confronted with the following behaviour (of grade 6): vandalism, theft

Satisfaction with orderly school climate

- A quiet, orderly learning environment at school

- The school yard, the group classrooms and the common rooms form an orderly and attractive playing/learning environment for the pupils
- The school supplies a supporting and secure environment
- Pupils and teachers feel secure at school
- There is a safe and orderly climate in my group
- Satisfaction with respect to safety at school, behaviour in the classroom, the school and teachers being attentive
- Satisfaction with respect to pupils' behaviour
- Degree of satisfaction with pupils' behaviour now and 5 years ago
- The extent to which teachers set an example in their behaviour to pupils
- Satisfaction with respect to precautions/the way the school handles vandalism, drugs, alcohol and tobacco

(b) Climate in terms of effectiveness orientation and good internal relationships

Priorities in an effectiveness-enhancing school climate

Perceptions on general effectiveness-enhancing conditions

Relationships between pupils

Relationships between teachers and pupils

Relationship between head teacher and pupils

Relationship between members of staff

Relationships: the role of the school head

Engagement of pupils

Appraisal of roles and tasks

Job appraisal in terms of facilities, conditions of labour, task load and general satisfaction

Facilities and building

6. Evaluative potential

Evaluation emphasis

Monitoring pupils' progress

The use of pupil monitoring systems

School process evaluation

Use of evaluation results

Keeping records on pupils' performance

Satisfaction with evaluation activities

7. Parent involvement

Emphasis in school policy

Contact with parents

Satisfaction with parent involvement

8. Classroom climate

Relationship within the classroom

Order

Work attitude

Satisfaction

8. Effective learning time

Importance of effective learning time

Monitoring of absenteeism

Time at school level

Time at classroom level

Classroom management
Homework

9. Structured instruction

Emphasis in school's policies
Structure of lessons
Preparation of lessons
Direction instruction
Monitoring

10. Independent learning

(No subcomponents)

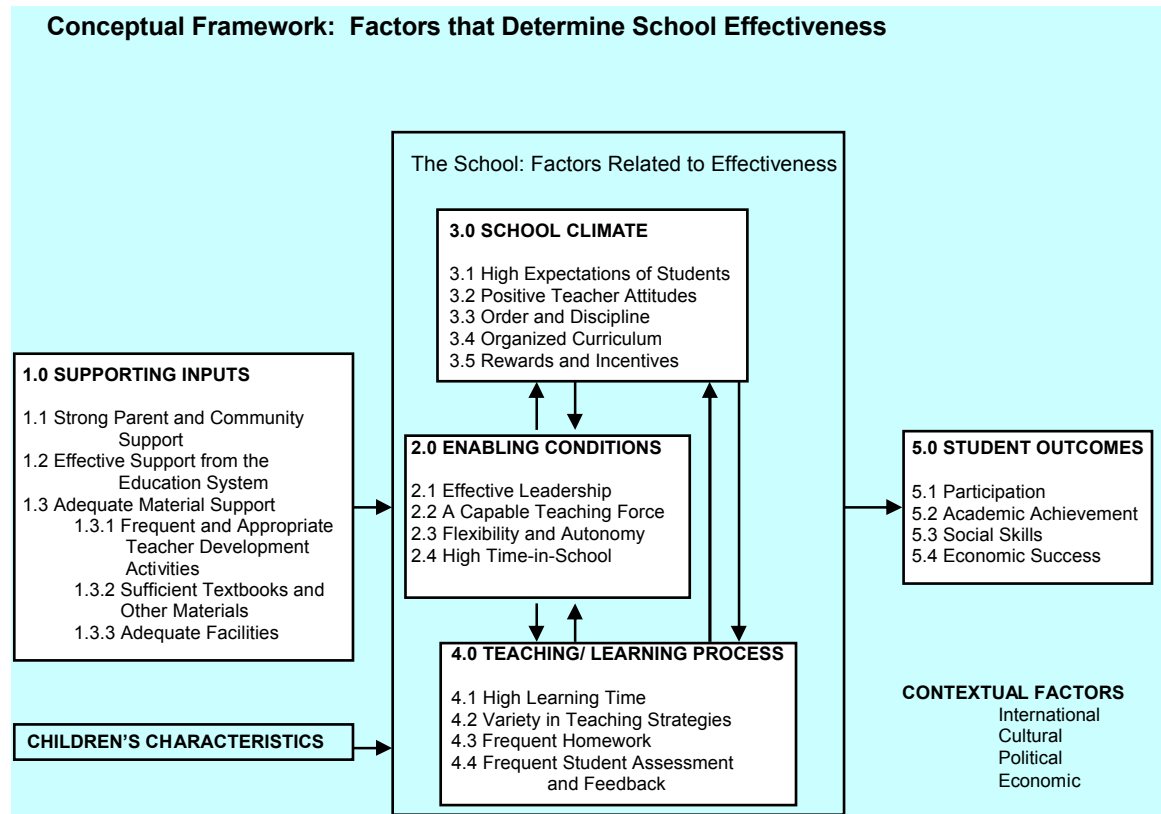
11. Differentiation

General orientation
Special attention for pupils at risk

12. Reinforcement and feedback

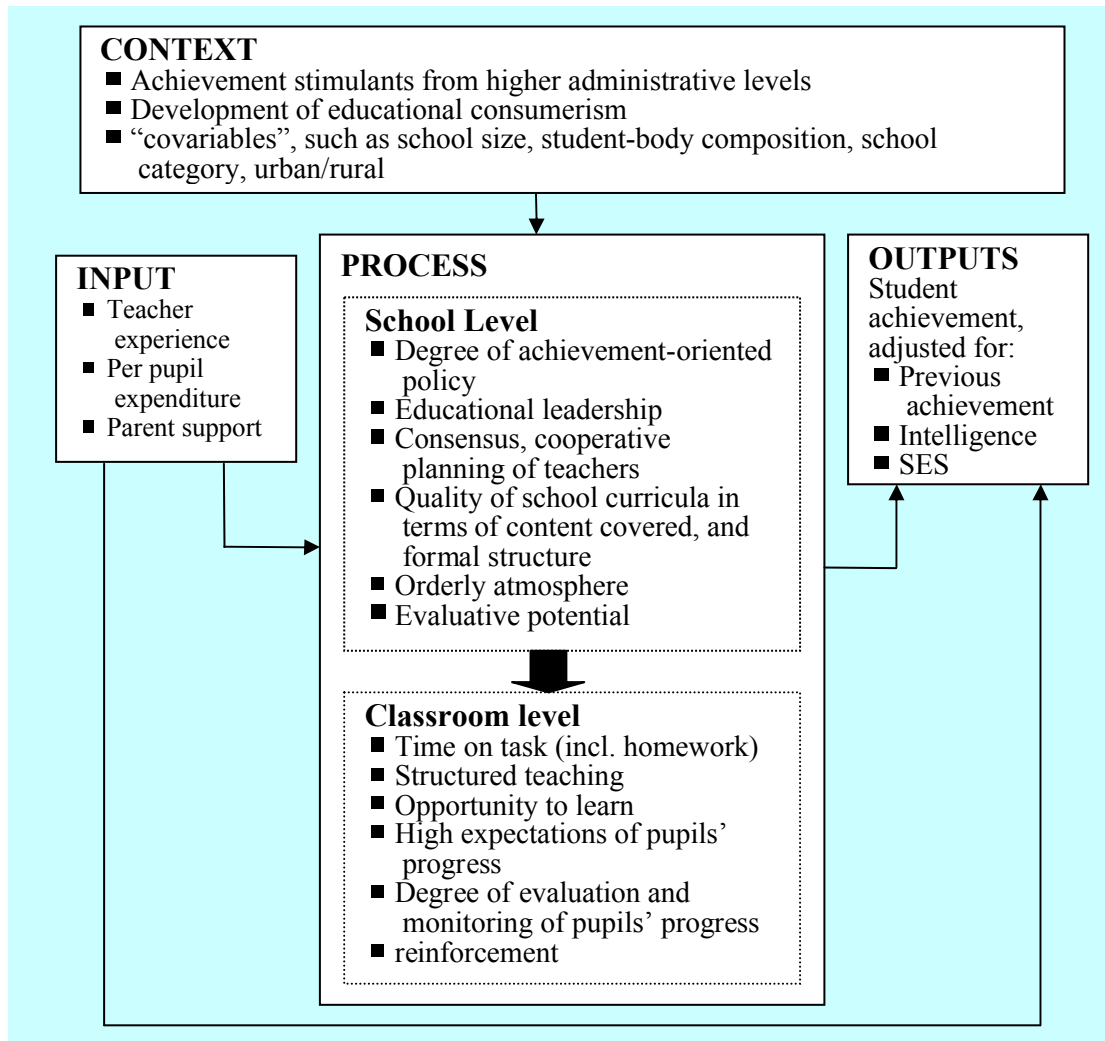
(No subcomponents)

Appendix 3: Conceptual Framework: Factors that Determine School Effectiveness (Heneveld & Craig 1996, Heneveld 1994)



(see *Mapping SACMEQ II Variables to the School Effectiveness Framework: an internal document of SeeQ project*)

Appendix 4: An integrated model of school effectiveness (from Scheerens, 1990)

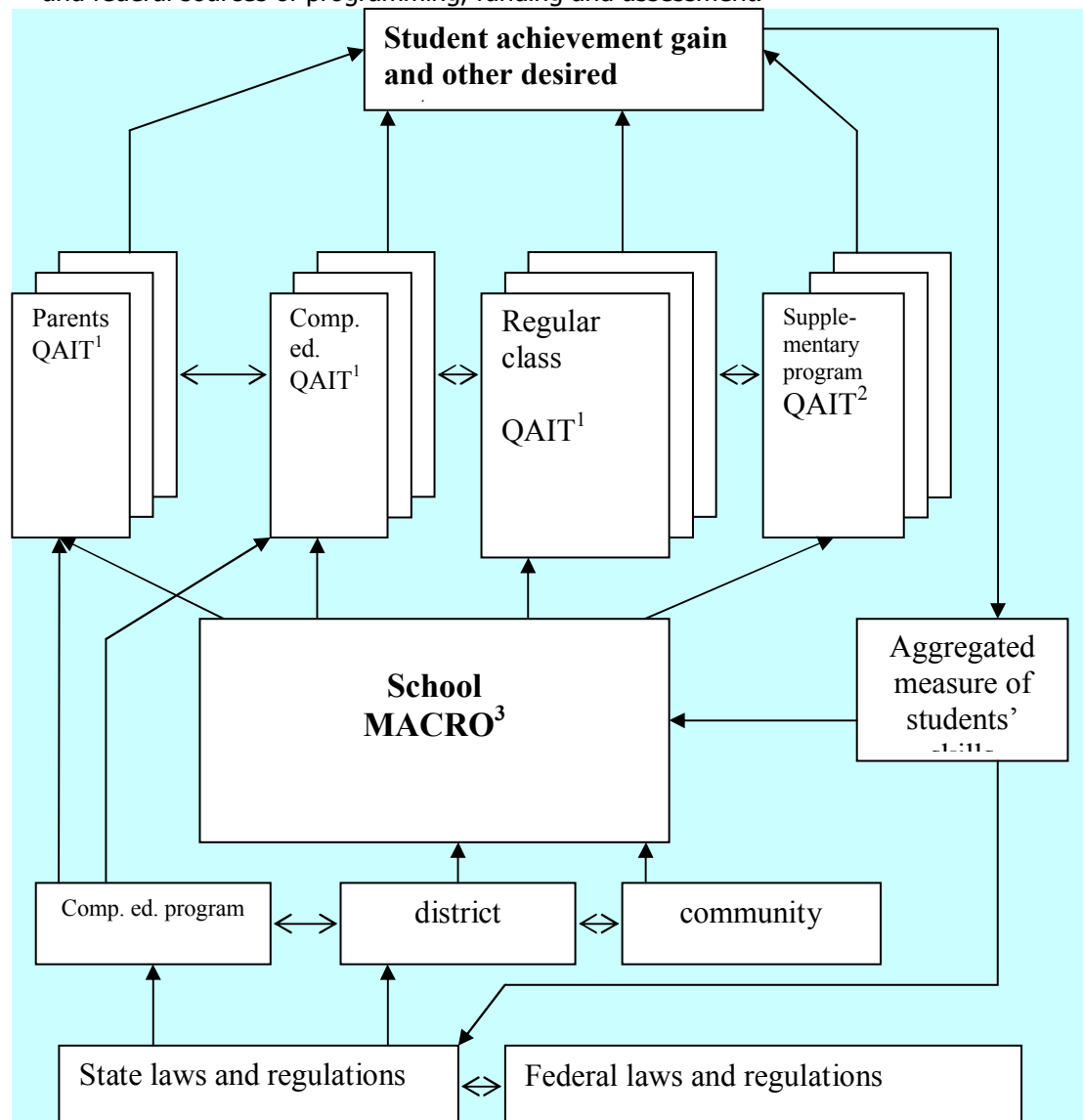


Appendix 5: The Slavin/Stringfield model of school effectiveness (1992)

The QAIT/MACRO model developed by Stringfield and Slavin (1992). QAIT stands for quality, appropriateness, incentive and time; MACRO is the acronym for meaningful goals, attention to academic focus, coordination, recruitment and training, and organization.

This model has four levels:

1. the level of the individual student and learner;
2. (para)professionals who are in direct interaction with students;
3. schools, with head teachers, other school level personnel, and programs, "which affect student learning by affecting the ways in which students, teachers and parents act and interact" (Stringfield & Slavin, 1992, p. 36);
4. the above-school level, comprising the community, the school district, state and federal sources of programming, funding and assessment.



A hierarchical elementary educational effects model

1: quality, appropriateness, incentive, time of instruction; 2: special education, bilingual education, etc. 3: meaningful goals, attention to academic functions, coordination, recruitment and training, organization

Appendix 6: School Functions and School Effectiveness

1. School functions and effectiveness at multilevel interactions

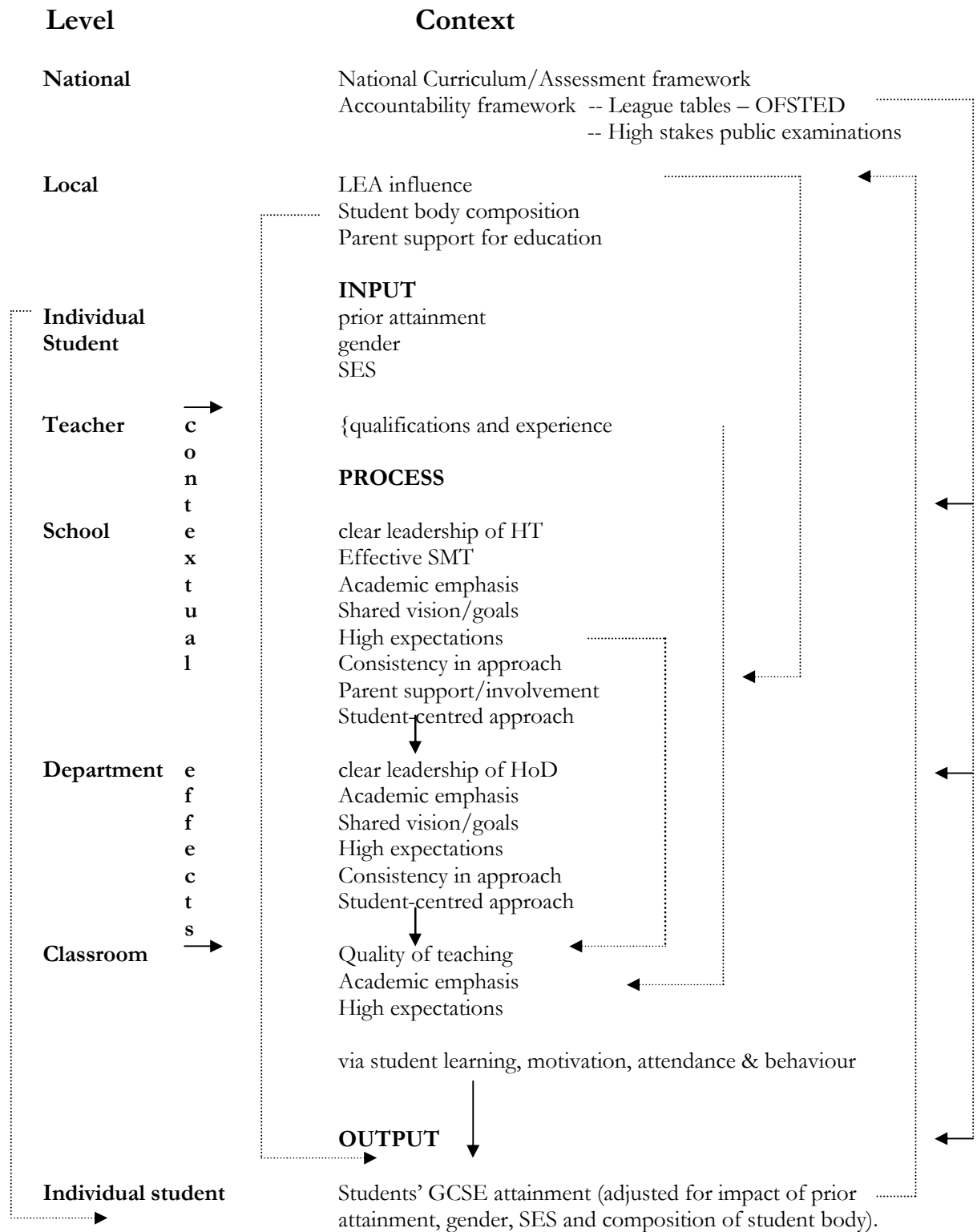
| School F & E Levels | Technical/economic | Human/social | Political | Cultural | Educational |
|-----------------------------------|--|---|--|---|---|
| Individual (students, staff, etc) | <ul style="list-style-type: none"> Knowledge and skills training Career training Job for staff | <ul style="list-style-type: none"> Psychological developments Social developments Potential developments | <ul style="list-style-type: none"> Development of civic attitudes and skills | <ul style="list-style-type: none"> Acculturation Socialization with values, norms, and beliefs | <ul style="list-style-type: none"> Learning how to learn and develop Learning how to teach and help Professional development |
| Institutional | <ul style="list-style-type: none"> As a life place As a work place As a service organization | <ul style="list-style-type: none"> As a social entity/system As a human relationship | <ul style="list-style-type: none"> As a place for political socialization As a political coalition As a place for political discourse or criticism | <ul style="list-style-type: none"> As a centre for cultural transmission and reproduction As a place for cultural revitalization and integration | <ul style="list-style-type: none"> As a place for learning and teaching As a centre for disseminating knowledge As a centre for educational changes and developments |
| Community | <ul style="list-style-type: none"> Serving the economic or instrumental needs of the community | <ul style="list-style-type: none"> Serving the social needs of the community | <ul style="list-style-type: none"> Serving the political needs of the community | <ul style="list-style-type: none"> Serving the cultural needs of the community | <ul style="list-style-type: none"> Serving the educational needs of the community |
| Society | <ul style="list-style-type: none"> Provision of quality labor forces Modification of economic behavior Contribution to the manpower structure | <ul style="list-style-type: none"> Social integration Social mobility, social class perpetuation Social equality Selection and allocation of human resources Social development and change | <ul style="list-style-type: none"> Political legitimisation Political structure maintenance and continuity Democracy promotion Facilitating political developments and reforms | <ul style="list-style-type: none"> Cultural integration and continuity Cultural reproduction Production of cultural capital Cultural revitalization | <ul style="list-style-type: none"> Development of the education professions Development of education structures Dissemination of knowledge and information Learning society |
| International | <ul style="list-style-type: none"> International competition Economic cooperation International trade Technology exchange Earth protection Sharing information | <ul style="list-style-type: none"> Global village International friendship Social cooperation International exchanges Elimination of national, regional, racial, gender biases | <ul style="list-style-type: none"> International coalition International understanding Peace / against war Common interests Elimination of conflicts | <ul style="list-style-type: none"> Appreciation of cultural diversity Cultural acceptance across countries/regions Development of global culture | <ul style="list-style-type: none"> Development of global education International education exchanges and cooperation Education for the whole world |

(Adapted from Cheng 1996, p.10 & p.14)

2. Models of School Effectiveness in the light of organizational management literature (Cheng 1996, p.19)

| | Conception of SE | Conditions for model usefulness | Evaluation indicators / key areas |
|-------------------------------|---|---|---|
| Goal model | <ul style="list-style-type: none"> Achievement of stated goals | <ul style="list-style-type: none"> Goals are clear, consensual, time-bound and measurable; resources are sufficient | <ul style="list-style-type: none"> Objectives listed in the school or program plans, e.g. achievements |
| Resource-Input model | <ul style="list-style-type: none"> Achievement of needed resources and inputs | <ul style="list-style-type: none"> There is a clear relationship between inputs and outputs; resources are scarce | <ul style="list-style-type: none"> Resources procured, e.g. quality of student intake, facilities, financial support, etc. |
| Process model | <ul style="list-style-type: none"> Smooth and healthy internal process | <ul style="list-style-type: none"> There is a clear relationship between process and outcome | <ul style="list-style-type: none"> Leadership, communication, participation, coordination, social interaction, etc. |
| Satisfaction model | <ul style="list-style-type: none"> Satisfaction of all powerful constituencies | <ul style="list-style-type: none"> The demands of the constituencies are compatible and cannot be ignored | <ul style="list-style-type: none"> Satisfaction of education authorities, management board, administrators, teachers, parents, students, etc. |
| Legitimacy model | <ul style="list-style-type: none"> Successful legitimate or marketing activities for school survival | <ul style="list-style-type: none"> The survival and demise among schools must be assessed | <ul style="list-style-type: none"> Public relations, marketing, public image, reputation, status in the community, accountability, etc |
| Ineffectiveness model | <ul style="list-style-type: none"> Absence of characteristics of ineffectiveness in school | <ul style="list-style-type: none"> There is no consensual criteria of effectiveness, but strategies for school improvement are needed. | <ul style="list-style-type: none"> Existing conflicts, dysfunctions, difficulties, defects, weaknesses, etc. |
| Organizational learning model | <ul style="list-style-type: none"> Adaptation to environmental changes and internal barriers | <ul style="list-style-type: none"> Schools are new or changing; the environmental changes cannot be ignored | <ul style="list-style-type: none"> Awareness of external needs and changes, internal process monitoring, program evaluation, development planning |
| Total quality management | <ul style="list-style-type: none"> Total management of internal people and process to meet strategic constituencies' needs | <ul style="list-style-type: none"> The constituencies' needs are compatible; the technology and resources are available for total management | <ul style="list-style-type: none"> Leadership, people management, strategic planning, process management, quality results, constituencies' satisfaction, impact on society, etc. |

Appendix 7: A model of secondary school academic effectiveness (Sammons, Thomas and Mortimore (1997))



Appendix 8: Dimensions of school quality, Kenya (Lloyd et al. 2000)

Time to learn

- Total time school in session over school year
- Time lost to unscheduled closures
- Time lost to teacher absences
- Time lost due to discipline/punishment*
- Time lost to students' extracurricular duties

Material inputs

Facilities

Infrastructure

- Buildings
- Classrooms
- Sports facilities
- Science labs
- Library

Equipment

- Desks
- Blackboards
- Telephone
- Duplicating equipment

Amenities

- Toilets*
- Electricity
- Water

Instructional materials

- Textbooks
- Maps and charts
- Lab equipment
- Sports equipment*
- Library books

Teaching staff

Quantity

- Student/teacher ratio
- Sex ratio*

Quality

- Training
- Supervision
- Experience
- Workload
- Remuneration

Curriculum beyond core*

- Sports
- Art
- Music
- Drama
- Clubs
- Family life education

Other staff

- Supervisors
- Student advisor
- Nurse or doctor

Community support

School and classroom dynamics

- General school environment
- Orderliness and organization
- Vandalism

- Classroom schedule disruption
- Enforcement of uniforms
- Classroom dynamics
 - Use of instructional time
 - Language spoken
 - Students' participation*
 - Teachers' treatment of students*
 - Classes streamed by ability
- School head's and teachers' attitudes toward*
 - Teaching boys versus teaching girls
 - Girls' and boys' abilities/importance and ease of subjects for each
 - Teaching family planning/sexuality
 - Schoolgirl pregnancy/sex with teachers
- School policies/practices with gender implications*
 - Separate classes
 - Separate curricula
 - Different types of duties
 - Discrimination in rewards
 - Pregnancy tests
 - Family life education instruction
- Interactions outside classroom*
 - Student to student
 - Teacher to student

Note: Lloyd *et al.* (2000) focused on the gender disparity in the dynamics of schooling and school effectiveness. * Indicates that there is a possible gender difference for these items/dimensions of school quality and their differential effects on boys and girls, for example, the dropout odds and academic achievement.

Appendix 9: A summary of the key outcome variables in the school effectiveness studies in Sub-Saharan African countries from 1990s

(see also Appendix 10)

| Study | Country(countries) | Key outcome variables |
|------------------------------|---------------------------|--|
| Abraha <i>et al.</i> (1991) | Ethiopia | Girls' <i>persistence</i> (i.e. retention rate) through primary schools and their <i>performance</i> in Ethiopian national examination |
| Carrim and Shalem (1999) | South Africa | Qualitative study on the <i>experiences of black schools</i> in two projects |
| Eisemon <i>et al.</i> (1993) | Burundi | Sixth-graders' reading comprehension, written composition in narratives, mathematics and science (including elements of agriculture and health). |
| Fuller <i>et al.</i> (1994) | Botswana | Junior secondary school students' English proficiency and mathematics achievement |
| Harber and Trafford (1999) | South Africa | Qualitative study on the democratic school management in the form of school councils, focusing on the broad theme of school life such as mutual understanding between students of different ethnic background, sense of belonging and responsibility, and physical and verbal violence |
| Harber (1993) | Tanzania | Similar to Harber and Trafford (1999) |
| Lee <i>et al.</i> (2005) | Fourteen SACMEQ countries | II Sixth-graders' reading comprehension abilities collected by SACMEQ |
| Lee and Lockheed (1990) | Nigeria | Effects of single-sex and co-educational schooling on students' academic achievement and stereotypic views of mathematics, using data from the Second International Mathematics Study conducted by IEA in Nigeria during the 1981-1982 academic year |
| Michaelowa (2001) | Five countries | PASEC Fifth-graders' achievements in French and mathematics in standardized tests |
| Nyagura and Riddell (1993) | Zimbabwe | Grade 7 students' examination scores in English and mathematics |
| Riddell and Nyagura (1991) | Zimbabwe | Secondary school students' test scores in Zimbabwe Junior Certificate in English and mathematics, as well as their matched Grade 7 English and mathematics examination scores in 1989 |
| Urwick and Junaidu (1991) | Nigeria | Process variables of teaching and learning: the authors viewed the processes both as aspects of the quality of education in themselves and as links between school physical inputs and pupils' academic achievement (Note: achievement data were not available to the authors) |

Appendix 10: A summary of the school effectiveness studies in Sub-Saharan African countries from 1990s

10A: Literacy in reading/writing

| Study | Country (countries) | Student age and sample | Main findings in relation to school characteristics |
|------------------------------|---------------------|--|---|
| | | Key outcome variables | |
| Abraha <i>et al.</i> (1991) | Ethiopia | <p>Girls (Grade 6) from 182 primary schools randomly selected (two <i>awrajas</i> – provinces – were randomly selected from each of the 13 regions; and from each <i>awraja</i>, 7 primary schools were drawn)</p> <p>Two measures of girls' <i>performance</i>, based on school-level data on the number of boys and girls who passed the school-leaving exam, after completing Grade 6:</p> <p>(a) the simple percentage of girls passing the national examination, and (b) the ratio of female/male pass-rates</p> <p>Note: actual test scores were not available for this study.</p> | <p>Since the pass-rate for girls and boys is generally high, little variation exists to explain and construct stable multivariate models.</p> <p>The discrete influence of school characteristics on girls' performance remained unclear. Class size, number of shifts did not relate to girls' performance in any consistent manner.</p> |
| Eisemon <i>et al.</i> (1993) | Burundi | <p>1946 sixth-graders in 47 classes from predominantly rural areas were surveyed during a two-month period prior to the administration of the national examination.</p> <p>½ of the students were 14 or 15 years old;</p> | <p>Grade repetition had the great impact, among the variables such as students SES, school management, implementation of national curricular, and teacher experience and skills, on test scores. Repeaters scored significantly higher on all tests; and the differences were greatest for the tests administered in French.</p> <p>School management in terms of school director visits, the direct impact of visits on learning outcomes as well as the indirect impact through teacher punctuality, is the most powerful school characteristics.</p> |

| | | | |
|-----------------------------|----------|--|---|
| | | <p>Only 10% started school at age 6 and progressed to the sixth grade without repeating (55% were repeating the sixth grade)</p> <p>Reading comprehension, written composition in narratives</p> <p>Note: the tests were initially developed in English and then translated into French and from French to Kirundi. The central focus of the study was to understand how the use of different language may affect the measurement of literacy, mathematics and science achievements.</p> | <p>Some instructional practices such as providing extra hours of instruction had a relatively weak impact on learning outcomes.</p> |
| Fuller <i>et al.</i> (1994) | Botswana | <p>4948 Form 1 (i.e. Grade 8) and Form 2 (Grade 9) students in junior secondary schools</p> <p>English proficiency</p> | <p>Material conditions, school inputs and time in school (e.g. supplies of text books, exercise books, teacher guides, supplemental reading materials such as non-textbook readers, magazines and reference books, class size, inspector visits to classroom), and</p> <p>Teacher characteristics and training (e.g. gender, social class, pre-service training, frequency of in-service training, length of teaching experience, tenure in the current school and nationality) explained significant proportion of the variance in students' achievement. (Note: see the teacher gender effect below)</p> <p>However, the following process variables in teaching practices and classroom social rules (e.g. task complexity, vertical character of authority by the teacher, complexity of instructional tools used by the teachers, frequency and complexity of questions asked of pupils, consistency of teacher pedagogical technology, distribution of teacher time, proportion of teacher talk in English or Setswana), and teacher effort and pedagogical beliefs (e.g. teachers' self-perception of competence in different areas, job satisfaction,</p> |

| | | | |
|--------------------------|------------------------------|--|---|
| | | | <p>level of efficacy in shaping pupils' learning and school-wide policies and practices) held little explanatory power.</p> <p>School location (i.e. urban) made a positive difference in students' post-test scores as well as learning gains over a year or so</p> <p>Teacher gender was related to learning gains: both female and male students attending forms with a higher proportion of female teachers in their grade level show significantly higher learning gain scores.</p> <p>Girls' advantage in post-test scores was less for pupils whose teachers ask more open-ended questions.</p> <p>Note: the range of variability in student achievement <i>within</i> schools was far greater than <i>between</i> schools and communities. What features of the schools and the micro-processes in classrooms that could raise student achievement however remained "somewhat of a mystery".</p> |
| Lee <i>et al.</i> (2005) | Fourteen SACMEQ II countries | <p>Around 42,000 students in 2,300 schools in the fourteen countries</p> <p>Six-graders' reading comprehension abilities</p> | <p>School's average social background (i.e. school composition) was significantly and positively linked to school average literacy achievement in 8 out of the 14 countries.</p> <p>In all countries (except Seychelles and Mozambique), grade repetition had a statistically significant and negative association with achievement in literacy. In case of Seychelles and Mozambique, the insignificant relationships may well be due to the fact that very few Seychelles students repeated a grade and most students repeated in Mozambique.</p> <p>Grade size: Schools with smaller sixth grades exhibited higher achievement in Kenya, Botswana, Namibia and Swaziland. In Mauritius, however, schools with larger sixth grades evidenced higher achievement. In other countries, grade size was not significantly related to achievement.</p> <p>There was a consistent pattern of lower achievement for schools practising shifts.</p> <p>School location: Schools located in urban areas have higher average achievement, compared to rural areas, especially in Botswana, Zambia, Namibia, South Africa and</p> |

| | | | |
|-------------------|----------------------|---|---|
| | | | <p>Lesotho.</p> <p>Larger schools, if offering education in shifts and if in rural areas, tended to have lower average literacy achievement than schools that were smaller, operating full-day programmes and were located in towns and cities.</p> <p>Students in schools that were better physically resourced achieved higher; however, teaching resources were unrelated to achievement.</p> <p>There was a strong and positive association between the quality of teachers and student achievement in Botswana, Mozambique, Namibia and Seychelles.</p> |
| Michaelowa (2001) | Five PASEC countries | <p>Fifth-graders from Francophone Sub-Saharan African countries Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar and Senegal</p> <p>Achievements in French in standardized tests</p> | <p>Teachers' initial education and regular training seemed to be important</p> <p>Teachers' knowledge of the local language had a positive and significant effect on students' academic achievement</p> <p>Teachers' knowledge of French, the language for instruction, had no significant effect</p> <p>Teachers' nonschool activities such as farming and running a small business had positive and significant effects.</p> <p>The number of days teachers were absent from school and teachers' self-reported job satisfaction had significant negative and positive effects respectively on student learning outcomes</p> <p>Neither the exchange between teachers nor the correction of students' written homework had a significant effect.</p> <p>The availability of textbooks had strongly significant and positive impact on learning outcomes.</p> <p>The availability of classroom equipment such as desks, blackboard and chalk, and teachers' manuals also showed positive effects, though less pronounced than availability of textbooks.</p> |

| | | | |
|----------------------------|----------|---|---|
| | | | <p>A surprisingly positive relationship between class size and student achievement was noted.</p> <p>Double shifting had negative and significant impact on learning outcomes</p> <p>Multigrading had positive and significant impact on learning outcomes</p> <p>Students in schools visited by inspectors achieved significantly higher scores</p> <p>Teachers' contract status (whether a civil servant, or a teacher engaged on a “voluntary” basis) had significant effect. Despite low payment, students of “voluntary” contract teachers and their achievements were positive, strongly significant</p> |
| Nyagura and Riddell (1993) | Zimbabwe | 6927 Grade 7 students from 86 schools; examination scores in English | <p>School type: High-fee paying school students were better in English than low-fee paying and district council school students.</p> <p>Three school level variables: the pupil-teacher ratio, the availability of textbooks, and the percentage of trained teachers were highly significant for students' English achievement.</p> |
| Riddell and Nyagura (1991) | Zimbabwe | Secondary school students' test scores in Zimbabwe Junior Certificate in English, as well as their matched Grade 7 English examination scores in 1989 | <p>School type: High-fee paying school students were better in English than low-fee paying and district council school students.</p> <p>Boarding schools and single-sexed schools had higher level of academic achievement, according to the outlier analyses</p> <p>Student achievement was higher when schools had a greater availability of textbooks, a larger percentage of trained teachers and teachers who had taught at that particular school for a longer period of time.</p> <p>Newly trained recruits had much to offer and that longer experience in teaching was not necessarily a good indicator of teacher effectiveness.</p> |

10B: Mathematics/Science

Note: see 10A above for details of *student age and sample*.

| Study | Country (countries) | Student age and sample Key outcome variables | Main findings in relation to school characteristics |
|------------------------------|---------------------|--|---|
| Abraha <i>et al.</i> (1991) | Ethiopia | See 9.A above | See 9.A above |
| Eisemon <i>et al.</i> (1993) | Burundi | Six-graders' mathematics and science (including elements of agriculture and health). | <p>Language of assessment, French or Kirundi, profoundly influenced the measurement of achievement in most of the subjects tested. In Kirundi versions of science/agriculture, students achieved significantly higher scores. For the performance of the most able students in mathematics, the results in French and Kirundi versions were nearly identical.</p> <p>Repeaters scored significantly higher in mathematics.</p> <p>School director visits was the most powerful feature in relation to school effectiveness</p> |
| Fuller <i>et al.</i> (1994) | Botswana | mathematics achievement | See 9A above on students' achievement in English |
| Lee and Lockheed (1990) | Nigeria | <p>1012 students drawn from the data of the Second International Mathematics Study conducted by IEA in Nigeria during the 1981-1982 academic year</p> <p>Effects of single-sex and co-educational schooling on students' academic achievement in mathematics and views on learning mathematics</p> | <p>After adjustments of student background and attitudes, attendance at a girls schools was significantly related to mathematics achievement, while boys attendance was not related.</p> <p>After controlling both student characteristics (background and attitudes) and school characteristics such as school location, student/teacher ratio, teacher and teaching experiences variables, both single-sex school effects were significant, albeit in different directions. Girls of single-sex schools evidenced higher mathematics achievement than their female counterparts in coeducational schools. Conversely, boys of single-sex schools scored significantly below their male coeducational school counterparts.</p> <p>Rural location, schools with higher proportion of fathers in professional jobs (i.e. higher-SES schools) and schools with lower ratios of students to teachers (i.e. smaller classes) were strongly and positively related to mathematics achievement.</p> <p>Teachers' time use (whole-class instruction introducing new material and reviewing old material, students listening to teacher lectures) was significantly and negatively related to</p> |

| | | | |
|----------------------------|----------------------|---|--|
| | | | <p>mathematics achievement.</p> <p>No significant relationship between student mathematics achievement and the mathematics teacher's gender and teaching experience.</p> <p>Girls schools appeared to instil in their students less stereotypic views of mathematics as a male domain than do their coeducational school counterparts; whereas, boys schools seemed to foster more stereotypic views in their male students than do coeducational schools.</p> |
| Michaelowa (2001) | Five PASEC countries | Fifth-graders' achievements in mathematics in standardized tests | See 9A above on students' achievement in English |
| Nyagura and Riddell (1993) | Zimbabwe | Grade 7 students' examination scores in mathematics | <p>School type: High-fee paying school students were better in mathematics than low-fee paying and district council school students; however, after controlling for student intake variables such as gender, age, years spent in pre-school, days absent from school, time devoted to mathematics homework, and SES, school type was no longer a significant discriminating factor for mathematics achievement.</p> <p>Textbooks and trained teachers were highly significant variables for both mathematics and English; and in addition, they were more important for mathematics achievement than English.</p> <p>The amount of instructional time and the number of hours of supervised study were of significant importance for mathematics achievement (Note: not for English).</p> <p>Three school level variables: the pupil-teacher ratio, the availability of textbooks, and the percentage of trained teachers were highly significant for mathematics achievement.</p> |
| Riddell and Nyagura (1991) | Zimbabwe | Secondary school students' test scores in Zimbabwe Junior Certificate in mathematics, as well as their matched Grade 7 scores in 1989 | See 9A above on students' achievement in English |

References

- Abraha, S., Beyene, A., Dubale, T., Fuller, B., Holloway, S., & King, E. (1991). What factors shape girls' school performance? Evidence from Ethiopia. *International Journal Of Educational Development*, 11, 107-18.
- Beaton, A. E., Postlethwaite, T. N., Ross, K. N., Spearritt, D., & Wolf, R. M. (1999). *The benefits and limitations of international educational achievement studies*. Paris: UNESCO International Institute for Educational Planning.
- Behrman, J. R. (1996). Measuring the effectiveness of schooling policies in developing countries: Revisiting issues of methodology. *Economics of Education Review*, 15, 345-64.
- Boissiere, M. (2004). *Determinants of primary education outcomes in developing countries: Background paper for the evaluation of the world bank's support to primary education*. Washington, D. C.: The World Bank Operations Evaluation Department.
- Brock-Utne, B. (2001). Education for all - in whose language? *Oxford Review Of Education*, 27, 115-34.
- Carrim, N., & Shalem, Y. (1999). School effectiveness in South Africa. *International Journal of Qualitative Studies in Education*, 12, 59.
- Cele, N. (2005). Effective schools operating with amazing (dis)grace of human resources strategy, policy and practice: A South African case. *International Journal of Leadership in Education*, 8, 223.
- Chapman, D. W., & Snyder, C. W., Jr. (2000). Can high stakes national testing improve instruction: Reexamining conventional wisdom. *International Journal of Educational Development*, 20, 457.
- Cheng, Y. C. (1996). *School effectiveness and school-based management : A mechanism for development*. London: Falmer Press.
- Clark, D. L., Lotto, L. S., & Astuto, T. A. (1984). Effective schools and school improvement - a comparative-analysis of 2 lines of inquiry. *Educational Administration Quarterly*, 20, 41-68.
- Cohn, E., & Rossmiller, R. A. (1987). Research on effective schools: Implications for less developed countries. *Comparative Education Review*, 31, 377-99.
- Coleman, J. S., Campbell, E., Hobson, C., McPartland, J., Mood, A., Weinfield, F., & York, R. (1966). *Equality of educational opportunity*. Washington, D. C.: US Government Printing Office.
- Creemers, B. (1994a). *The effective classroom*. London: Cassell.
- (1994b). The history, value and purpose of school effectiveness studies. In D. Reynolds, B. P. M. Creemers, P. S. Nesselrodt, E. C. Schaffer, S. Stringfield & C. Teddlie (Eds.), *Advances in school effectiveness research and practice*. Oxford: Pergamon.
- Crossley, M., & Murby, M. (1994). Textbook provision and the quality of the school curriculum in developing-countries - issues and policy options. *Comparative Education*, 30, 99-114.
- Edmonds, R. (1979). Effective schools for the urban poor. *Educational Leadership*, 37, 16-18.
- Eisemon, T. O., Schwille, J., Prouty, R., Ukobizoba, F., Kana, D., & Manirabona, G. (1993). Providing quality education when resources are scarce: Strategies for increasing primary school effectiveness in burundi. In H. M. Levin & M. E. Lockheed (Eds.), *Effective schools in developing countries* (pp. 130-57). London: The Falmer Press (with the World Bank).
- Farrell, J. P., & Oliveira, J. B. (1993). *Teachers in developing countries: Improving effectiveness and managing costs*. Washington, D.C.: The World Bank.
- Fertig, M. (2000). Old wine in new bottles? Researching effective schools in developing countries. *School Effectiveness and School Improvement*, 11, 385-403.
- Fraser, B. J. (1989). Research syntheses on school and instructional effectiveness. *International Journal of Educational Research*, 13, 707.
- Fraser, B. J., Walberg, H. J., Welch, W. W., & Hattie, J. (1987). Syntheses of educational productivity research. *International Journal of Educational Research*, 11, 145-252.
- Fullan, M., & Watson, N. (2000). School-based management: Reconceptualizing to improve learning outcomes. *School Effectiveness And School Improvement*, 11, 453-73.

- Fuller, B. (1987). What factors raise achievement in the third world? *Review Of Educational Research*, 57, 255-92.
- Fuller, B., & Clarke, P. (1993). How to raise the effectiveness of secondary schools? - universal and locally tailored investment strategies. Washington DC: World Bank.
- (1994). Raising school effects while ignoring culture - local conditions and the influence of classroom tools, rules, and pedagogy. *Review Of Educational Research*, 64, 119-57.
- Fuller, B., & Heyneman, S. (1989). Third world school quality: Current collapse, future potential. *Educational Researcher*, 18, 12-19.
- Fuller, B., Hua, H., & Snyder, C. W. (1994). When girls learn more than boys: The influence of time in school and pedagogy in Botswana. *Comparative Education Review*, 38, 347-76.
- Glewwe, P. (2002). Schools and skills in developing countries: Education policies and socioeconomic outcomes. *Journal of Economic Literature*, 40, 436-82.
- Glewwe, P., Kremer, M., & Moulin, S. (2001). Textbooks and test scores: Evidence from a randomized evaluation in Kenya. Washington D. C.: World Bank, Development Research Group.
- Hannaway, J., & Talbert, J. E. (1993). Bringing context into effective schools research - urban-suburban differences. *Educational Administration Quarterly*, 29, 164-86.
- Hanushek, E. A. (1995). Interpreting recent research on schooling in developing countries. *The World Bank Research Observer*, 10, 227-46.
- (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation And Policy Analysis*, 19, 141-64.
- Hanushek, E. A., & Luque, J. A. (2003). Efficiency and equity in schools around the world. *Economics Of Education Review*, 22, 481-502.
- Harber, C. (1993). Democratic management and school effectiveness in Africa: Learning from Tanzania. *Compare*, 23, 289-300.
- (unknown). School effectiveness and education for democracy and non-violence. Paris: UNESCO.
- Harber, C., & Davies, L. (1997). *School management and effectiveness in developing countries : The post-bureaucratic school*. London: Cassell.
- Harber, C., & Muthukrishna, N. (2000). School effectiveness and school improvement in context: The case of South Africa. *School Effectiveness and School Improvement*, 11, 421.
- Harber, C., & Trafford, B. (1999). Democratic management and school effectiveness in two countries: A case of pupil participation? *Educational Management Administration Leadership*, 27, 45-54.
- Harbison, R. W., & Hanushek, E. A. (1992). *Educational performance of the poor: Lessons from rural northeast brazil*. New York: Oxford University Press.
- Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). Does money matter? A meta analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher*, 23, 5-14.
- Heneveld, W. (1994). Planning and monitoring the quality of primary education in sub-saharan Africa. Washington DC: World Bank, Human Resources and Poverty Division.
- Heneveld, W., & Craig, H. (1996). *Schools count: World Bank project designs and the quality of primary education in Sub-Saharan Africa*. Washington, DC: The World Bank.
- Heyneman, S., & Loxley, W. A. (1982). Influences on academic achievement across high and low income countries: A re-analysis of IEA data. *Sociology Of Education*, 55, 13-21.
- (1983). The effect of primary school quality on academic achievement across twenty-nine high and low income countries. *American Journal of Sociology*, 88, 1162-94.
- Jansen, J. D. (1995). Effective schools? *Comparative Education*, 31, 181-200.
- Kellaghan, T., & Greaney, V. (1992). Using examinations to improve education: A study in fourteen African countries. Washington, D. C.: World Bank.
- (2001). *Using assessment to improve the quality of education*. Paris: UNESCO: International Institute for Educational Planning.
- (2004). *Assessing student learning in Africa*. Washington, D. C.: World Bank.
- Lee, V. E., & Lockheed, M. E. (1990). The effects of single-sex schooling on achievement and attitudes in Nigeria. *Comparative Education Review*, 34, 209-31.

- Lee, V. E., Zuze, T. L., & Ross, K. N. (2005). School effectiveness in 14 sub-saharan African countries: Links with 6th graders' reading achievement. *Studies In Educational Evaluation*, 31, 207.
- Levin, H. M., & Lockheed, M. E. (1993). *Effective schools in developing countries*. London: The Falmer Press (with the World Bank).
- Levy, M. B. (1971). Determinants of primary school drop-outs in developing countries. *Comparative Education Review*, 15, 44-58.
- Lloyd, C. B., Mensch, B. S., & Clark, W. (2000). The effects of primary school quality on school dropout among kenyan girls and boys. *Comparative Education Review*, 44, 113-47.
- Lockheed, M. E., & Hanushek, E. A. (1988). Improving educational efficiency in developing countries: What do we know. *Compare*, 18, 21-38.
- Lockheed, M. E., & Levin, H. M. (1993). Creating effective schools. In H. M. Levin & M. E. Lockheed (Eds.), *Effective schools in developing countries* (pp. 1-19). London: The Falmer Press (with the World Bank).
- Lockheed, M. E., & Longford, N. T. (1989). *A multi level model of school effectiveness in a developing country* Washington DC: World Bank.
- Lockheed, M. E., & Verspoor, A. M. (1991). *Improving primary education in developing countries*. Oxford: Oxford University Press (Published for the World Bank).
- Michaelowa, K. (2001). Primary education quality in francophone Sub-Saharan Africa: Determinants of learning achievement and efficiency considerations. *World Development*, 29, 1699-716.
- Mortimore, P., Sammons, P., Stoll, L., Lewis, D., & Ecob, R. (1988). *School matters: The junior years*. London: Open Books Ltd.
- Murimba, S. (2005a). The impact of the southern and eastern Africa consortium for monitoring educational quality (SACMEQ). *Prospects*, XXXV, 91-108.
- (2005b). The southern and eastern Africa consortium for monitoring educational quality (SACMEQ): Mission, approach and projects. *Prospects*, XXXV, 75-89.
- Nyagura, L. M., & Riddell, A. (1993). *Primary school achievement in English and mathematics in Zimbabwe: A multi-level analysis*. Washington DC: World Bank.
- Pennycuik, D. (1993). *School effectiveness in developing countries : A summary of the research evidence*: Great Britain, Overseas Development Administration.
- Purkey, S. C., & Smith, M. S. (1983). Effective schools: A review. *The Elementary School Journal*, 83, 426-52.
- Ralph, J., & Fennessey, J. (1983). Science or reform: Some questions about the effective schools model. *Phi Delta Kappan*, 64, 689-94.
- Reynolds, D., Creemers, B. P. M., Nesselrodt, P. S., Schaffer, E. C., Stringfield, S., & Teddlie, C. (1994). *Advances in school effectiveness research and practice*. Oxford: Pergamon.
- Reynolds, D., & Cuttance, P. (1992). *School effectiveness : Research, policy and practice*. London: Cassell.
- Riddell, A., & Nyagura, L. M. (1991). *What causes differences in achievement in Zimbabwe's secondary schools?* Washington, D. C.: Population and Human Resources Department, World Bank.
- Riddell, A. R. (1989). An alternative approach to the study of school effectiveness in third-world countries. *Comparative Education Review*, 33, 481-97.
- (1997). Assessing designs for school effectiveness research and school improvement in developing countries. *Comparative Education Review*, 41, 178-204.
- Rutter, M. (1983). School effects on pupil progress - findings and policy implications. *Child Development*, 54, 1-29.
- Rutter, M., & Maughan, B. (2002). School effectiveness findings 1979-2002. *Journal of School Psychology*, 40, 451.
- Rutter, M., Maughan, B., Mortimore, P., & Ouston, J. (1979). *Fifteen thousand hours: Secondary schools and their effects on children*. London: Open Books Ltd.
- Sammons, P., Hillman, J., & Mortimore, P. (1995). *Key characteristics of effective schools: A review of school effectiveness research*. London: Great Britain, Office for Standards in Education.

- Sammons, P., Thomas, S., & Mortimore, P. (1997). *Forging links: Effective schools and effective departments*. London: Paul Chapman Publishing Ltd.
- Saunders, L. (2000). *Effective schooling in rural Africa: Report 2 - key issues concerning school effectiveness and improvement*. Washington DC: World Bank.
- Scheerens, J. (1992). *Effective schooling: Research, theory and practice*. London: Cassell.
- (2000a). *Improving school effectiveness*. Paris: UNESCO-IIEP.
- (2000b). *School effectiveness in developed and developing countries: A review of the research evidence*. Washington, D. C.: World Bank.
- (2001a). *Monitoring school effectiveness in developing countries*. *School Effectiveness and School Improvement*, 12, 359-84.
- (2001b). *School effectiveness in developing countries - introduction*. *School Effectiveness And School Improvement*, 12, 353-58.
- Scheerens, J., & Bosker, R. J. (1997). *The foundations of educational effectiveness*. Oxford: Pergamon.
- Simmons, J., & Alexander, L. (1978). *The determinants of school achievement in developing countries: A review of the research*. *Economic Development and Cultural Exchange*, 26, 341-57.
- Slee, R., Weiner, G., & Tomlinson, S. (1998). *School effectiveness for whom?: Challenges to the school effectiveness and school improvement movements*. London: Falmer.
- Urwick, J., & Junaidu, S. U. (1991). *The effects of school physical facilities on the processes of education: A qualitative study of Nigerian primary schools*. *International Journal Of Educational Development*, 11, 19-29.
- Velez, E., Schiefelbein, E., & Valenzuela, J. (1993). *Factors affecting achievement in primary education: A review of the literature for latin america and the caribbean*. Washington, D. C.: Department of Human Resources Development and Operations Policy, World Bank.
- Verspoor, A. M. (2005). *The challenge of learning: Improving the quality of basic education in sub-saharan Africa*. Paris: Association for the Development of Education in Africa (ADEA).
- Verstegen, D. A., & King, R. A. (1998). *The relationship between school spending and student achievement: A review and analysis of 35 years of production function research*. *Journal of Education Finance*, 24, 243-62.
- Weber, G. (1971). *Inner school children can be taught to read: Four successful schools*. Washington, D. C.: Council for Basic Education.
- White, H. (2004). *Books, buildings, and learning outcomes: An impact evaluation of World Bank support to basic education in ghana*. Washington, D. C.: World Bank.
- Wimpleberg, R. K., Teddlie, C., & Stringfield, S. (1989). *Sensitivity to context: The past and future of effective schools research*. *Educational Administration Quarterly*, 25, 82-107.
- World Conference on Education for All (1990). *World declaration on education for all and framework for action to meet basic learning needs*. Paris: UNESCO, EFA Forum Secretariat.
- Wößmann, L. (2003). *Schooling resources, educational institutions and student performance: The international evidence*. *Oxford Bulletin of Economics and Statistics*, 65, 117-70.

**EdQual RPC
- Implementing Education Quality
in Low Income Countries**

Contact:

EdQual RPC
Graduate School of Education
35 Berkley Square
BRISTOL BS8 1JA
T 0044 (0)117 331 4288
F 0044 (0)117 925 7584

www.edqual.org