Ministry of Foreign Affairs of the Netherlands

IOB Evaluation

Lessons learnt: Synthesis of literature on the effectiveness of investments in education

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Preface

Within the framework of the policy review on 'basic education' executed by the Policy and Operations Evaluation Department (IOB) of the Ministry of Foreign Affairs, it was considered useful to conduct a broader literature analysis regarding the registered effects and outcomes of development aid activities for enhancing access, quality, relevance and sustainability of basic education in developing countries.

The main purpose of this literature overview is to enable a wider and more thorough assessment of (a) the motives for donors (like the Dutch government) to make investments in basic education, and (b) the effectiveness of specific interventions supported by the Netherlands. Consequently, the literature review seeks to address two key questions, which are closely linked to the Dutch policy on basic education and development cooperation:
1. Does education contribute to development and if so, how?
2. What interventions in education work best and why?

These key questions are examined using a rigorous, transparent and systematic literature search and selection methodology. Sources cover published peer-reviewed research as well as grey literature published by reputable sources, and include articles reporting impact evaluations, literature reviews and meta-analyses, and studies of (cost)-effectiveness and cost-benefit. Both qualitative and quantitative studies, as well as mixed methods approaches were included. Even while the majority of identified articles are based on quantitative research, rigorous impact evaluations are still scarce.

The structure of the study closely follows international practice regarding the different channels that outline the effects of education on development (e.g. impact on individual welfare, growth, and equity, and derived effects for democracy, health and environment). This part of the study enables us to identify potential areas for measuring development effectiveness of aid for basic education. Hereafter, attention is focussed on specific types of educational interventions that have shown to possess most potential. This analysis includes both demand- and the supply-side interventions of the education sector, categorised into main areas of improved school infrastructure, teacher training, 'healthy learning' (e.g. deworming and nutrition), cost reduction (e.g. cash transfers, vouchers, etc.), improved management and governance, and linkages of basic education with early childhood and technical/vocational training.

The systematic presentation of the results indicates that research on the effectiveness of basic education interventions has moved from looking at the impact of personal variables such as socio-economic status and the role of traditional inputs (books, teachers, schools) to assessing a range of more promising interventions such as incentives for teachers, cost-reducing measures for pupils, improved school management and larger community involvement. Increasing attention for robust measurements methods to assess the effectiveness of education interventions in different settings - including costing - might enable a more evidence-based decision-making process regarding (inter)national support to basic education in developing countries.

This study has been co-authored by Muriel Visser-Valfrey (consultant) and Phil Compernolle (IOB). The report benefitted from inputs provided by IOB colleagues Simone Verkaart, Paul de Nooijer and Antonie de Kemp.

IOB expects that the - sometimes ambivalent - findings reported in this study will be considered as a stimulus for further research and might invite development practitioners to find out how in location-specific circumstances the impact of basic education programs can be further enhanced.

We make this study accessible to the interested audience and encourage wide circulation amongst basic education experts. The final responsibility for the reports remains with IOB.

Prof. dr. Ruerd Ruben
Director

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Ministry of Foreign Affairs

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Acronyms and abbreviations

ADEA	Association for the Development of Education in Africa
AIDS	Acquired Immunodeficiency Syndrome
CCT	Conditional Cash Transfer
CONFEMEN	Conférence des Ministres de L'éducation Nationale
DFID	Department for International Development
DHS	Demographic Health Surveys
ECD	Early Childhood Development
EFA	Education for All
ERIC	Education Resources Information Center
GDP	Gross Domestic Product
GMR	Global Monitoring Report
HIV	Human Immunodeficiency Virus
IATT	UNAIDS Inter Agency Task Team
IIEP	International Institute for Education Planning
LSHTM	London School of Health and Tropical Medicine
MDG	Millennium Development Goals
NGO	Non-Governmental Organization
OECD	Organisation for Economic Co-operation and Development
OED	Operations and Evaluation Department
PAL	Poverty Action Lab
PASEC	Programme d'Analyse des Systèmes Educatifs de la CONFEMEN
RECOUP	Research Consortium on Educational Outcomes and Poverty
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SBG	School-Based Governance
SBM	School-Based Management
SERNAM	Servicio Nacional de la Mujer
SES	Socio-Economic Status
SIDA	Swedish International Development Agency
TVET	Technical and Vocational Education
UIS	UNESCO Institute of Statistics
UK	United Kingdom
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
WASH	Water, Sanitation and Health
WB	World Bank
WHO	World Health Organization

1

Introduction

This systematic literature review was conducted by the Policy and Operations Department (IOB) of the Netherlands Ministry of Foreign Affairs, as part of a broader policy review of the Dutch support to basic education in the past ten years.[1] This literature review will be used to:

a. Assess the motivation for the investments made by the Dutch government in basic education; and,
b. Support the evaluation of the Dutch contribution to education in partner countries.

For many countries, expenditures on education take up a substantial part of national spending, both by households and governments. The education sector in developing countries receives substantial external support through official development assistance (12% of all aid commitments in 2006/2007).[2] Between 2003 and 2009 the Netherlands contributed more than EUR 3.1 billion to basic education programmes of national governments, non-governmental organisations (NGOs) and multilateral organisations such as UNICEF and the World Bank. Yet, it is often stated that these resources do not foot the bill. In that case, careful consideration is required of which investments stand to offer most value for money.

In response, the literature review seeks to address two key questions, which are closely linked to the policy review of the Dutch policy on basic education and development cooperation:

1. *Does education contribute to development and if so, how?*
2. *What interventions in education work best and why?*

In the first section of this report, the literature is categorised according to the channels through which education is found to affect human and economic development, each of which is described in a separate chapter: 1) Micro-economic returns to education; 2) Macro-economic growth; 3) Distributional effect of education; 4) Democracy and peace; 5) Health effects; 6) Environmental effects.

The second section investigates which educational interventions have most potential from the perspective of (cost) effectiveness. The analysed interventions, both at the demand- and the supply-side of the education sector, are categorised into six main areas and one cross-cutting area: 1) School infrastructure and resources; 2) Teachers; 3) Inputs for 'healthy learning'; 4) Cost reductions; 5) Management and governance; 6) Beyond primary education; 7) Girls' education (cross-cutting area).

For the first question about 100 articles were retained after a careful selection process, and around 70 articles for the second question. The data for this literature review was collected through a systematic search of published peer reviewed articles and grey literature from reputable sources, including impact evaluations/studies, literature reviews, meta-analyses, evaluations of (cost)-effectiveness and cost-benefit studies. Qualitative and quantitative

[1] For more information, see IOB (2011).
[2] UNESCO (2010).

studies, as well as mixed-methods studies, are included.[3] The study predominantly covered research published between 2005 and 2011, covering both developed and developing countries, although where relevant older publications dating back to the 1980's and 1990's were included in view of their significance for the field of study.

Articles were accessed through on-line (open or subscription based) data bases. A set of search terms for each of the topics of the study was determined and refined in two stages. The articles identified through the search were each submitted to a detailed assessment and scoring process to determine whether they met the standard required for this study. The detailed assessment criteria included relevance, study focus and theoretical basis, study methodology, quality of analysis, and thoroughness of conclusions. A weighted, scoring scale was used to weed out articles that were relatively weak. In addition, in the practice of writing the report a process of snowballing was used where additional in-text references of relevance (and which had not already been identified through the initial search process) were identified and retrospectively scored for possible inclusion. All papers were stored in a data base and in the writing process both the abstract and full text of the articles were reviewed. Annex 1 provides a detailed overview of the search methodology.

Obviously, the impact of education as well as the (cost-)effectiveness of interventions is highly context specific. No blueprint or Top-20 exists. Nevertheless, it is possible to extract some overarching lessons on these two issues, which have been summarised in the concluding chapters of each section. This literature review has been useful as part of the broader policy review of the Dutch support to basic education in the past ten years. The authors hope that it is equally valuable for others working in the field of basic education and development cooperation.

[3] The studies identified in this literature review are slanted towards quantitative approaches. This is not simply a reflection of the search strategy, but also the result of the limited use of mixed-methods and qualitative research for approaching evaluation questions.

2

Defining education effectiveness

Education is a broad concept, covering a lifelong process, ranging from early childhood development to different kinds of tertiary and further education. Education can be formal or informal, private or public, for children, youths and adults. It covers a broad range of different skills. The Education for All (EFA) Framework for Action of 2000 aimed at 'education that will meet [children, young people and adults'] basic learning needs in the best and fullest sense of the term, an education that includes learning to know, to do, to live together and to be.'[4] In the literature that forms part of this review, education is always defined much more narrowly, as primary or secondary education, most often formal and public education. In some instances, the research concentrates on education of women, mothers or girls.

With regard to effectiveness, the outcome of education is often equated with schooling in a formal setting. Schooling is then often measured in terms of access indicators, such as the number of boys and girls enrolled at different grades and levels. Between 1998 and 2008, an additional 52 million children have been enrolled in primary school, and over the same period the number of children out of school was halved in South and West Asia. In sub-Saharan Africa too – and in spite a large increase in school age population - enrolment ratios rose by one third during the decade. In terms of who goes to school, the gains have included an improvement in gender parity in those parts of the world that started the decade with the greatest gender gaps. However, despite these advances, the most recent Global Monitoring Report (GMR) describes continuing gaps between the EFA goals and the advances that have been made.[5]

The ultimate test for an education system is, however, not whether it seeks to attract pupils (although this is certainly a pre-condition for any benefit from participating) but rather whether it succeeds in doing what it set out to do, namely 'It is an education geared to tapping each individual's talents and potential, and developing learners' personalities, so that they can improve their lives and transform their societies'.[6] This requires assessing what young people learnt, but also the extent to which they are able to use what they learn (relevance). This is often referred to as measuring education quality.

There has been an increasing focus, and a lot of debate, over the past decade on measuring and quantifying quality.[7] These efforts can be categorised broadly into two approaches.[8] The first approach to measuring quality emphasises the role of education in promoting values and attitudes and bringing about broader emotional and creative development. Measuring this aspect of learning is complex, and comparing between countries, contexts and people, is even more difficult. As such, this approach has not been used much for evaluations, which requires comparing between interventions or over time. It has been used to assess the effects of teaching processes and methods.

4 Education for All (2000).
5 UNESCO (2011).
6 Education for All (2000).
7 See, for example, the forum 'After 2015: time for an education quality goal?' in Compare, the Journal of Comparative and International Education (Volume 41, Issue 1, 2011).
8 See also Nikel and Lowe (2010)

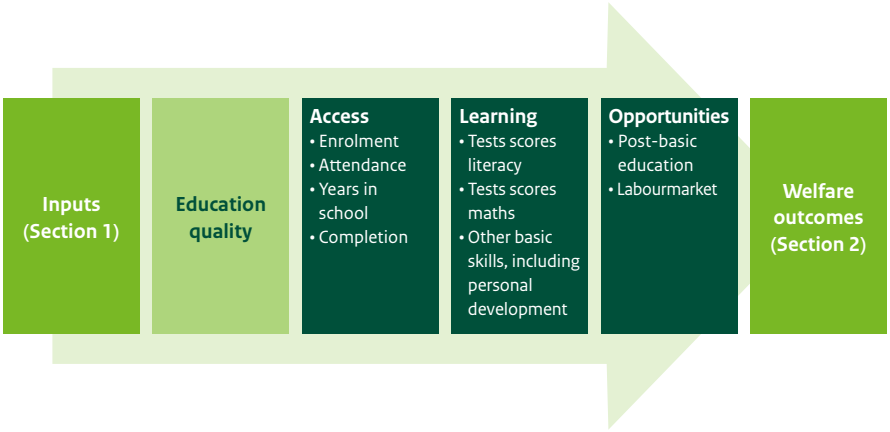
The second approach focuses on a basic set of cognitive skills – reading, writing and numeracy – as key indicators of learning. These indicators, often test results, have been used to compare across groups, contexts and countries. Standardized tests have evolved as key tools in this respect to compare the performance of groups of children at the same level in different schools in a country or region. Linking test scores to other school-based or pupil information (e.g. pupil-teacher ratios, school management, socio-economic status, materials), provides information about causes of the differences in performance. International standardised tests - such as those of the Southern Africa Consortium for Monitoring Educational Quality (SACMEQ), the Programme d'Analyse des Systèmes Educatifs de la CONIFEM (PASEC) and the Programme for International Student Assessment (PISA) - offer insights into differences in education quality at national levels and possible underlying determinants, such as a country's income and level of expenditure.

It is disheartening that the latest GMR concludes that 'the quality of education remains very low in many countries … (and that) … millions of children are emerging from primary school with reading, writing and numeracy skills far below expected levels' (UNESCO, 2011, p. 5). In fact in 2008, just under 796 million adults, of which nearly two-thirds women, lacked basic literacy skills – around 17% of the world's adult population.

Measuring the impact of education goes one step further to ask what the opportunities and benefits are that education, both access and quality, may bring young people? As the literature review clearly illustrates, education can have an impact on a variety of indicators of individual and collective well-being. Indicators include for example, wages, a country's national product, mortality rates, and measurements of political freedom.

Figure 1 illustrates the way in which these concepts of education effectiveness are linked to each other.

Figure 1 *The relationship between educational inputs and outcomes*



Ultimately, education, and the benefits it may bring, is very context-specific. Context impacts on the input side: who goes to school (rich or poor, boys or girls, rural or urban) and what schooling is available. It will also determine the resources that are available, as well as the national policies for the sector and the expectations of the population. Context similarly impacts on the effects of education by playing a major role in determining how what has been learnt can subsequently be used. This relates to economic factors, such as the nature of the labour market, wage levels, opportunities for engaging in productive activities, but also to cultural and social factors that shape opportunities - in ways which often have more negative consequences for those that are disadvantaged (women, ethnic minorities). Inequality is thus not only a major barrier in accessing education but also in receiving benefits from participating in education.

Section I

Impact of education

1 Linking education to development: what do we know?

Education has been one of the centrepieces of the Dutch development aid policy for a long time. Two main considerations guided this choice, namely:
1. The human rights argument for education ('education for all', equity), and
2. The link between education and development ('contribution to human and economic development').

These considerations were reflected in the overall objectives of the Ministry of Foreign Affairs. The education programme falls under the Ministry's fifth policy article: 'Increased human and social development', and more specifically under operational objective 5.1: '*All children, youth and adults have equal opportunities to undergo quality education, which provides the necessary skills and knowledge to participate fully in society*' (TK, 2007).

The commitment to education as a human right was confirmed through the title of the 1999 policy: 'Education: a basic human right'.[9] The policy acknowledges that education has been identified as a human right since 1948 as part of the Universal Declaration of Human Rights, and as a specific right for Children since 1989.[10] As a signatory of both treaties, this creates international obligations for the Netherlands.

The human rights approach to education fits well with the work of Economic Nobel-laureate Amartya Sen, who argued that poverty is a condition that results from the lack of freedom to choose, and therefore affects an individual's overall ability to function in society.[11] Inadequate education and the denial of other rights are in themselves a form of poverty.[12] This provides a link with the second motivation for investments in education as a strategy for reducing poverty.

In the 1999 policy, the theory of change for investments in basic education is expressed as follows: '*[The Dutch policy on basic education's] aim is to ensure high-quality basic education, which is accessible and relevant to all, opens up opportunities for the most disadvantaged sections of the population, and contributes to a more democratic and equitable society*'.[13]

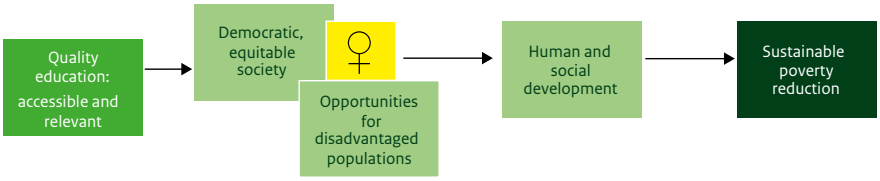
9 Ministry of Foreign Affairs (2000).
10 UN General Assembly (1989).
11 Sen (2001).
12 This chapter will focus on the link between education and poverty rather than the other way round. However, poverty (socio-economic status of students and their households) affects participation and educational outcomes at all levels. See, among others Ross, Zuze, and Ratsatsi (2005); Patrinos, Ridao-Cano, and Sakellariou (2006); Willms (2006); Campbell et al. (1991); UNESCO EFA Global Monitoring Report (2006).
13 Ministry of Foreign Affairs, 2000.

This expected to be achieved through 'the sustainable improvement of education systems in developing countries', whereby the specific objectives of the policy on basic education were:[14]

- To maintain and improve the quality and relevance of basic education;
- To achieve social justice by providing equal opportunities for people from disadvantaged groups in order to help them gain a basic level of essential knowledge, values and skills necessary to ensure a productive, peaceful and equitable existence; and accordingly,
- To reduce gender disparities in educational achievement and enhance gender justice through education by promoting the empowerment of women.

This reasoning, extracted from the 1999 policy, can be depicted as follows:

Figure 2 *Schematic representation of motivation for investing in basic education*

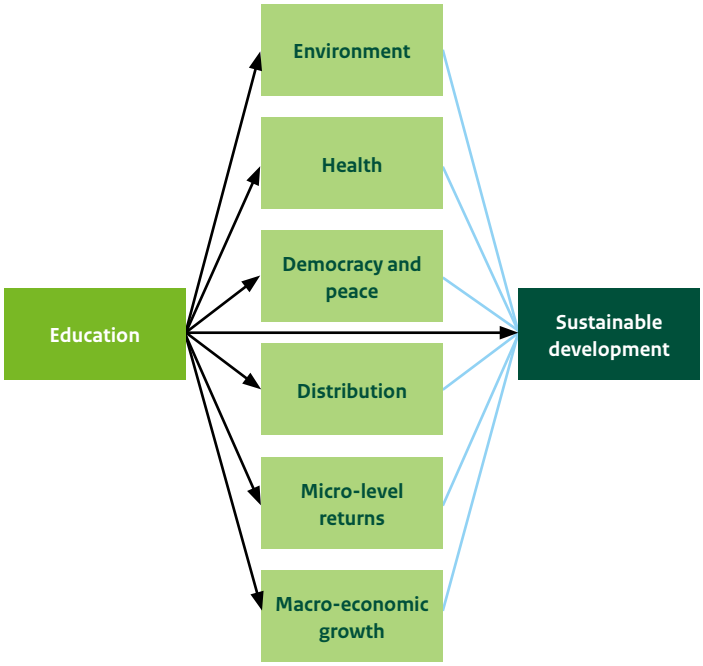


The literature review sought to assess the evidence on this motivation for the ministry's investments in basic education in developing countries. Around 100 articles published in peer reviewed journals or from reputable sources were retained from the broader selection process.[15] The findings of this literature can be categorised according to six main channels (figure 3), which will be discussed in chapters 2 to 7. Chapter 8 draws conclusions.

[14] Ministry of Foreign Affairs, 2000.

[15] The methodology for the literature review is described in more detail in Annex 1.

Figure 3 *Channels of impact of education*



2 Micro-level returns on education

The literature on micro-level effects or individual returns to education has grown in volume and scope since the seminal work of the so-called 'Chicago School' on human capital in the early 1960s (e.g. Becker, Mincer and Shultz).[16] There are a number of caveats related to research on earnings; e.g. the formal labour force, on which data exists, is not a random selection of the population, especially in developing countries that tend to have a large informal labour market. Nevertheless, the research in both developing and developed countries over the past fifty years is conclusive in its finding of significant individual returns to education.[17]

Findings

There is conclusive evidence of significant individual returns to education in the form of earnings, in both developed and developing countries. Education leads to increased employability, productivity and higher income potential. The positive impact is stronger when the quality of education is higher and when demand for certain skills is high compared to the supply. Hence, returns to primary education have been falling compared to post-primary education. Both men and women benefit, but not equally due to discrimination in the labour market.

The average rate of return to education, measured as the percentage increase in annual earnings obtained from one additional year of schooling, is approximately 10%.[18] However, earnings are not only related to the quantity of education (measured in terms of years in school, or grades and level of schooling), but even more so to the quality of education.[19] In this context Patrinos and Psacharopolous (2011) point out that: '*years of schooling ... often masks the quality of schooling*'.[20]

[16] Examples of such research are: Krueger and Lindahl (2001); Psacharapoulos and Patrinos (2002); Boissiere (2004); Owens (2004); Patrinos, Ridao-Cano, and Sakallariou (2006); Hanushek and Woessmann (2007). Yabiku and Schlabach (2009) undertook a rare study, combining quantitative and qualitative methods to study determinants of schooling enrolment and attainment in Chitwan valley in Nepal. There are a number of specific challenges to research on earnings (see, Colclough et al. (2009); Psacharopoulos and Patrinos (2004). For instance, in many developing countries the formal labour force is not a random section of the population, where more people work in the informal sector or subsistence agriculture.

[17] Some 24 studies are identified through the literature search.

[18] Orazem, Glewwe and Patrinos (2008), consistent with other studies. The different ways in which returns to education can be measured is described in Patrinos and Psacharopolous (2011).

[19] Hanushek and Woessmann (2007).

[20] P. 13. By comparing per capita income and years of schooling between 1950 and 2010 among almost 1600 people in 146 countries, Patrinos and Psacharopolous (2011) found a threshold level of six years of schooling that is required. However, other recent research seems to suggest that the threshold may in fact be lower (Benhabib and Spiegel (2005).

The returns to education vary between groups of individuals, depending on the scarcity of education labour force:

- Generally, the individual rate of return decreases as the proportion of the population that receives a certain level of education increases.[21]
- Returns for women are almost always higher than those for men. The interquartile range for estimated real returns across countries varies from 5 - 10 % for men and from 9 - 12 % for women.[22] Yet, although individual rates of return may in principle be higher for women, contextual factors impact on the actual labour market earnings by women and put them at a disadvantage compared to men.[23]
- Returns are generally higher for developing countries than for developed countries.[24]
- Returns are, on average, found to be higher in 'economically free' countries compared to more regulated countries, owing to the opportunities generated by increased mobility and trade.[25]
- Returns are higher when the labour market consists of sectors that require an educated labour force (e.g. less so for agriculture, and more for manufacturing and industry).[26]

Over time returns to primary education have fallen, even in developing countries, and have also fallen relatively compared to post-primary education. For example, Pakistan has seen a consistent increase in the mean years of schooling of the adult population between 1950 and 2010 from just under one year average to just under six years of schooling. Calculations of the welfare loss associated with missing out on one year of schooling shows that while that welfare loss in 1950 was over 50%, it is only 20% at present.[27] This implies that while returns to education used to increase more sharply at lower levels of education (i.e. a concave shape) the relationship has now reversed (i.e. a more convex shape).[28]

A study by IOB on returns to education in Uganda illustrates the shape of the curve, though this research links education levels to the percentage of people in formal employment rather than earning:[29]

21 Patrinos and Psacharopoulos (2011); Psacharopoulos and Patrinos (2004).

22 Orazem, Glewwe and Patrinos (2008).

23 Using data from the Pakistan Integrated Household Survey which yielded over 13.000 men and women between 15 and 65 years of age, Aslam (2007) finds gains in returns to education are lost in total labour market returns as a result of the sizable earnings gap between men and women in the labour force. This will also apply to minority groups, who face wage discrimination as part of their social exclusion.

24 Patrinos and Psacharopolous (2011) concur with Hanushek and Woessmann (2007).

25 Orazem, Glewwe and Patrinos (2008).

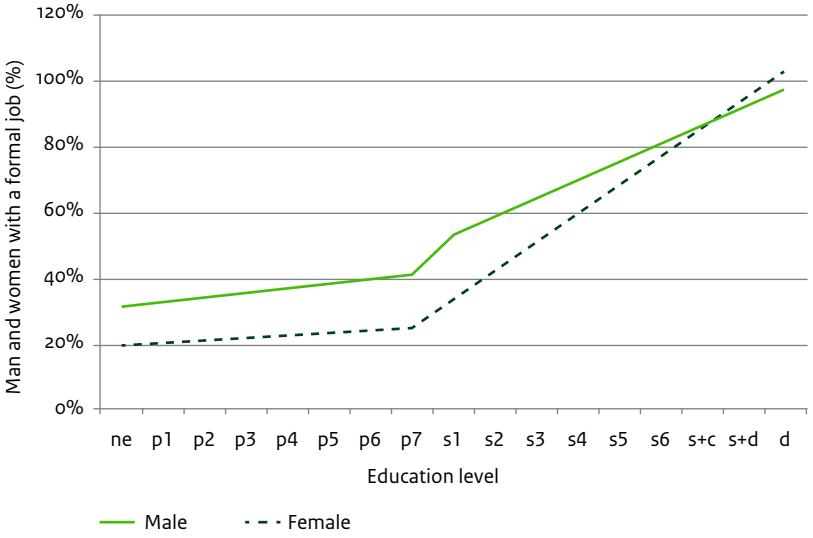
26 Fox and Oviedo (2008).

27 Patrinos and Psacharopolous (2011).

28 Colclough, Kingdon, and Patrinos (2009) based on a comprehensive analysis of 18 studies with evidence on returns to different levels of education from 26 countries in Asia, Africa and Latin America. See also the analysis of country level data in India: Tilak (2005). Early literature already suggested that basic (primary) education was of greatest importance for economic growth in low-income, developing, countries. For middle-income countries, secondary education was considered most important, while tertiary educational was most significant for wealthy nations (Gemmell (1996)).

29 IOB, forthcoming.

Figure 4 *Opportunity to formal employment for men and women in Uganda*



Source: Education survey Uganda in IOB, forthcoming

The literature advances several reasons for this:

- Expansion of education, which reduces the scarcity of educated workers.[30]
- Lower quality of primary education, resulting in lower cognitive skills.[31]
- Low efficiency of education, so that the attainment of basic skills takes too long (over 5 years).[32]
- Poor alignment between the educational outputs (in terms of types and levels of skill mastery) and labour market requirements (which evolve over time due to technological change).[33]

The finding that returns to primary education in developing countries are decreasing could at first sight seem to imply that the potential poverty-mitigating impact of basic education has diminished as well. However, improved quality of education might well increase the returns to primary education. Moreover, primary and post-primary education are not mutually exclusive but found to complement each other.[34] Primary education establishes the basic skills on which further education builds (and so the returns). Interventions early in

30 IOB, forthcoming. Also Fox and Oviedo (2008), who used data from the recent Enterprise Surveys (2003-2007) which covered 20 countries in sub-Saharan Africa and 44% of the total manufacturing output of the region to conduct regression analysis of wages and productivity premia estimation.

31 IOB, forthcoming for Uganda. Confirmed by, on a global level, Colclough, Kingdon, and Patrinos (2009); Hanushek and Woessmann (2007); Fasih (2008).

32 Fasih (2008).

33 IOB, forthcoming for Uganda. Also, van der Berg (2008); Jamison, Jamison and Hanushek (2006).

34 For example, Autor et. al. (2008) for the US.

life are found to have high returns because of the accumulation of knowledge.[35] Also, low skilled workers will remain an important part of countries' labour markets, even when technological advancement brings changes to the type of skills employers are looking for.[36] The returns to primary education in the informal economy, for which less published evidence exists, might well be different due to different requirements of the informal labour market. The specific role of primary and post-primary education will be discussed again with regard to their impact on economic growth in the next chapter.

Not only are the private returns to education influenced by the labour market dynamics (including national labour policies), but the labour market will also be influenced by the educational attainment in a country. The level of education in a country can become a constraint to further development. For example, the lack of growth in the manufacturing sector in sub-Saharan Africa has been attributed, amongst others, to the lack of educational attainment in these countries.[37] Furthermore, there are the so-called 'knowledge spillovers' from educational attainment, whereby more educated individuals raise the productivity and earnings of those they work and interact with in the wider labour market. For example, there is evidence from Bangladesh that primary education has been important in the adoption of new technology for the production of commercial vegetables.[38] Indeed, beyond its contribution in directly or indirectly improving the available labour force and its potential productivity, education can also play an important role in the labour markets by increasing the capacity for innovation, and enabling the diffusion of knowledge to maximize opportunities for innovation (such as new technologies, products and processes).[39]

35 Heckman and Masterov (2007). See chapter 6 in Section 2.

36 Hanusheck and Woessman (2009).

37 Fox and Oviedo (2008). Also, the Asian Development Bank (2004) concluded from an extensive study of labour market development that the transition from low to middle-income country, with underlying increase in manufacturing and service sectors, requires a substantial systemic shift, in which education is one of the mediating factors.

38 Hojo (2001) in IOB (2011a).

39 As described in the endogenous or new growth theory (e.g. Lucas, Romer). Fox and Oviedo (2008).

3 Education and economic growth

The relationship between education and economic growth is another area that has produced a vast volume of research over the past decades. The work originated at the University of Chicago in the early 1960s, in what is widely known as the human capital school, which postulated that expenditure on education was an investment akin to the investment in machinery for an industry. This theory was expanded in the 1980s and 1990s as the endogenous or new growth theory (e.g. Lucas, Romer). This theory stressed that knowledge is a public good that allows the economy to grow beyond what is possible with the measurable inputs (capital, land). This also implies a risk of underinvestment in human capital formation.

The establishment of internationally comparable data bases on educational indicators of access – which in more recent years have also included comparable indicators of student performance - and the development of more sophisticated statistical techniques, as well as the accumulated knowledge from research, have led to considerable progress in this area and strengthened the evidence on the impact of education on economic growth.[40]

Findings

There is sufficient evidence to conclude that quality education, generating both basic and higher-level skills, reinforces economic growth. This causal relationship holds for both developed and developing countries. Education policies that raise cognitive skills are thus important to promote economic development.

The various research studies and literature reviews examined for this paper concur on the fact that the large volume of research in this area has shown a strong positive correlation between education and economic growth.[41] There has also been continuous debate on this issue, with as major points of controversy:[42]

1. Is establishing an impact of years of schooling not meaningless given that the content of 'schooling' varies between countries and types of education (e.g. primary and post-primary)?
2. Does education affect growth or is it growth that affects education (i.e. reverse causality)? Or does education pick up other determinants of growth (e.g. institutions, history) rather than having an effect itself (i.e. omitted variables)?
3. Why have investments in education in the past decades (such as those by the Netherlands) not resulted in higher economic growth in developing countries?

[40] The data does suffer from limitations; education information is often poorly measured and difficult to compare between countries (Krueger and Lindahl (2001), which is a particular problem for research that relies heavily on quantitative analysis and cross-country comparisons. Data limitations are discussed in Aghion, Boustan, Hoxby and van den Bussche (2009); Hannum and Buchmann (2005). It leads Glewwe, Maiga and Zheng (2007) to conclude that: 'each country should undertake microeconomic studies of the impact of different types of education on both wages and self-employment income, as well as microeconomic impact studies that assess the impact of education policies on student learning' (p.1).

[41] c.f. Hannum and Buchmann (2005); Aghion et al. (2009).

[42] Pritchett (2009), Bils and Klenow (2000) on endogeneity.

Over time, each of these arguments has been refuted. Concerning the first argument, initially, education was indeed measured by its quantity.[43] Most commonly years of schooling was used, but economic growth (Gross Domestic Product (GDP) or GDP per capita) has also been linked to the number of years spent attending school, number of school (grade level) years completed (thus excluding years lost due to repetition of classes and absence from school), or in some cases the highest level of education attained.[44] These different ways of operationalizing the education variable are likely to have been - at least partially - responsible for some of the inconclusive findings that characterized early research.

Recent research has moved away from years of education to focus on the impact of 'quality education' (at the basic education level and beyond) on economic growth. The advent of internationally comparable data, which includes developing countries, made it possible to operationalize quality of education as students' performance on standardised tests of cognitive skills (reading, maths).

Results from this research provide strong evidence that the quality of education is significantly more important to economic growth than just the years of schooling.[45] For example, a study of 50 OECD countries first examined the relationship between years of schooling and GDP growth and found that higher test scores were associated with higher average annual growth rates in GDP per capita over the whole 40-year period. But when educational quality was included rather than quantity, the share of variation in economic growth explained by education increased from 25% to a very substantial 73%.[46]

Concerning the second argument, sceptics have suggested that economic growth will lead to better education through higher income of a country rather than the reverse.[47] The socio-economic background of students (together with their health and ability), which is related to economic growth, might be what leads to higher test scores, in addition to specific policies for improving educational quality. Moreover, the results of the research might be influenced because there are factors that affect both education and economic growth, such as country-specific institutions, culture, efficiency, health status etc. (i.e. endogeneity of test scores). In that case, education and economic growth would merely move together (i.e. correlation) rather than education leading economic growth.

43 An example of such earlier, influential research was undertaken by Barro (1991), who conducted a regression analysis of GDP growth rates on variables such as primary and secondary enrollment rates, fertility rates and investment ratios. Most of Barro's regressions found significant relationships between primary and secondary education and economic growth. Another study, in 2004, found that each additional year of education is associated with an increase of 0.58 percentage points in long term growth. When broken down further, the growth impact of each additional year of education in a non-OECD country was found to be substantially greater than in an OECD country (Hanushek and Woessman (2004) compared annual rate of growth in GDP against years of schooling for 92 countries, over a forty year timeframe).

44 Other studies have used investment in education as a proxy measure for the impact of schooling (c.f. the studies in Uganda by Musila (2004).

45 Hanushek and Woessmann (2007); Psacharopoulos and Patrinos (2004); Hanushek and Kimko (2000).

46 Hanushek and Woessmann (2009) present results of analyses covering 40 years (1960-2000) for a sample of 50 OECD countries for which test scores were available.

47 Pritchett (2001, 2009).

A recent, influential study by experts in the field has addressed each one of these doubts.[48] These researchers find that education quality (expressed by test scores) impacted on growth in 50 OECD countries, even when only looking at the part of the variation in cognitive skills that is caused by differences in school systems (thus focussing on policy and not abilities). Exit exams, private schools and decentralised decision-making have all been associated with better student performance, but are unrelated to economic growth. When these policies turn out to have a significant impact on growth, it is fair to conclude that it is the cognitive skills, developed through such education policies, that lead to higher economic growth. Moreover, by comparing test results of US migrants that were schooled in their country of origin with those from the same country but schooled in the US, the authors are able to conclude that schooling has an impact on economic growth through the returns of education, irrespective of country-specific differences in institutions, culture, traditions etc. Both analyses provide evidence that the economic impact of education is causal, as they correct for possible impact of economy on the test scores (by focusing on variations in cognitive skills due to policies, and on returns in one specific country).

The third area of debate - regarding the link between education and economic growth - stems from the frustration that years of investment in the education sector in developing countries has not led to significant improvements in economic growth or poverty reduction. First of all, it takes considerable time for countries (a) to increase enrolments at each level of education (35-80 years to move from 10% net primary enrolment to 90% with increasing difficulties towards reaching 100%),[49] and (b) for investments in education to impact on economic growth.[50] Secondly, the finding that access to education, on which investments have concentrated to date, is less important than education quality largely explains the apparent lack of results. The significant skills deficit in developing countries clearly impedes economic growth. The GMR 2011 cites the example of India, where one survey in 2009 found that just 38% of rural grade 4 students could read a text designed for grade 2 and that even after eight years of school, 18% of students were unable to read the grade 2 text. Similar poor results are found in countries in sub-Saharan Africa. Such trends are particularly worrying as research has shown that quality education has an even stronger impact in developing countries.[51] Moreover, if there is a mismatch between the skills acquired through education and the requirements of the labour markets, the macroeconomic impact of education will also be limited.

Hanushek and Woessmann examined the effects on economic growth of two different scenarios: providing basic education for all or providing higher education for a selected group of scientists. They found that both options are important for economic growth. A 10% point increase in the share of students that attained basic literacy led to a 0.3% point increase in annual growth (so say from 2.7% annual growth to 3% annual growth); and a 10% point increase in the number of top-performing students led to a 1.3% point increase in annual growth. The effect of high-level skills is even stronger for developing countries.

48 Hanushek and Woessmann (2009).
49 Patrinos and Psacharopoulos (2011).
50 E.g. Glewwe, Maiga and Zheng (2007).
51 GMR (2011).

Before concluding that supporting high performers is the way to go, the authors noted that this group is also more difficult (and perhaps costly) to target and still needs to emerge from the group with basic skills. Moreover, because of complementarity between basic and high-level skills in the production processes, the authors conclude that '*in order to be able to implement the imitation and innovation strategies developed by scientists, countries need a workforce with at least basic skills*'.[52]

Box 1 *Economic growth and gender inequality of education and employment*

The impact on economic growth of inequality in education and employment opportunities for women compared to men has been fiercely debated. On the one hand, research has shown that gender inequality in education is detrimental to growth.[53] On the other hand, quite a number of studies have concluded that gender-based wage differences, partly caused by different access and returns to education, are beneficial to economic growth.[54] The argument is roughly that relatively lower wages in female-dominated industries (e.g. manufacturing) will make investment attractive because of high expected profitability, boosting exports and economic growth - a conclusion that has been called '*disturbing from an equity point of view*'.[55]

More recently, however, more studies have come to the conclusion that gender gaps in education and employment significantly reduce economic growth.[56] The 'costs' of education and employment gaps in Middle East and North Africa and South Asia are thought to have resulted in lower growth rates of respectively 0.9-1.7 and 0.1-1.6 % point compared to East Asia, where gender gaps in education are much lower. The effect of inequality in education, i.e. lowering the quality of human capital, explains 60% of the total difference in economic growth. This also includes an indirect effect of education through its effect on fertility and thus population growth.[57]

52 Hanushek and Woessmann (2009) p. 24.

53 Hill and King (1995); Dollar and Gatti (1999); Forbes (2000); Knowles, Lorgelly and Owens (2002); Abu-Ghaida and Klasen (2004), quoted in Schober and Winter-Ebmer (2009).

54 Such as Seguino (2000), and Mitra Kahn and Mitra Kahn (2009), cited in Schober and Winter-Ebmer (2009).

55 Schober and Winter-Ebmer (2009).

56 Klasen and Lamanna (2008) comprehensively review the literature and conduct primary research on the link between female education, employment and economic growth using cross-country and panel regressions for an extensive time period (1960-2000). Schober and Winter-Ebmer (2009) used data from meta-analysis of 263 studies in 63 countries and construct three different measures of the gender wage gap.

57 Klasen and Lamanna (2008).

4 Distributional effects of education

The expansion in access to education has led to increased access for previously disadvantaged population groups, such as female students, or students that come from poorer households or minorities. The assumption is that once these youths also access education, their relative social and economic position will be improved and the inequality in society will be reduced as a result. However, because education is not only a means for advancement in society, but is also part of society itself, it has been hard to disentangle the impact of education from other contextual factors and to find conclusive evidence of distributional effects of education. Seventeen articles were retained on education and equality, mainly related to socio-economic and gender inequalities.[58]

Findings

The literature reflects the fact that the link between education and equality is highly complex, context-specific and working both ways. As a result, the impact of education on socio-economic, gender or ethnic equality is not necessarily of the magnitude or direction that one might hope for.

The studies highlight that gains in access to education, including for previously disadvantaged groups, do not seem to have translated directly into a reduction of inequalities. Existing inequalities, in gender, income or ethnic origins, are also reproduced in the education system (e.g. access, division of resources, quality, curriculum, norms). It appears that access to education in itself is insufficient to overcome a variety of important contextual causes of exclusion - including policies, access to resources, social and cultural barriers - that sustain existing inequalities.

The link between education and *socio-economic inequality* passes through investments in education, parental education and returns to education (as discussed above).[59] There is some evidence that secondary education has a larger impact on reducing income inequality than primary education.[60] However, when economic factors (e.g. economic growth, economic freedom) are also taken into account, the relationship between education and income inequality becomes diluted.[61]

[58] The majority of the studies use longitudinal or cross-sectional data from national databases for country or cross-country analysis, and rely on advanced modelling techniques and statistical analysis to examine relationships. Qualitative research in this area is the exception. Unfortunately, only a small number have focused on causality, but several studies struggled with the multicolinearity of the variables.

[59] Ballarino and Shadee (2011) provide a comprehensive overview of findings from research in this area. Also, Clarke (2006).

[60] c.f. Papanek and Kyn (1986); Bourguignon and Morrisson (1990); Nielsen and Alderson (1995); Barro (2000); Alderson and Nielsen (2002), cited in Wells (2006).

[61] For example, Digdowiseiso (2009), using National Economic Survey data for 1996-2005 in 23 provinces in Indonesia.

Education does matters for *intergenerational mobility*. Rather than comparing people within one particular generation, this assesses how children improve their socio-economic position compared to their parents. Comparing countries, the more mobile countries are the ones with higher education spending (as % of GDP).[62] Evidence from Nordic countries suggests that education policies, such as compulsory education, can improve intergenerational mobility. Yet the impact is smaller for people from less-educated backgrounds.[63] Clearly, the education system cannot be disconnected from society-wide inequalities, whereby advantaged groups have better access to (better) education and subsequent economic opportunities. Education by itself does not change the relative socio-economic position of groups, and might even perpetuate existing inequalities.[64]

A recently published literature review on social inequality and schooling in the United Kingdom (UK), which is considered a particular immobile society, reaches the same conclusion. The study examined evidence on the influence of UK schools in overcoming social disadvantage. The overriding conclusion is that while schooling can lead to *'modest improvements for disadvantaged children'*, its influence is limited by factors beyond the direct control of the school system.[65]

Nor does access to education automatically translate into greater *gender equality*, measured by higher economic status or greater political participation for women.[66] As noted earlier, though the returns to education (i.e. increase in wage due to increased schooling) might be higher for women than for men, these benefits of education do not persist because of unequal treatment in the labour market. For example, in Pakistan a sizable gender asymmetry in economic returns to education was found, with a marginal return of 16.6 % for women compared to 7.2 % for men. However, because women receive substantially lower wages for equal levels of education compared to men, the wages still end up higher for men.[67]

With regard to *ethnic inequality*, the picture is even bleaker with ethnic minorities still lagging behind in terms of educational access and completion of education, as well as with regard to results and outcomes of education.[68] For example, with regard to access, in Nepal, '*patterns of access to formal education have closely mirrored traditional caste-ethnic hierarchies, despite rapid educational expansion*'.[69] This is confirmed by research in Kenya, where there seems to be a '*close correspondence of differentials between inequalities in education and ethnic affiliation to the ruling elite. Relatively small, clearly defined ethnic groups have accumulated an advantage over the majority in the*

62 Blanden (2011).
63 Black and Devereux (2010).
64 Hannum and Buchmann (2005). Boliver (2011) based on a longitudinal study in the UK between 1960 and 1995.
65 Ainscow et al. (2010).
66 For example, SERNAM (2004) for Chile.
67 Aslam (2007) examined the private returns to education for male and female earners aged 15 to 65 for a sample of over 8000 men and 2000 women.
68 In this context, Hannum and Buchmann (2005) review the evidence around education and ethnic inequality, and cite evidence from, amongst others, Nepal (Stash and Hannum (2001)) and China (Hannum (2002)).
69 Stash and Hannum (2001), cited in Hannum and Buchmann (2005), p.341.

national population, in terms of the education infrastructure and resources'.[70] With regard to results, in South Africa and China educational disparities are considered a key factor in maintaining race-based differences in occupational status.[71]

It should be noted that this also applies to developed countries, such as the Netherlands. After elementary school, where results are approximately equal, students from ethnic minority groups consistently enrol in the lower tracks of the education system (even after controlling for disadvantaged socio-economic backgrounds of the students). When these students continue to secondary education, they are less likely to complete educational careers and go on to university. The authors of the study concluded that: *'In a country where class-based and gender-based educational inequality has decreased over time, ethnic-based educational inequality remains very apparent'*. [72]

There are examples, however, of the usefulness of targeted efforts to enhance equity of opportunities through education. For example, the Nigerian government intervened to expand access to higher education for ethno-regional minority groups. This led to a larger number of graduates from ethnic minority groups taking on leading positions in local government administration.[73]

[70] Alwy and Schech (2004). This study used Kenyan national survey data to examine differences in opportunity and resources of ethnic groups based on their geographical location and ethnic proximity to the ruling elite.

[71] Mickelson et al. (2001); Hannum and Xie (1998); both cited in Hannum and Buchmann (2005).

[72] Tolsma et al. (2007) assess changes over cohorts in highest educational level and school transitions, comparing data on educational achievement, for the four largest ethnic groups in the Netherlands and of Dutch natives. They use data from a national immigrant household survey that is conducted every 3 years in 13 municipalities in the Netherlands.

[73] Ukiwo (2007).

5 Education, health, and well-being

There is a substantial amount of literature that provides evidence of a strong correlation between education and health, especially for girls, with better education leading to better health and vice versa, referring both to developed and developing countries.[74] A total of 34 articles were reviewed under the overall topic of health and well-being.[75] The relationship between education and health holds true whether good health was measured by mortality rates, morbidity rates, self-evaluation of health status, or physiological indicators of health, and whether the units of observation are individuals or groups.[76]

Findings

There is clear evidence from both developing and developed countries, and for men and women, that a higher level of education leads to better health status and lower mortality risks at individual level, and has external effects on communities.

As posed by Gakidou et al. in an influential recent publication in the Lancet '*one of the most consistent and powerful findings in public health is the strong association between mothers' education and child mortality*' and that '*even a few years of primary schooling – insufficient to impart functional literacy – is advantageous for child survival*'.[77] This has particularly important implications for poverty reduction because healthier children are likely to become more productive and better-educated adults, leading to second-round benefits of education.

For developed countries, a clear link has been established between education and health of adults. For example, a recent study in the United States of America (USA) and Canada found that education explains more than half the observed differences in poor health, depression and obesity among adults at the age of 30.[78] Among adults over 25 years in the USA and the UK, every year of education is has been found to lower the mortality risk by 24 %, through reduction in risky behaviour such as drinking, smoking, and obesity.[79] It is thought that this

74 The research on the impact of health on education is beyond the scope of this review, and this issue has been relatively little addressed. An excellent recent review, commissioned by the World Health Organization, Suhrcke and de Paz Nieves (2011) reviews the literature on the impact of health on educational outcomes.

75 The quality of the research is overall better than in other areas covered by this review. Studies generally involve substantial, randomly selected, samples or large national data bases - such as the Demographic Health Surveys (DHS) or population census data. Studies control for factors such as age, income, religion, ethnic group, etc., and statistics generally report confidence intervals. Very few studies, however, have used control groups (one notable exception is a study discussed further below by Chowdhury et.al. (2007)). Only one study identified made use of qualitative data (Shreffler and Nii-Amoo Dodoo (2009).

76 Grossman (2006).

77 Gakidou et al. (2010), p. 959.

78 Conti, Heckman and Uruza (2010); confirmed by Lleras-Muney (2004).

79 Cutler and Lleras-Muney (2010).

happens because education produces the kind of critical thinking that is necessary for managing (complex) health conditions and makes individuals more likely to seek and adopt medical interventions. Moreover, indirectly, education leads to higher economic status and to jobs that have less negative impact on health, thus resulting in a better health status. At the global level, the same results are found: a 10% rise in primary enrolment ratios is associated with an average 0.9 year increase in life expectancy (1 year increase for 10% rise in secondary enrolment).[80]

While for developing countries there is little research on determinants of general adult (and in particular male) health, there is much more, with conclusive evidence, on the impact of education on the health of children and youths, and in particular girls.

The strongest link appears to be between a mother's education and the health of her young children. First of all, maternal education reduces *child mortality*. One of the earliest studies in this field was conducted in 1979 in Nigeria with a sample of over 6000 Yoruba women aged 15 to 59 years. Examining a large number of factors including income, father's education, area of residence, availability of health services, use of birth control, and availability of water and sewage facilities, the study found that '*maternal education was the single most significant factor of … the marked differences in child mortality*'.[81] Subsequent research has supported these findings. On average, one year extra education for the mother results in a 7 – 9 % reduction in mortality in children younger than 5 years.[82] Child mortality among mothers with at least 7 years of school has been found to be 58% lower than among those without schooling. In other words, 51% of the fewer deaths among children younger than five between 1970 and 2009 can be attributed to increased educational attainment by women of reproductive age. The study concludes that '*if women's education had not increased, the number of child deaths would have increased during the period of the MDGs as a result of the HIV epidemic*'.[83]

Secondly, research has established conclusively that the education of a mother leads to improved *health of her children*. For example, a study in Mexico covering 25 years found that the reduction in wasting, stunting, and underweight children was related not only to a high level of coverage of public health interventions, but that there was also a significant association to the investments in social services (such as water and social protection), and particularly to investments in education of mothers.[84] Similarly, research in Bangladesh and Indonesia found that both paternal and maternal formal education significantly reduces the probability of child stunting in these countries, whereby the impact of maternal formal education was somewhat higher. For example, in Indonesia, more maternal formal education led to a decrease of between 4.4% and 5% in the odds of child stunting and

[80] Hannum and Buchmann (2004). Also, Buchmann (1996); Hadden and London (1996); Schultz (2002), all cited in Hannum and Buchmann (2005).

[81] Caldwell (1979), p. 408.

[82] Gakidou et al. (2010). This estimate was very similar to the findings by Cleland and van Ginneken on the same topic in 1988.

[83] Gakidou et al. (2010), p.970, based on analysis of complete time series of mean number of years of education and child mortality for 175 countries between 1970 and 2009. GDP growth and reduction of HIV prevalence were also significantly associated with reductions in child mortality, though education explained most of the variance.

[84] Sepúlveda et al. (2006).

greater paternal formal education led to a decrease of 3% in the odds of child stunting.[85] Another study in the United States found that an extra year of education reduced the incidence of low birth weight by around 10%, because maternal education reduces parity,[86] increases use of prenatal care, and reduces smoking.[87]

The explanations for this strong link between education and child health are:[88]

- Better capacity to understand and act on information (e.g. immunizations)[89]
- Improved use of health services in general, including fertility control
- Economic benefits (higher income)
- Empowerment and independence (greater individual choice)
- Community effects (whereby the community benefits from generally higher levels of education)[90]

There is also support for the link between education and *maternal mortality*. An analysis of data on women's status and human development, and maternal mortality from 148 countries found that female literacy and combined primary, secondary and tertiary enrolment ratios were significant and powerful predictors of maternal mortality rates, explaining around 50% of variance. These results led the authors to conclude that '*Programs aimed at providing medical care to reduce maternal and infant mortality may have limited success unless carried out in parallel with improved availability of education for women*'.[91] At country level, an analysis of records of maternal mortality over 30 years in two areas in Bangladesh identified significant educational differentials for mortality comparing women with more than 8 years of schooling with those that had no schooling. Women with 8 years of schooling had a 30 percent lower maternal mortality rate than women in the comparison group.[92] Moreover, abortion mortality was 11 times lower for highly educated women than for those without education, even though induced abortions were more common.

Education of young children and youths, especially girls, also seems to have a significant impact on *reproductive health* through the following mechanisms:[93]

- Contraceptive use among unmarried girls who are enrolled in schools is typically higher than among girls out of school. Also, adolescents (especially girls) in school are better informed and more motivated to use contraception to avoid pregnancy and sexually transmitted diseases.

85 Semba et al. (2008) using a major nutritional surveillance study in Indonesia and Bangladesh of over 500.000 and 300.000 participants.

86 Parity is used in obstetrics to classify woman by the number of live-born children and stillbirths they have delivered at more than 20 weeks of gestation.

87 The study by Currie and Moretti (2003), examined the effect of maternal education in first time mothers aged 24 to 45 on birth outcomes (defined as birth weight and gestational age) using Vital Statistics Natality data from the USA over a 20 year period up to 1999.

88 Gakidou et al. (2010).

89 Cleland and van Ginnekin (1988); Jejeebhoy (1996), both cited in Hannum and Buchmann (2005).

90 Kravdal (2004) based on a family health survey covering over 90.000 women in India.

91 McAlister and Baskett (2006), p.7.

92 Chowdhury et al. (2007).

93 Literature reviews were conducted by Heargraves and Boler (2006) of 45 primary research articles and Lloyd (2007) of 32 research studies conducted between 1995 and 2008. Also, Grant and Hallman (2006); Marteleto, David and Ranchhod (2008).

- Girls who are in school are less likely to have had premarital sex (although exceptions were found in specific countries such as Mali and Benin), are less likely to initiate sex and less likely to become pregnant. [94]
- Though there is too little reliable information on sexual harassment and gender-based violence in schools, the evidence seems to suggests that even where schools are not necessarily of good quality, being in school can still provide some protection against violence and sexual abuse for young girls.

Linked to reproductive health, there is substantial evidence of a positive impact of education on *fertility control*, by increasing the age of first time motherhood and time in between children, and therefore reducing the number of children.[95] However, there is less clarity on the way in which this happens. For example, Benefo examined longitudinal date from the Ghana Living Standards Survey for a sample of 1,141 women aged 15–50 years and found that in households where children go to school, contraceptive use is higher. In a subsequent study with survey data collected in rural Ghana during the 1980s, the same author concluded that, net of her own characteristics, a woman's interest in limiting fertility and using modern contraception increases with the percentage of women with education in her community.[96] A rare qualitative study in Kenya found that education does not directly affect fertility (but land scarcity did).[97] Kravdal, using Demographic Health Survey (DHS) data from Tanzania, concludes that especially secondary school enrolment – more so than primary - influences fertility by substantially increasing the age of first-time motherhood.[98]

Currently there is a clear consensus that school-going children and youths are less likely to be infected by the Human Immunodeficiency Virus (HIV) than those out of school, even if Acquired Immunodeficiency Syndrome (AIDS) prevention is not covered in the school curriculum.[99] However, over the years research in this area has made an interesting swing. Early studies examining patters of education and HIV prevalence found associations between higher levels of education and higher HIV prevalence. This was thought to be caused, among others, by the higher mobility of these groups, higher economic status, urban living, and with this a higher probability of exposure to the virus.[100] However, it was

94 However, the strong evidence of a negative relationship between education and initiation of (unsafe) sex might be confounded by the fact that sexual activity and its consequences (pregnancy, parenthood) are reasons for dropping out of school, leaving the students who are less sexually active in school (Biddlecom et al. 2007). Therefore, while the level of education mediates in greater receptiveness of reproductive health messages, school may not in itself constitute the most effective channel for disseminating SRHR messages. This might partially explain why specific efforts at using education to promote adolescent sexual and reproductive health appear to have had limited effect. For example, Plummer et al. (2007) finds limited effect due to poor quality of education in general. In contrast, Kirby and Rolleri (2006) conclude on the basis of an extensive review of 83 evaluations that such programmes generally do delay initiation of sex and result in safer sex.

95 c.f. Hannum and Buchmann (2005); Riddell (2007).

96 Benefo (2005); Benefo (2006).

97 Shreffler and Nii-Amoo Dodoo (2009).

98 Kravdal (2001).

99 IATT (2008).

100 Over and Piot (1993), cited in Glynn et al. (2004); Vandermoortele and Delamonica (2000); Gregson, Waddell, and Chandiwana (2001).

also immediately noted that though the higher educated were more vulnerable to HIV, they would also be quicker to respond because of their level of education.[101] Indeed, once prevention campaigns became generalized and behaviour started to adapt, HIV incidence among the more educated dropped significantly. As a result, more recent research consistently shows a lower probability of HIV infection for people with access to and higher levels of education.[102] Girls who completed secondary education have been found to have a lower risk of HIV infection and practised safer sex than girls who had only finished primary education.[103] For example, a study in Uganda found that one additional year of education decreased the probability of becoming HIV positive by 6.7% for young people, because of higher responsiveness to information campaigns in and outside of schools, higher condom use and a reduced number of sexual partners for educated girls.[104] Another possible way in which education affects HIV prevalence is through higher levels of income and greater empowerment, which reduces the need to exchange sex for money, and allows individuals (and particularly women and girls) to make better choices with regard to sexual partners and methods of prevention.[105]

[101] For example, De Walque (2009) finds that though schooling is a predictor of higher infidelity and lower abstinence, it is also the most consistent predictor of knowledge and behaviour change; Gregson et al. (2001).

[102] Glynn at al. (2004) in a study by of approximately 2000 adults in Cotonou (Benin), Yaounde (Cameroon), Kisumu (Kenya), and Ndola (Zambia).

[103] Heargraves and Boler (2006).

[104] De Walque (2007), using longitudinal data collected from a cluster of 15 villages in Masaka district (Uganda) over a period of 12 years. This has been confirmed by subsequent studies, including those summarized in a publication by the UNAIDS Inter-Agency Task Team on Education (2008).

[105] Heargreaves and Boler (2008).

6 Education, democracy and peace

There is some evidence that democracies with a higher share of educated population are more stable than those with a less educated population, and that educational attainment is a significant determinant of democratic attitudes. However, the relationship between these two variables is not straightforward, as education is not easily separated from other factors that may impact on democracy and there might also be a two-way impact.[106] A total of 10 articles were retained for this analysis.[107]

With regard to education and peace, relatively few articles met the criteria for this literature review. However, because the Netherlands has assigned an important role to education in countries affected by conflict and emergencies since 2007, additional effort has been made to include recent literature in this area.[108] Those reviews conclude that the impact of education on peace and reconciliation is not sufficiently understood and *'virtually all the literature refers to a weak evidence base for linkages between education, conflict and peace building'*.[109] This does not come as a great surprise given the methodological and practical difficulties of conducting research on a complex topic with relatively short term interventions in very volatile and often dangerous environments.

Findings on democracy

Studies have shown that the mechanism through which education promotes democracy is the strong relationship between education and informed citizenship of individuals, reflected for example in voter behaviour and participation in community activities. This mechanism is strengthened by more equal access to education and by access to higher levels of education.

Apart from education, many other factors might influence democracy, such as demographic attributes (age, sex, ethnic and linguistic background, political affiliation, and religion), levels of development, ethnicity, and access to resources.[110] Yet, when controlling for these factors, education is found to be an important factor in promoting democracy.[111]

[106] Drackner and Subrahmanyam (2010).

[107] Most of the articles are quantitative, though some qualitative studies are useful for clarifying educational and democratic processes. A majority of the studies that were reviewed focussed on multiple countries and regions. The studies use simple statistical analysis (correlations and chi-square tests), though more recently more sophisticated econometric modelling has been used.

[108] Smith et al. (2011); James (2010).

[109] Smith et al. (2011), p. 24 (commissioned by UNICEF's evaluation office).

[110] Acemoglu et al. (2005), for example, suggested that the relationships that were identified to that date were caused by omitted factors (i.e. factors that influence both education and democracy but are not included in the research) rather than being a causal relationship.

[111] Evans and Rose (2007) used national 'Afrobarometer' surveys across 18 African countries which covered 18 nationally representative, stratified random samples of households, summing up to 1200-2400 eligible voters, 18 years and older in each country.

The bulk of the research in the area of education and democracy is based on two predominant frames of reference: (a) the political modernization perspective and (b) the institutional perspective.[112] According to the political modernization perspective, the 'aggregate effects of mass education expansion on democracy are largely achieved via education's socializing influences on individuals'.[113] Mass education, particularly primary and secondary education, generates support for democracy by 'modernizing' the system. The institutional perspective takes a narrower approach, arguing that it is higher education specifically that generates civic-minded elites, who will then implement and run democratic systems society. According to this theory: 'whether or not education is beneficial for the development and retention of democracy depends on how education and educated elites are incorporated into the political system of a country'.[114]

Comparing education (literacy, primary and secondary enrolment) with measures of democracy (such as the Freedom House World Index),[115] correlation and causality have been established between years of schooling and democracy.[116] For example, assessing 89 countries over a period of four decades, it turns out that 20 of the 22 well-educated countries were democratic in the 1960 and that all of these (except Uruguay) remained so over the next forty years.[117] Moreover, there seems to be a clear tendency for dictatorships with a well educated population to become democratic. Actually, some authors dared to conclude rather precisely that 'The probability of a well-educated dictatorship becoming a democracy within 20 years is 87 percent'.[118] Schooling is thought to lead to the promotion of democracy and rejection of non-democratic alternatives by generating 'cognitive elements of political comprehension'.[119]

More specifically, the following trends emerge:[120]

- A more equal distribution of education, i.e. a more educated majority, is a better predictor of democracy than an increase in the average years of education.[121]

[112] Drackner and Subrahmanyam (2010).
[113] Benavot (1996), cited in Hannum and Buchmann (2005).
[114] Ibidem.
[115] Democracy is measured by either the Freedom House's ratings, which measures political rights and civil liberties or the so-called 'Polity IV's index', which focuses on political regime type and The Economist Intelligence Unit's Democracy Index. (Drackner and Subrahmanyam (2010)).
[116] For example, Drackner and Subrahmanyam (2010) for 15 partner countries of the Swedish International Development Agency (SIDA): Bangladesh, Bolivia, Botswana, Burundi, Cambodia, Ethiopia, Guatamala, Honduras, Kenya, Mozambique, Namibia, Rwanda, Tanzania, Uganda, and Zambia.
[117] Glaeser (2006). In the study countries were labeled 'well-educated' if they had above 5.01 years of schooling in 1960 (the 75th percentile in the sample schooling distribution in 1960).
[118] Glaeser et al. (2006), p.5. There are, however, always countries that do not fit this picture.
[119] Evans and Rose (2007), p.20.
[120] Mostly based on primary research and literature review by Drackner and Subrahmanyam (2010) on the relationship between education and democracy. These findings are broadly consistent with the literature reviews in other studies that were reviewed for this paper (c.f. Hannum and Buchmann (2005); Evans and Rose (2007); Riddell, (2005)).
[121] Confirmed by the econometric research of Castello-Climent (2007) using a sample of 104 countries over the period 1965–2000 (deliberately selecting countries that were dictatorships at the beginning of the period to reduce the problems of endogeneity and reverse causality). As noted by the author the disadvantage of the average years of schooling is that this does not provide information on whether a restricted group of highly educated individuals has more influence on democracy than a large mass of moderately educated citizens.

- Primary education (both formal and non-formal) is particularly important in the causal relationship between education and democracy.
- Commitment to democratic ideals grows with levels of education, and post-secondary education may result in top-down pressures for democratisation (exceptions acknowledged).
- People with a higher education are more aware of the benefits that can be gained from registering to vote and from voting, and are also more likely to participate in charitable giving and voluntarism.[122] For example, 12.000 high school graduates from the US were followed over a period of 12 years, and an additional year of schooling was found to increase voter participation by 6.8 percentage points, even when education does not specifically include content related to democratic values or civic education.[123]

As a result, though different studies concluded that there is a link between education and democracy even without specific actions targeting civic education,[124] the content of education will most probably matter. As stated by one author: 'The content and curriculum of education needs to be anti-authoritarian if it is to produce democratic effects. In many African countries, educational practices and content do not promote the values associated with democratic political culture'.[125]

Findings on peace-building and reconciliation

In countries affected by conflict, education has the potential to both exacerbate and mitigate conflict. Positive results have been found where education contributed to personal protection (especially for girls), provision of alternative education when the state fails, and restoration of normality after the conflict ended. There is less evidence of the impact of education on promoting peace. Yet, the fact that there is little research on this topic comes to no surprise given the methodological and practical challenges of undertaking research in such contexts.

The GMR 2011 has argued for recognition of education as part of the humanitarian response to emergencies. Education actually has 'two faces' in conflict-affected countries: it can exacerbate or mitigate conflict through the access to education, structure of schooling, teacher recruitment and training, and curriculum content (e.g. language, religion, history).[126] The first face, whereby education is part of the forces that create and sustain conflict requires careful conflict analysis of education systems in conflict-affected countries. The GMR suggests that: ' to unlock education's potential to nurture peace, governments and

[122] Riddell (2005) in a comprehensive literature review of the impact of education on economic and social outcomes.

[123] Dee (2004).

[124] Benavot (2002) argues for the importance of civic content in education (in Drackner and Subrahmanyam (2010)), while Dee (2004), Evans and Rose (2007) and Castello-Climent (2007) all provide strong evidence that education has an impact on democracy regardless of the specific inclusion of civic education content.

[125] Drackner and Subrahmanyam (2010), p.7

[126] Bush and Salterelli (2000); Smith et al. (2011).

donors need to prioritize the development of inclusive education systems, with policy on language, curriculum and decentralization informed by an assessment of the potential impact on long-standing grievances'.[127]
According to the GMR 2011, 42% of the world's children out of school (28 million) live in conflict-affected countries. A literature review commissioned by Comic Relief in the UK listed a number of ways in which education can have an impact on recovery for such conflict-affected children ('second face'), and move beyond 'do not harm' (i.e. addressing the 'first face').[128]

Positive results have been found, where education contributed to:
1. Protection from violence, especially for girls,[129] from recruitment,[130] through survival skills (e.g. landmine awareness),[131] and providing opportunities for personal development[132]
2. Return to normality, by restoring formal education, hope and providing additional services (e.g. health)[133]
3. Provision of alternative education and catching up for those who feel outside the formal system (e.g. accelerated learning programmes, remedial catch up programmes)

There is still less evidence for the role of education in providing:
4. Psychosocial support (though this is limited by teacher capacity and need to provide family support)
5. Education for peace (which is closely related to the importance of careful conflict analysis of education systems, as mentioned above)
6. Economic opportunities (evidence is mixed for technical and vocational education, as it can improve resilience and increase opportunities, e.g. for ex-combatants, but also lead to frustration if not compatible with labour market demands)

[127] GMR (2011), p.3.
[128] James (2010).
[129] Kirk (2008), cited in James (2010).
[130] Nicolai (2005), cited in James (2010).
[131] Bird (2007), cited in James (2010).
[132] Ibidem.
[133] Respectively INEE (2010); Nicolai (2005); and Boyden (1996), all cited in James (2010).

7 Education and the environment

There is an emerging interest in the way in which education relates to the environmental agenda. Education has been identified as a potentially effective, although under-used, avenue for generating environmental awareness among young people.[134] The six, all fairly recent, studies retained for detailed review dealt with two main issues: resilience and carbon emissions.[135]

Findings

The evidence on the link between education and the environment, more specifically resilience to disasters and carbon emissions, is still meagre. There is some indication that countries with higher levels of education might be better equipped to deal with environmental challenges. Furthermore, there is evidence that female education may be a cost-effective way of abating carbon emissions, partly because of its impact on family planning and livelihood (cooking, water use) practices. More research is needed in this area, however, to examine the exact mechanisms by which the relationship works and to more firmly establish causality.

There is some evidence of a relationship between education and resilience to environmental disasters. For example, in Asia over the past 35 years, human fatalities from different types of environmental disasters have been substantially lower in countries with higher educational attainment (secondary school enrolment).[136] The explanation for this is that: '*higher educational attainment enable(s) people to make better choices with regard to safe construction practices, location decisions, and other safety infrastructures that will result in lesser deaths from disasters*'.[137] Countries with high *female* education are even more capable of getting through extreme weather events than countries with equivalent income and weather conditions but less female education.[138] Based on projections for 2005 through 2050, Blankespoor et al. (2010) conclude that '*by mid century, neutralizing the impact of extreme weather events requires educating an additional 18 to 23 million young women at a cost of $11 to $ 14 billion annually*'.[139]

[134] In a paper for the Brookings Institution focused on better leveraging education for climate change, Anderson (2010) argues for better agreement and synergies between international agreements and relevant agendas, including the agendas related to: Education for Sustainable Development, Education for All, the Quality Learning Agenda, the Disaster Risk Reduction, and Environmental and Climate Change Education.

[135] Much of the research relies on econometric modelling and focuses on cost calculations, using multi-country analysis in Asia or global analyses.

[136] Padli and Habibullah (2008), in their panel study of 15 Asian countries: Bangladesh, China People's Republic, India, Indonesia, Iran, Israel, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Syrian Arab Republic, Thailand and Turkey. This finding confirms their literature review.

[137] Padli and Habibullah (2008), p. 7.

[138] Blankespoor et al. (2010) build on this and other studies that have looked at vulnerability to environmental hazards (c.f. Toya and Skidmore (2007); Noy (2008)), and use global data related to deaths from floods and droughts during 1960–2003 to identify factors related to resilience.

[139] Blankespoor (2010), p.17.

Female education also compares *highly favourably* with a large number of other options for reducing carbon emissions, such as solar, wind, and nuclear power, second generation bio-fuels, and carbon capture and storage. There is some evidence that female education is cost-effective compared to forest conservation and other improvements in forestry and agricultural practices. Population policies (family planning) are thought to be more cost-effective, but, as has been reported before, female education and fertility are complementary rather than competitive interventions. The authors of the study that established this impact of education on a global level conclude that '*that female education and family planning should be viewed as viable potential candidates for financial support from global climate funds*'.[140]

[140] Wheeler and Hammer (2010), p.1. This study uses recent data on carbon emissions, effectiveness and costs of programs, to estimate the cost of various forms of carbon emissions abatement.

8 Summary and conclusions

Education is a basic human right, according to international law since 1948. Denial of access to (quality) education is in itself a form of poverty. This in itself forms a sufficient basis for Dutch support to basic education. However, there is more. The literature provides clear evidence that education, especially quality education, has both individual and social benefits, through a variety of channels:

1. There is strong support for the impact of education on individual economic opportunities in both developed and developing countries. Education results in increased employability, productivity and income potential. The positive impact is even stronger when the education is of higher quality (measured by scores on standardised tests).

2. Even though private returns to education are found to be higher for women, ultimately men still benefit more from education than women in developing countries, due to wage and other forms of labour market discrimination.

3. In recent years, the returns to primary education have fallen in developing countries. This is ascribed to the expansion of education (less scarcity of people educated at primary levels), low quality of education and changes in the demand from the labour market.

4. Education also has important external effects, beyond the individual returns. For example, in the labour market, educated workers enhance overall productivity beyond their own individual contribution. An educated workforce enables diffusion of knowledge and facilitates the overall capacity for innovation, as such improving conditions for economic growth.

5. There is substantial evidence that education impacts on economic growth. While access to education is important in this context, it is educational quality in particular that produces the greatest benefits.

6. With regard to non-economic aspects of poverty, research has found very strong support for the impact of education on health for people in different age groups, and in both developed and developing countries. Apart from reducing maternal mortality, maternal education is particularly important for the health of infants and children. There is also consistent support for the impact of education on protecting against HIV and AIDS, contributing to sexual and reproductive health and lowering fertility. Mere access to education, irrespective of its quality or the inclusion of health education, already improves the health of children and youth.

7. The relationship between education and social, gender, economic and ethnic equality is highly interrelated, complex and context-specific, and cannot be established with certainty. While educational expansion has included disadvantaged groups, there is no strong evidence that this has reduced social and economic inequalities. Education is part of society, and can - by itself - not overcome inherent inequalities (e.g. in access and quality of education, and economic opportunities).

8. While there is a strong correlation between levels of education and democracy, the causal link has been difficult to establish. However, recent studies do find support for a relationship between education and informed citizenship of individuals, reflected for example in voter behaviour and participation in community activities. The impact is stronger with a more equal distribution of education.

9. Though education can be party in conflicts (e.g. teaching of language, history), education also has the potential to contribute to protection (especially for girls), provision of alternative education and restoring normality. However, evidence is still relatively weak.

10. The evidence on the link between education and the environment, more specifically resilience to disasters and carbon emissions, is still meagre. There is some evidence that countries with higher levels of education might be better equipped to deal with environmental challenges. However, the exact mechanisms through which education affects the environment require further research.

Section II

What works?

1 Improving access to quality education: what do we know?

The previous section established that education access, and quality of education in particular, have important individual and social benefits and impact on different dimension of poverty. The next question is how to get children in schools and learning. What works and why? And given limited resources, how can the best 'value for money' be generated?

The Netherlands has supported many different education interventions, but these cannot easily be identified because of the way in which the Netherlands provides this support. The Dutch support to governments, NGOs and multilateral organisations covers a variety of interventions specific to the country contexts without earmarking the support for specific interventions.

The literature review was set up to examine and summarise the findings from published evidence regarding the (cost) effectiveness of interventions in basic education aimed at increasing access to education and improving the quality of education. Using the same methodology as outlined above (and detailed in Annex 1) about 70 studies were identified for this review. These are predominantly studies from developing countries.

The findings of the literature review have been structured in six categories, as illustrated in figure 5:

1. School infrastructure and resources.
2. Teachers (numbers, qualifications, incentives).
3. Inputs for 'healthy learning', such as nutrition.
4. Cost reducing measures for pupils, including (conditional) cash transfers, and scholarships.
5. Management and governance: covering among school management and parent participation.
6. Policy choices beyond primary education, such as Early Childhood Development (ECD) and Technical and Vocational Education and training (TVET).
7. Improving education for girls, as a cross-cutting theme.

The literature review focused on the (cost) effectiveness of interventions within the education sector. Whether children go to school or learn, however, is predominantly determined by factors outside of the education sector, such as the socio-economic status of the students (and their households), preferences of parents and opportunity costs.[141]

But even within the education sector, not all possible interventions could fit within the scope of this literature review. The research methodology identified for example, very little research into the effectiveness of different teaching methods on learning in developing

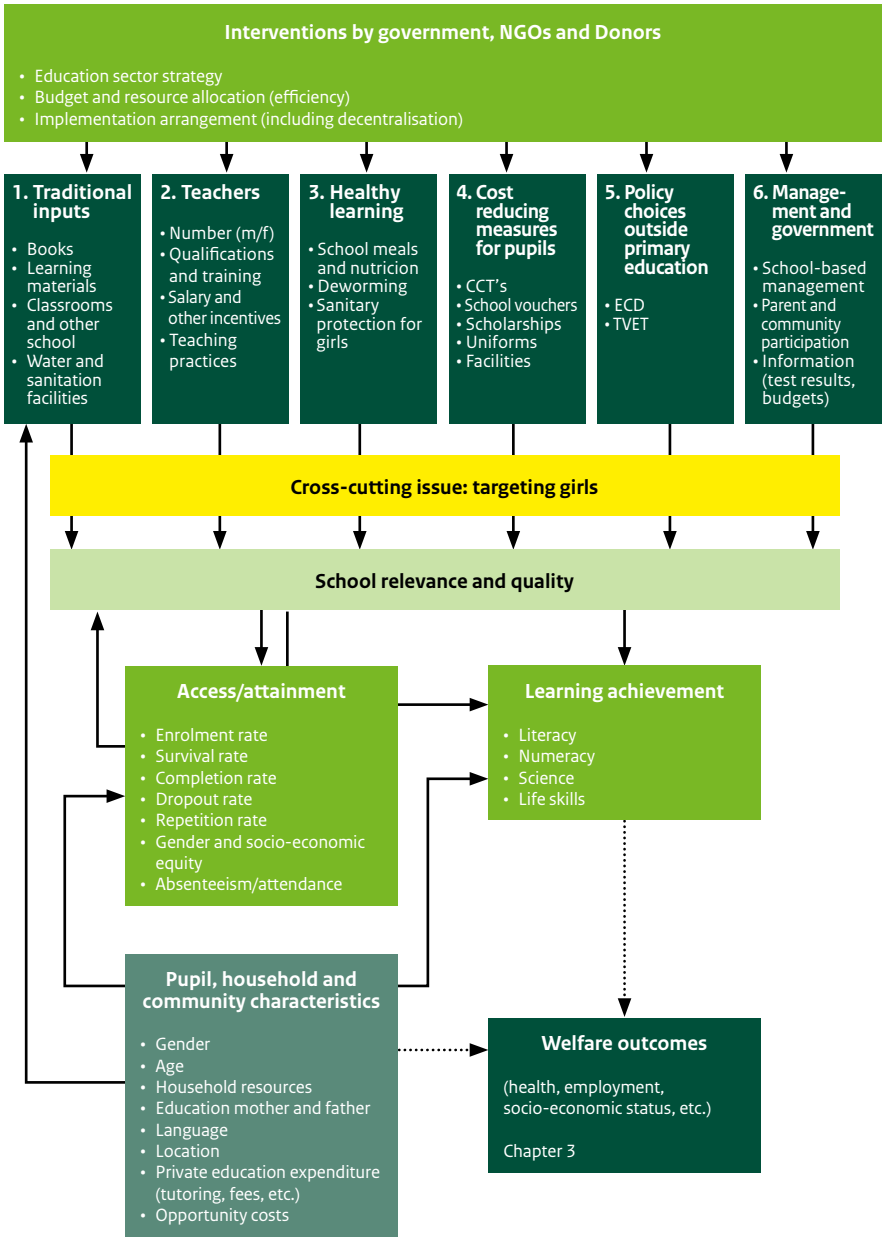
[141] See, for example, the country evaluations conducted by IOB in Zambia, Uganda and Bangladesh. But since long established in the literature, see among others: Ross et al. (2005), Willms (2006); UNESCO (2005) and others.

countries. A more elaborate search specifically focused on different aspects of teaching and pedagogic approaches (e.g. curriculum development and approaches, language of instruction, child-centred approached, tracking of students, etc.) might generate additional sources of research and provide further insight into the processes that are being examined.[142]

The answer on 'what works and why' is obviously very context-specific. No Top-20 or blue-print exists. Nevertheless, the literature does provide some pointers on which interventions are promising from an effectiveness and cost-effectiveness perspective. In reality, a mix of interventions will work better than stand-alone projects and continuous monitoring and evaluation remains imperative to improve our understanding of the factors that impact on access and achievement of pupils.

[142] For example, tracking of students (grouping according to ability) has received increased attention in recent years, as has been summarised in Galiani & Perez-Truglia (2011).

Figure 5 *Education interventions*



2 Traditional educational inputs

The origins of education research around these determinants of effectiveness can be traced back to what is known as the Coleman Report, which investigated equal opportunity issues during the 1960s in the USA.[143] The report concluded that school resources (books, teachers, classrooms) did not explain much of the variation in students' achievement, and that in fact it was students' socio-economic (SES) status and background that was critical to educational performance. The Coleman Report provoked an avalanche of research in developed and developing countries, much of which continues to date.

Findings

A first key conclusion from the body of research into traditional education inputs over the past decades is that such inputs appear to make little difference in developed countries, but that inputs such as textbooks and other learning material, as well as basic infrastructure can have an important impact on learning in developing countries.[144] It is generally assumed that adequate sanitary conditions are important for the enrolment and performance of girls; however, more research is required to substantiate this assumption.

Secondly, the research reviewed highlights important differences between developed and developing countries in the impact that traditional education inputs have on outcomes, as well as differences within developing countries. This is likely because what matters is the appropriate use of educational inputs (e.g. books being distributed to pupils and used by teachers). Moreover, the difference between countries can be explained by diminishing returns of such inputs. In other words, inputs will make the biggest difference when their availability is still scarce.[145]

Books and learning materials

The literature reviewed a large number of studies focussing on textbooks and the findings underscore that text books are particularly crucial for effective education in developing countries.[146] One influential study in Southern Africa found that moving from no textbooks to one book per student for the whole class improved student performance.[147] The particularly strong impact of books in for developing countries underscores how in many contexts resources continue to be very scarce.

[143] Coleman (1966), cited in Boissiere (2004).
[144] IOB (2008a), IOB (2008b), IOB (2011b), White (2004).
[145] Boissiere (2004).
[146] Boissiere (2004) conducted a literature review for the Operations Evaluation Department (OED) of the World Bank. Michaelowa & Wechtler (2006) draw a similar conclusion based on their literature review, as well as from econometric analysis for Southern and Western Africa between 1995-2002.Barrett et al. (2007) conducted another literature review (albeit less systematic) for the Research Consortium EdQual.
[147] Michaelowa & Wechtler (2006) (by 5%-20% of a standard deviation, i.e. 53%-61% % of student achieve the level that previously only 50% achieved).

Not any textbook will do. A study in Uganda found that books are cost-effective (and relatively cheap) but that mathematics books were more effective than books for English for improving results.[148] And obviously, just books will be insufficient; they need to be used by the pupils as part of the classroom practice. Too often books are stored instead of used, and even when they are available to the pupils, teachers continue rote learning, sometimes because they lack accompanying manuals.[149]

Some countries, like Zambia where one book may be shared by three or more primary students, face significant challenges as the consistently low score of Zambia on the SACMEQ data illustrates.[150] Findings from an analysis of student performance in Southern Africa, suggest that at a minimum 50 % of pupils in each classroom should have books. The authors of this study note that: '*teachers will actually use the textbooks only if there is a minimum general coverage. However, if almost every student already has a book, adding additional books will no longer have much impact on teaching practice*'.[151]

While the findings point towards provision of books as being the most cost-effective measure, there is also clear evidence other learning materials - such as wall charts and teacher materials - can also have a positive effect on learning.[152] It has also been suggested that computers may improve effectiveness of education. Yet, the literature reviewed provides only mixed evidence in this area. For example, one study found that that pre-algebra and algebra instruction using computers improved students test scores compared to a control group with traditional instruction.[153] Other studies found limited effect of technology, among others because teachers failed to integrate the technology into their classroom practice.[154] In any case, computers seem to be only effective when they complement rather than substitute the teachers' work.

Infrastructure (buildings and furnishing)

A minimum quality of school facilities matters for student performance.[155] For example, loss of teaching and learning time due to leaking classroom roofs was found to be a major problem in Ghana (less than two-thirds of schools could use all their classrooms when it was raining in 2003) and had implications for student performance.[156]

148 Noted for Uganda in IOB (2008a).
149 See for example, for Uganda by Ward et al (2006) and IOB (2008a).
150 IOB (2008b).
151 Michaelowa & Wechtler (2006), p. 41, established by plotting French proficiency tests against the number of books per pupil, with the steepest slope in the middle.
152 Michaelowa & Wechtler (2006).
153 Barrow, Markman and Rouse (2009) for the USA.
154 Randomized trial by Linden and Barrera-Osorio (2009) in Colombia. Confirmed by Linden (2008) for India. Michaelowa and Wechtler (2006) found that when controlling for electricity (another indicator of privileged schools), the effect of technology in the classroom on performance scores was entirely eliminated.
155 White and Masset's (2004) in Ghana; and examples for Brazil and Africa cited in Boissiere, 2004.
156 White and Masset's (2004) study in Ghana.

Yet, the literature reviewed does not find evidence for a strong link between more sophisticated infrastructure and learning outcomes. Given the high costs associated with classroom construction, going beyond a basic level of furnishings and buildings does not seem particularly cost-effective.[157] The definition of such a basic standard of school facilities would be close to: '*enough classrooms to accommodate about 40 students per classroom, sufficient desks in preference to using floor mats, chalk boards, and maybe a storage cupboard for books and materials*'.[158] Class size is discussed in the next chapter as the number of children in one class is determined by how many classrooms as well as teachers are available.

It is generally assumed that where adequate sanitary conditions are put in place, this will impact on the enrolment and performance of girls. However, a recent review of the published literature on the impact of providing single sex toilets on enrolment, attendance and completion of girls in primary or secondary schools was unable to provide conclusive evidence of the impact of sanitary facilities. None of the studies on water and sanitation were adequately designed to assess the specific impact of separate sex toilets on educational outcomes.[159] This is thus clearly an area where more research is required.

[157] Michaelowa and Wechtler(2006) drawing on a large number of previous studies (Mingat (2003); Verspoor (2003); Michaelowa (2003) and (2001); Glewwe et al. (2004); Glewwe and Kremer (2006); Tatto, Nielsen & Cummings (1991)). Also, Boissiere (2004).

[158] Boissiere (2004) p.17.

[159] Birdthistle, Dickson, Freeman and Javidi (2011) reviewed a total of 78 evaluation/research papers. While a number of evaluations focussed on separate toilets for girls, these were not useful because: (a) they did not systematically compare separate-sex toilets with other arrangements such as shared toilets or no toilets; (b) the relative effects of single components such as separate sex toilets could not be disentangled from broader Water, Sanitation and Health (WASH) interventions; and, (c) educational outcomes were not systematically disaggregated by sex.

3 Teachers

The review underlines the importance of choices with respect to both the quantity (e.g. student-teacher ratios, contact hours) and the quality of teachers (e.g. levels of initial training and arrangements for teacher training, as well as teacher incentives). Teachers have the potential to generate maximum effect on learning, but their appointment also has important budgetary implications. In many countries teacher salaries constitute a large if not major part of government education budgets. For example, in sub-Saharan Africa, salaries account for between 70% and 97% of current public expenditure on education.[160]

There are three key groups of teacher related policies:
1. number of teachers and effective teaching time;
2. teacher training, including choices about quality and duration; and
3. incentives.

Management of schools, including school inspection, also affects learning through its impact on teachers. This will be discussed in Chapter 8 of this section.

Findings

Teachers, their motivation and the quality of their teaching, have an important impact on learning. There is less clarity on how to achieve this; by what combination of education, training, experience and incentives.

Evidence on the impact of contracting modes is mixed, and questions are posed about the sustainability and equity implications of for example private tutoring. For improved motivation, improved accountability with external monitoring and systems of rewards and penalties are found to be effective in reducing teacher absenteeism and increasing students' performance. However, these kinds of mechanisms need a careful design to avoid negative side effects. In this respect, management of teachers is crucial.

Number of teachers and teaching time[161]

Increasing the number of teachers reduces class size and student-teacher ratios (assuming sufficient rooms are available), but empirical evidence of the impact on educational performance is not consistent. Different studies have concluded that teacher numbers (measured by pupil-teacher ratios and class sizes) have only a modest impact on achievement.[162] A reason for small impact could be that '*the effect of class size [...] which is generally small compared to other factors contributing to successful learning, such as direct instruction, quality teaching and*

[160] UIS (2011).
[161] The benefits of female teachers are discussed in chapter 7.
[162] Noted by Michaelowa and Wechtler (2006).

time on task [...] is hidden in the effect of more significant variables'.[163] Moreover, the effect of class size and pupil-teacher ratio is further obscured because high quality schools attract more pupils, thus raising the class size in schools with higher test scores.[164]

Pupil-teacher ratios and class size, on the other hand, do clearly matter. The threshold for pupils seems to be around 50 to 60 students, beyond which less teachers (or more pupils per teacher) seriously affects pupils' achievements. Once there are less than 50 students, further reduction in class sizes by increasing numbers of teachers is thought to become less cost-effective.[165]

Rural areas are in general less attractive for teachers (or other service deliverers). A scheme of district sponsorship of teachers developed in Ghana turned out to be able to attract teachers to rural teaching positions. On completion of their courses, the newly qualified teachers were deployed in the districts that sponsored them. The rationale behind the scheme was that '*candidates sponsored by, and from, the district would not only accept posting to 'their' districts but also stay longer since as natives they were already used to conditions there*'.[166] The authors stress the importance of complementing financial incentives with such non-monetary incentives.

Some countries, such as Kenya and India, have tried contracting teachers with shorter term contracts (e.g. for tutoring), parallel to the existing teaching cadre. For example, in a pilot programme in India local women with secondary education were paid 10% of a teachers' salary to tutor children. This improved the performance of the tutored children significantly, especially for those children who started off with the lowest grades.[167] Other studies also found that contract teachers are less absent, spent more time teaching and improve learning (at least for the first year).[168] Because these teachers are hired for lower salaries, they are quickly found to be relatively cost-effective given that the performance of their pupils is better or at least equal. Contracts might seem to provide useful incentives to teachers.

However, there are questions about the sustainability of such an approach, as ultimately these teachers will want to be included into the overall teaching cadre. The positive effect of contract teachers and external tutors could also be inflated if these teachers are additional to the official teaching cadre, causing class sizes and pupil-teacher ratios to be reduced. With regard to tutoring, even when it has a positive impact on learning, equity remains a concern. For example, in Bangladesh, two thirds of children in primary school receive a form of tutoring, more so for boys, in urban areas and for children from wealthier households, which implies it is linked to the quality of official schooling and increase inequalities.[169]

[163] Riddell (2008), p.31).
[164] IOB (2008a) and (2008b).
[165] Michaelowa (2001) studying data from Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar and Senegal; Verspoor (2003).
[166] Cobbold (2006), p.458.
[167] Banjeree et al. (2007); if tutoring is done by teachers who should have taught the students while they were in class, results of tutoring for tutored children will be exaggerated.
[168] Muralidharan and Sundararaman (2010); Goyal and Pandey (2009) cited in Bruns et al. (2011).
[169] IOB (2011a).

Another way in which the lack of teachers has been resolved is using a double shift teaching system. This has a detrimental impact on student achievement due to the reduction in formal instruction time.[170] It also does not reduces costs because often two different teachers serve the two shifts and overtime has to be paid to teachers who work both shifts.[171] In remote rural areas with low population density, multi-grade teaching emerges as a cost-reducing strategy without negative impact on student performance.[172]

Teacher training

Not just any teacher will do. Teacher quality emerges as an important determinant of achievement and performance from the literature. Quality of teachers can be measured in different ways, but in the literature collected for this review, it is most often measured by teacher test scores. A higher score of teachers on a maths test was found to increase the scores of pupils on a mathematics aptitude test by a range of 5 marks (Tanzania) to 15 marks (Seychelles). In the same study, teacher experience was also significantly associated with pupil performance; 10 years extra experience added 4 to 7 marks on pupils' scores. The (formal) education level of teachers did not have a significant impact.[173]

With respect to teacher training, quality rather than duration emerges from the literature as important.[174] Longer teacher training (both pre- and in-service) has only a modest impact on student performance, and can be relatively expensive.[175] This leads to a seemingly obvious conclusion, which is however not yet mainstream practice, that '*from a cost-benefit perspective, short but well designed and practice oriented programs appear to be most promising*'.[176]

Teacher incentives

Improving teacher motivation and reducing absenteeism are identified in the literature as key interventions that have a direct impact on effective learning.[177] In many countries, effective time spent teaching is often much shorter than the required time for teaching, and time in class is ineffectively managed. Poor motivation and inadequate incentives for teachers have an important impact on teacher behaviour. These incentives are for a large part based on salaries, but not solely.

Teacher effectiveness can be enhanced through a combination of (financial) incentives for teachers with external monitoring.[178] A system of rewards and reprimands, or rather monitoring, seems to work in several developing countries, whereby incentives can be provided to teachers or to schools, based on student learning outcomes or teacher inputs. Careful design of such incentive schemes is required to avoid negative side effects. For example, student test scores can easily be increased if poor performing students do not

[170] Michaelowa and Wechtler (2006); Barrett et al. (2007).
[171] Mingat and Suchaut (2000), cited in Michaelowa & Wechtler (2006). IOB (2008a).
[172] Michaelowa & Wechtler (2006).
[173] Atherton (2009) analysing SACMEQ data from 2001/02.
[174] Michaelowa & Wechtler (2006); Atherton (2009) also analysing SACMEQ data from 2001/02.
[175] Michaelowa & Wechtler (2006).
[176] Ibid, p. 10.
[177] Michaelowa & Wechtler (2006); Riddell (2008); White (2009); Bennell & Akyeampong (2007).
[178] White (2009).

participate in the tests. Therefore, some incentive schemes included both the amount of students participating in the final tests as well as the test scores. It is also important to ensure teaching does not concentrate solely on passing the standardised final exams.[179] For example:

- In Kenya, pupils' scores increased when schools were rewarded for the test scores of students, and were penalized for students who did not take exams. A larger number of students in treatment schools took the government exam than in the control group. They also scored higher on the exams than students in comparison schools in the second year of the programme. There was, however, no impact on teacher attendance and when the programme ended the effect dissipated.[180]
- In India, a combination of monitoring with cameras and financial incentives for individual teachers in rural schools reduced teacher absenteeism from 42% to 23%, and also impacted positively on the test scores of pupils and on completion.[181] Teachers responded particularly strongly to financial incentives.[182]
- Additionally, a study on education and health services in India and Kenya found that apart from a system of rewards and punishments, active involvement of teachers and health workers themselves, as well as of the beneficiaries of services, improved service delivery (and increased demand for services).[183]

A recent evaluation in the USA did not find any impact on learning outcomes, despite considerable incentives for teachers and schools. Specificities of the education sector in developing countries go a long way to explain why incentives programmes might work better in that context (e.g. weak monitoring systems, weak teacher professionalism with low entry requirements, and the size of the incentive compared to low salaries).[184]

[179] For example, the IOB country evaluation of Bangladesh found that students were trained to memorise the information requested in the standardised final exams. (IOB, 2011a).
[180] Glewwe, Ilias and Kremer (2010).
[181] Duflo, Hana & Ryan (2010).
[182] Confirmed by Bennell and Akyeampon (2007).
[183] Banerjee & Duflo (2010).
[184] Bruns (2011) discusses in depth what the implications are for the design of teacher incentive programmes (or broader accountability reforms).

4 Healthy learning

This section reviews the published evidence on the effectiveness of interventions that are not directly related to the formal learning processes or traditional inputs, but which enable children and young adults to be healthy for learning. The relationship between health and education works in two-ways: (a) better health, nutrition and overall well-being will enhance school participation and benefit the outcomes of schooling, and (b) schooling itself will produce outcomes in terms of improved health, nutrition and well-being (as discussed in section I).

Findings

Healthy children attend schools more and learn more. Deworming and iron supplementation works and is relatively cheap (where high prevalence). However, there is mixed evidence on the impact of school meals. While school feeding improves enrolment, it diminishes contact time between teacher and pupils due to the time spent managing the programme. Finally, though lack of sanitary protection is found to be a barrier to schooling for girls, there is still surprisingly limited evidence on what exactly is required to overcome this.

Nutrition and school feeding

In general, nutritional status has been found to be a significant determinant of enrolment and performance in school: '*children who are better nourished in the first years of life stay in school longer and learn more per year of schooling*'.[185] However, the evidence on the impact of nutrition interventions (e.g. school feeding, iron supplementation) in schools is mixed. As will be seen below, published research highlights positive effects, as well as substantial drawbacks.[186]

Nutrition interventions once in school can positively impact on learning. School meals increase the demand for schooling, reduce absence rates and improve learning outcomes.[187] For example, in Guatemala the provision of nutritious porridge to schools increased the average years of schooling of students by 0.6 years. The subsequent increase in future wages was estimated at 5% per school year completed.[188] In the Philippines, the increase in test scores from better nutrition was thought to be equivalent to about six months extra schooling, which would lead to an increase in wages of $57 per year.[189] However, full meals can be rather expensive and should therefore be carefully targeted. The above mentioned programme in Guatemala cost USD 516 per child per year. Otherwise, less costly alternatives, such as distribution of small snacks, should be considered.[190]

[185] Damon and Glewwe (2007). Also, Taras (2005) for Nepal.
[186] The International Initiative for Impact Education (3IE) (2009) reviewed 13 assessments of school feeding interventions from various parts of the world. The lack of conclusive results is partly due to methodological problems and poor design of studies (e.g. only comparing schools with and without, rather than also comparing them before and after the intervention, i.e. double-difference).
[187] White (2009); Michaelowa & Wechtler (2006).
[188] Maluccio et al. (2006), cited in Damon and Glewwe (2007).
[189] Glewwe, Jacoby and King (2001), cited in Damon and Glewwe (2007).
[190] Michaelowa & Wechtler (2006).

Nutrition interventions can have unexpected results. A breakfast programme in the highlands of Peru did not seem to result in better performance of students compared to other schools; however it had a negative impact on drop-out rates and attendance.[191] The authors attribute this to the reduction in the time students spent in the classroom with teachers due to the breakfast service.[192] Similarly, in Kenya a breakfast programme was found to impact favourably on school participation (30% higher in the treatment group than in the comparison group).[193] It also affected test scores, but only when teachers were relatively experienced prior to the programme. Moreover, just as in Peru, the provision of breakfast displaced teaching time and resulted in larger class sizes because children from other schools were attracted to the schools providing meals. Subsequently, treatment schools raised their fees, and comparison schools close to the treatment schools decreased their fees. Interestingly, although schools used the money from these extra charges to attract teachers through a higher salary, teacher absenteeism remained around 30%.

Other health related interventions

This literature review has found evidence of other types of health related interventions that can impact positively on learning. For example, deworming has been found to be especially cost-effective. An influential evaluation of a randomly-phased, school-based, mass treatment with deworming drugs in Kenya found that the programme was able to reduce absenteeism in treatment schools by 25%.[194] Moreover, the authors conclude that it is '*far cheaper than alternative ways of boosting school participation*'.[195] However, the programme did not improve test scores. In India, the provision of iron supplementation and deworming drugs to children 2-6 year old enrolled in pre-schools in slum areas of Delhi resulted not only in significant weight gain among children (approximately 0.5 kg over 5 months of intervention), but also in an increase of 5.8 % points in pre-school participation and a reduction by one-fifth in absenteeism. The biggest gains were among children from the lowest socio-economic classes.[196]

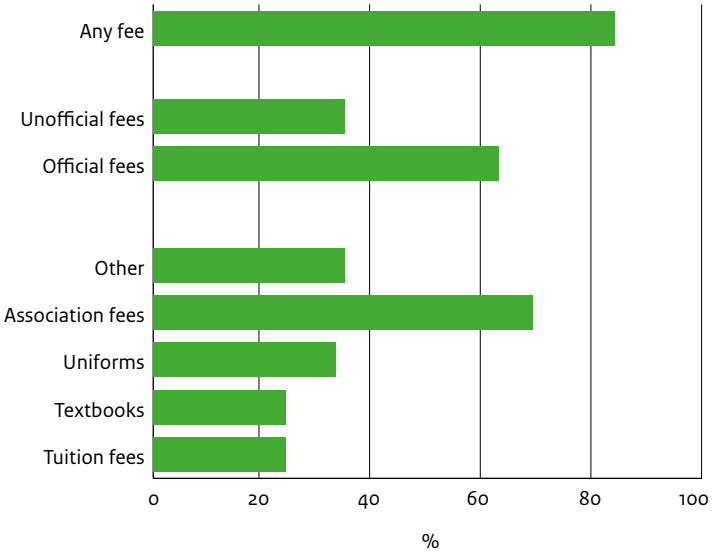
The cost effectiveness of interventions such as deworming will depend on the prevalence of the health problem (e.g. the area in Kenya had particular high worm infections).[197] Yet even where worms constitute an important health issue, deworming has not yet been mainstreamed in the education sector.[198]

[191] Cueto and Chinen (2008).
[192] An alternative and possibly additional explanation offered by the researchers is the differential drop-out rate in the treatment and contrast groups (the drop-out rate was higher in the contrast group during the three previous years prior to the evaluation).
[193] Vermeersch and Kremer (2004) collected data between 2000 and 2002 at 25 randomly chosen preschools out of a pool of 50 schools in Western Kenya.
[194] Miguel and Kremer (2004).
[195] Miguel & Kremer, 2004, p.159.
[196] Bobonis, Miguel and Sharma (2004).
[197] Damon & Glewwe, 2007.
[198] UNESCO (2005).

5 Cost reducing measures for pupils

There are considerable direct and indirect household costs associated with schooling. Direct costs include e.g. transportation, school uniforms, books, fees for associations, and unofficial payments to gain access to education. In 2005, in 84% of developing countries parents paid official direct costs for the education of their children (see figure 6).[199] Indirect costs, or opportunity costs, refer to the loss of family income due to the fact that children have less time for working and supporting household duties. Together these costs will influence the demand for education.

Figure 6 *Percentage of countries charging fees for education*



Increasingly primary education is provided for free In 2005, only 18% of developing countries charged official school fees for primary education. In many countries, this has led to a massive impact on education enrolment. The increase in enrolment is found to be especially large for children who were previously excluded from education (e.g. poor, girls). Targeting of those previously excluded is improved when fees are reduced for particular groups only, but such targeting can be challenging and costly.[200]

In order to further reduce the financial barriers to education, some countries have provided in kind (e.g. school uniforms, books) or monetary (e.g. scholarships) incentives for school going children. In general, such measures are found to be effective in enhancing participation in schools (higher enrolment and lower absenteeism). Conditional Cash Transfers (CCT) and vouchers have mainly been used in middle-income countries, such as India and in

[199] For an overview of direct costs based on World Bank surveys, see Kattan (2006).
[200] Kattan (2006); IOB (2008 Zambia); IOB (2008 Uganda).

Latin America. There is no empirical evidence of their use in sub-Saharan Africa.
Four different kinds of interventions will be discussed:[201]

1. CCT Programmes, where parents receive a monthly cash payment (or the equivalent in food) if their child attends school regularly.
2. Vouchers, which are certificates issued by the government, which parents can use for tuition at a private school. Though they do reduce the costs of education for households, they are mainly intended to improve quality of schooling by introducing competition between schools.
3. Scholarships, which will usually include support for tuition and other cost of schooling and may be conditional to a particular level of academic performance ('merit based').
4. In-kind contributions to school costs, e.g. uniforms.

Findings

Demand-side interventions that reduce costs of education, such as CCT, vouchers or in-kind contributions, impact on enrolment, especially where it is still low or when well-targeted. Combined with other incentives (e.g. merit-based scholarships) they can have an impact on learning as well. Careful design is required (e.g. addressing external effects and timing of transfers). Some studies observed external effects (of a positive and negative nature) on other children in the same class and on the household of the child benefiting from these intervention.

While the studies on CCT and vouchers have high internal validity through thorough randomized research design, they are specific to the Latin American context and care should be taken in generalizing from these. In addition the studies did not explore the effect of costs-sharing on preferences and behaviour of students and parents.

Conditional Cash Transfer Programmes

These programmes have been particularly popular in middle-income countries in Latin America.[202] There is sufficient evidence to conclude that CCT programmes have been effective in increasing enrolment and attendance.[203] As with all interventions based on incentives, design is crucial. For example, in Colombia when part of the CCT was saved to be transferred only when students prepare for enrolling in the next year, attendance as well as progression increased, despite lower monthly payments, even for children at risk of

[201] Interestingly, no literature has been identified with regard to the effectiveness of cost-sharing in education (comparable to the use of user fees in the health sector).

[202] Many of these programmes in Latin America (e.g. Colombia, Honduras, Jamaica, Mexico, and Nicaragua) have been subject tocareful randomized evaluation designs which make it possible to draw clear conclusions about their benefits.See, for example, literature review Damon & Glewwe (2007); Rawling and Rubio (2005), and Fernald, Gertler and Neufield (2009).

[203] However, qualitative studies have shown that schools and teachers are generally very reluctant to keep a tight control on school participation, because that would mean withholding much needed money from poor families.c.f. Barbosa & Lavinas (2000); Castro (1999); cited in Swartzman (2005).

dropping out.[204] However, the design of the CCT in Colombia did lead to negative external effects; in particular sisters of students who received support attended school less often than girls in families that received no support at all.

One of the most well-known CCT programmes is *Progresa/Oportunidades* in Mexico, which was the first programme of this kind, implemented since 1998. The programme provided monthly payments to the female head of the household for children (primary and lower secondary school age) from poor, rural families. The payments were estimated to increase household income by 20 – 30 %. The condition for the support was that the children attended school on 85% of school days, and also that parents participated in preventive health care lectures offered at clinics. Compared to the start of the programme, enrolment increased by 3.5 to 5.8 % points for boys (up from 73% to 79%) and 7.2 to 9.3 % points for girls (up from 67% to 73%).[205] A positive (peer) effect on ineligible children was observed, especially among poorer households.[206] Cumulatively, schooling of the children in the Progresa communities increased by 0.66 years, which is estimated to equal a wage increase of $ 66 per year (based on the assumption that each additional year of schooling increases wages by 10 %).[207]A subsequent evaluation also found a positive impact on child cognition and language and concluded that: '*access to increased financial resources might allow parents to provide an improved environment for their children (e.g., housing, electricity, gas stove, or telephone), or to purchase of goods that could directly affect child growth and development, such as animal-source foods*'.[208]

While they might have a poverty effect and impact on attendance, the evidence indicates that CCT programmes have limited effect on the quality of education. This might not come as a great surprise given the way in which they are designed (i.e. incentives for participation). On the other hand, one could expect children to learn more because they spend more time in school. This has been examined for a group of six CCT programmes from Bangladesh, Colombia, Honduras, Indonesia, Mexico, and Nicaragua.[209] The authors conclude '*that there is very limited support for the conclusion that CCTs are effective educational instruments, in particular with regard to their ability to increase learning*'.[210] Given the low quality of education in a lot of countries, students do not automatically improve their skills from additional years in school.

CCT programmes are, moreover, quite expensive. As a percentage of public expenditure on education, the costs range between 2.6% in Honduras, to over 10% in Nicaragua, with the other countries on average spending 7-9%.[211] It might then not be the most cost-effective intervention for raising enrolment, in particular when the aim is to improve learning, especially in countries with already relatively high enrolment rates as is the case in Latin

[204] Barrera-Osorio et al. (2011).
[205] Rawlings & Rubio (2005).
[206] Bobonis & Finan (2008), Cattaneo (2009).
[207] Schultz (2004).
[208] Fernald, Geutler & Neufield (2009), p. 2003.
[209] Reiners, DeShano da Silva and Trevino (2006).
[210] Ibid, p.11.
[211] Reiners, DeShano da Silva and Trevino (2006).

America. The programmes have also been criticised for constituting a means for national governments to create the impression that they are addressing education, while in fact they do not take on board the difficult educational reforms needed to address quality issues in education (such as those related to teacher selection, training, and promotion).[212]

School vouchers

The evidence of the effectiveness of school vouchers is mixed.[213] School vouchers (or capitation grants) are used to address both access and quality of education, in countries where private school provision is well developed and has excess capacity. Again, this applies mainly to middle-income countries, e.g. Latin America, South Africa or India, and for secondary rather than primary education.

Vouchers allow students to use government funds to pay for the cost of private schooling. The rationale for providing vouchers is that it should motivate competition among schools, which in turn is expected to impact on school quality. Moreover, excess capacity in the private sector can be used to supplement government schools in providing access to education. Yet there is no conclusive evidence of the impact of vouchers on learning results.

For example, in Colombia, providing a student from a poor neighbourhood with a voucher for secondary schooling cost the government $24 per year more than the cost of enrolling the student in a public school. While existing government supply was short, private schools could easily absorb extra students. The vouchers were found to have had an impact on performance, with students receiving vouchers performing higher on standardized tests (equivalent to an extra year of schooling) and being more likely to complete education.[214] However an evaluation of school vouchers in Chile, which are universal and where private schools can select students '*found no effect of vouchers on students' test scores, repetition rates and years of schooling. Indeed, the main effect of the program seems to have been to encourage the 'best' students in public schools to switch to private schools*'.[215]

Scholarships

Studies have found some support for the assertion that , compared to other measures (such as a textbook provision program, flip chart programs, and deworming programs), '*providing merit scholarship incentives is arguably the most cost-effective way to improve test scores*'.[216]

A scholarship programme in Indonesia, for example, targeted poor girls in secondary schools. The scholarships amounted to 7-18 % per capita household consumption. Pupils had full discretion on how to use the money. The main objective of the programme was to keep enrolments at pre- (economic) crisis levels, and analysis shows that this had clearly been achieved. Along the lines of what was found for some of the CCT programmes,

[212] Ibidem.
[213] Barrera-Osorio, Patrinos, and Wodon (2009).
[214] Angrist, Bettinger and Kremer (2005).
[215] Damon & Glewwe (2007), p.23.
[216] Kremer, Miguel & Thorton (2009), p. 28.

scholarships were found to relieve pressure on households' investments in education, and to reduce the use of child labour.[217]
In Kenya, scholarships were provided to girls who achieved good results on their academic exams at the end of 6th grade. Girls who received the scholarship made substantial gains in academic exam scores.[218] Girls with lower test scores also performed better in the schools that participated in the programme. And there was even a small, but statistically significant increase in the academic performance of boys, even though boys were not eligible for the scholarship. The authors note that: '*these positive externalities are likely to be due to higher teacher attendance or positive peer effects among students – or a combination of these reasons*'.[219] Teacher attendance improved in schools participating in the programme because the programme also included annual public awards for teachers, parents and local officials who had made a particular effort. This highlights the importance of combining interventions to maximize impact. However, the scholarships were provided in two different districts, whereby the effects were strong in one but much less significant in the other, confirming that the outcome of scholarships (and interventions in general) is context specific.

In-kind contributions: school uniforms

The distribution of school uniforms has been advocated for as another key cost-reducing mechanism, given that even when uniforms are not compulsory, pupils would rather wear them. Yet, there is relatively little research in this area; the literature review identified only one primary research study in this area for Kenya.

An NGO in Kenya used a lottery system to distribute school uniforms to children in impoverished areas. This reduced absenteeism by 44% for average students and by 62% for those students who previously did not own a school uniform (i.e. those that received a school uniform for the first time).[220] The authors of this study compared the cost of uniform provision with other interventions aimed at school participation, such as deworming. They found that the provision of uniforms is more expensive than deworming per year of schooling gained. However, when compared to interventions that constitute a transfer to households, such as CCT, the distribution of school uniforms is found to be cost-effective.

To conclude, the rationale behind all these demand-side interventions is that the direct and indirect costs of education may be an impediment to schooling. Therefore, for these interventions to be cost-effective, it is crucial that the subsidies go to children that would not have gone to school without them. Targeting, which is a challenge in itself, is thus essential.[221] Moreover, the way in which the cost-reduction is designed will also matter, e.g. including a savings component (as in Colombia), linking to achievements (merit scholar-

[217] Sparrow (2007).
[218] Kremer, Miguel & Thorton (2009) on the basis of a randomized evaluation (including a group of control schools)in two districts (Busia and Teso) in Kenya.
[219] Kremer, Miguel & Thorton (2009), p. 27.
[220] Evans, Kremer and Ngatia (2009).
[221] Hardly any of the evaluations have considered how targeted incentives affect others in community, family, schools etc. with regard to education performance (except Kremer, Miguel & Thorton (2009)) or otherwise (social relations).

ships), or increasing the subsidy for higher grades to compensate for increasing opportunity costs (as with *Progresa/Oportunidades*).

The deterring effect of costs of education, which lies at the basis of these interventions, has been challenged in the context of Latin America. An evaluation of the Brazilian Bolsa Escola CCT programme found that, despite being reasonably well targeted at low-income families, most of the stipends were given to families who would keep their children in school anyway. The author challenged the reasoning behind the CCT programme: 'Bolsa Escola is based on a wrong assumption, namely that the explanation for the lack of education of low-income children is that they do not go to school because they need to work'. The author notes that if poor children do not attend school this is often because of other factors such as school accessibility, school quality, learning difficulties, or because they 'get alienated and reach an age when they can already start working and are less dependent on their parent's control'.

However, evidence from low income countries such as Uganda, Zambia, Malawi and Tanzania, where enrolments exploded after school fees were abolished, convincingly points out that in most countries, the cost of education is a major barrier to access. Not denying though that even in those countries, the quality and relevance of education most probably will also play a role in parents and pupils' decisions on schooling. The cost of education is weighed against the expected benefits, in particular the opportunities for further education or access to the labour market.[222]

[222] The forthcoming study by IOB explores how in Uganda the lack of access to secondary education and limited opportunities for employment following primary education results in high dropout rates (IOB, forthcoming).

6 Beyond primary (basic) education

International programs like 'Education for All' (EFA) and the 'Millennium Development Goals' (MDGs) focus on primary education. This is motivated by the high returns to primary education in developing countries. However, as discussed before, private returns to education diminish once a country becomes more developed. One of the reasons for this trend is that more people have completed primary education. This also results in more demand for post-primary education, required to increase the returns to investments in education. These outcomes will, however, be conditional on the match between the skills developed through education and the demand for these skills from the labour market.

Post-primary education, such as basic TVET, is certainly important in this respect. However, it will undeniably always have to build on basic skills and knowledge (e.g. literacy) gained through basic education, starting with ECD. As such, any level of education has to be assessed within the full education continuum, ideally also including out-of-school acquisition of knowledge and skills.

Findings

Pre-primary education – or early childhood development – is found to promote cognitive development. This reduces the cost of primary education by preparing children for learning before they start school.

TVET can certainly enhance economic opportunities (for women as well as men) by equipping them with more skills and experience following primary school. However, most research focuses on higher TVET. Given the relatively high costs of TVET, there is not enough evidence that post-primary TVET in developing countries is cost-effective.

Early childhood development

Most evidence of the effectiveness of ECD originates from research in developed countries, because ECD is still the exception rather than the rule in developing countries.[223]

In the USA early childhood education is found to have a number of important educational benefits, such as prevention of developmental delay, improved school competence, reduction in grade repetition, and reduction in special education costs later on.[224] There are even social benefits, such as a reduction in crime.[225] These effects are particularly important for children from disadvantaged backgrounds.[226]

[223] The 2005 GMR on Quality highlights that: 'On average, a child in Africa can expect only 0.3 years of pre-primary schooling, compared to 1.6 years in Latin America and the Caribbean and 2.2 years in North America and Western Europe' (UNESCO (2005), p.21).

[224] Lazer et al. (1982); Currie (2001); Anderson et al. (2003); Heckman and Masterov (2007).

[225] Heckman and Masterov (2007).

[226] Currie (2001); Engle et al. (2007); Engle and Black (2008) (for US).

A review of evidence from developing countries mirrors many of the conclusions from developed countries: early childhood education leads to:[227]

- Improved school readiness, higher probability of on-time enrolment and better transition into primary education;
- Increased school survival through lower grade repetition and drop out, better performance, and a reduced need for special measures to support children lagging behind (e.g. remedial programmes);
- More beneficial employment, marital and fertility patterns in adulthood;
- Greater benefits for children from disadvantaged backgrounds.
- Impact on the parents of children who participate, by providing time for training or income generation activities, by improving their parenting skills and self-esteem, and by bringing about a bigger interest and commitment to their children's' education.

A recent review of ECD in low and middle income settings published in the Lancet sheds light on the benefits and the cost effectiveness of early child development interventions. The study finds that 'Effective investments in early child development have the potential to reduce inequalities perpetuated by poverty, poor nutrition, and restricted learning opportunities. A simulation model of the potential long-term economic effects of increasing preschool enrolment to 25% or 50% in every low-income and middle-income country showed a benefit-to-cost ratio ranging from 6.4 to 17.6, depending on preschool enrolment rate and discount rate'.[228]

However, ECD may be costly and a challenge to bring to scale. For example, to date early childhood education has not been well integrated in formal (primary) education system, which leads to inconsistence from a policy perspective.[229] In addition, it is difficult to come to a conclusion about the cost-effectiveness because little is known about the costs of ECD in developing countries and interventions have not followed a uniform design.[230] As a result, one reviewer of the literature in this area concluded that '*early childhood development programmes have been found to have a positive impact on cognitive development, but more evidence is needed, especially on cost-effectiveness*'.[231]

Technical and vocational education

Interestingly, despite the recent renewed attention to TVET, there is not much recent evidence of its effectiveness. Much of the literature is from the 1980s or older, which probably reflects the focus on basic and primary education in the last decades (including by the Netherlands). The most recent research covers developed and semi-industrialized countries and essentially compares the returns to different types of education (e.g. academic versus vocational) in terms of earnings.

[227] Hyde (2006).
[228] Engle et al. (2011).
[229] EdQual (2010).
[230] White (2009); Hyde (2006).
[231] White (2009).

For example, studies have found that in Britain the additional returns associated with an academic qualification are typically higher than those associated with vocational qualifications at the same level. However, when controlling for the time it takes to obtain the academic degree, the study found that returns to vocational education move closer to those that are obtained from higher education.[232] Moreover, for women the highest returns appear to be in teaching and nursing qualifications, already unduly female-dominated work areas.

Yet, this comparison between academic and vocational education is less relevant for developing countries where TVET is being introduced as alternative education at secondary level rather than tertiary. The evidence of the impact of vocational education at secondary level is mixed.

An older study on Surinam found that returns to general education exceed the returns to TVET. Moreover, '*female returns to the language track exceed those to the mathematics track from the social and private perspective, while for males, both social and private returns in the mathematics track exceed those in the language track*'.[233] Again this seems to indicate a reinforcement of existing differences in employment opportunities.

In Indonesia, where the government has invested significantly in expanding vocational education, students with the highest test scores are still more likely to choose general education than the vocational stream. In the earlier days, participating in vocational education gave men a 3 % point advantage in obtaining a formal job. However, this is no longer the case, leading the authors of this study to question the continued focus on vocational education.[234]

On the contrary, a study in Singapore found that the returns to vocational education are less affected by income than general education (where returns increase as one moves from lower to higher income, reflecting differences in economic opportunities). The study identified interesting gender differences, namely that '*the vocational education system in Singapore has served women with secondary vocational qualifications particularly well. They earn more, have higher labour force participation, experience higher employment rates and are associated with a narrower gender earnings gap compared with women with general education*'.[235] The authors conclude that the vocational system in Singapore has contributed to reducing overall earnings inequality.

A study of 16 East Asian and Latin American countries also finds that the returns to TVET exceed the returns to general secondary education.[236] However, the authors note that these are the (gross) private returns, which do not take into account the significant (public) costs of providing TVET.

[232] Dearden et al. (2002) using data from three large national data bases.

[233] Horowitz and Shenzler (1999) covered 70 % of the population to estimate private and social returns to technical, vocational and two tracks of general education (mathematics and language).

[234] Newhouse and Suryadarma (2009) examined the relationship between senior high school attendance and labour market outcomes, using longitudinal data from the Indonesia family life survey covering 14 years (1993-2007).

[235] Sakellariou (2003 and 2006) p.18.

[236] Patrinos, Ridao-Cano, and Sakellariou (2006).

7 Improving girls' education

The gender gap in enrolment in primary education is closing rapidly. However, there remain a number of challenges in particular regions. Moreover, while as many girls as boys are enrolling, fewer girls are competing primary education and transiting to secondary education and their performance lags behind boys.

Findings

In general, education interventions will impact on both girls and boys. However, some interventions, such as improving accessibility of schools, will have an even larger effect on girls. Targeted interventions, such as an increase in the share of female teachers, are found to enhance enrolment and performance of girls in school.

Even when not targeting girls explicitly, certain improvements in the school environment are found to benefit girls in particular, such as the number or qualifications of teachers (including the share of female teachers), and the availability of blackboards and textbooks school.[237] In the above mentioned study of rural villages in Pakistan, parents attributed importance to the school's quality (e.g. regular presence of teachers, infrastructure) when deciding to send their daughters to school.[238]

Girls' access to schooling depends on distance to school, costs of schooling and – to a more limited extent – quality of education.[239] The absence of a school nearby has a larger effect on girls' than boys' enrolment.[240] For example, in rural villages in Pakistan, girls' enrolment drops from 52% to 35% when there is no school in the village, while for boys there is no significant difference.[241] Investments that increase the availability of schools will have larger benefits for girls' enrolment.

There is also evidence that some demand-side policies, such as those that tackle school costs, will benefit girls more than boys.[242] For example, an evaluation of the national voucher system for private secondary schooling in Colombia found that while both boys

[237] Glick (2008).

[238] Lloyd, Mata & Sathar (2004).

[239] Glick (2008) reviewed the effects of policies that target gender gaps in education, based on a review of studies that used econometric surveys and randomized policy experiments.

[240] Glick (2008) cites studies from India (Sipahimalani (1999)), Ghana (Lavy (1996)), Senegal (Glick and Sahn (2005a)), Malaysia (DeTray (1988)), the Philippines (King and Lillard (1987)), and Pakistan (Hazarika (2001); Lloyd et al. (2005)).

[241] Lloyd, Mete, and Sathar (2005) developed a simulation model on the basis of data on child school history in a random sample of 12 rural communities in Pakistan in two major provinces, covering a total of 722 women, and 3657 children. The information was supplemented by visits to 38 local primary schools in the communities studied.

[242] e.g. Lloyd et al. (1998), cited in Glick (2008), and Lloyd, Mete & Sathar (2005) show good results, while Glick, Saha, & Younger (2004), cited in Glick (2008) show no impact for Uganda and Madagascar.

and girls with vouchers performed better, the effects on attainment and test scores were larger for girls.[243]

With regard to interventions specifically targeted at girls, there is ample evidence that the presence of female teachers increases the enrolment of girls and lowers drop-out rates.[244] A study using data on fifth grade students' achievement in French and Mathematics from Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar and Senegal found that '*On average, if the teacher is a man, the difference between the scores of girls and boys increases by 1.7 to 1.8 percentage points (i.e. 4% of average scores) in favour of the latter*'.[245]

A lot of attention has been given to the way in which inadequate menstrual care (e.g. sanitary pads) forms a barrier to schooling for girls. However, surprisingly there is very little research on the way in which this can be addressed. The literature review identified one study that reported no results from the distribution of sanitary cups to girls in Nepal. 246 The intervention studied sought to address absenteeism of girls because of menstruation, as girls were 3 % points less likely to attend schools during their periods. However, though the cups were found to be convenient (e.g. hygiene), there was no effect on school attendance, test scores, or self-reported self-esteem. This is an area, however, where further research is necessary.[247]

[243] Angrist et al. (2002). The Colombian programme provides vouchers to low income primary students based on a lottery system, with boys and girls being equally likely to receive the vouchers and thus provides a useful random sample for research purposes.

[244] Glick (2008).

[245] Michaelowa (2001) p.21.

[246] *'A menstrual cup is a small, silicone, bell-shaped device which is used internally during menstruation; the cup fills, and must be emptied and washed approximately every twelve hours. With proper care it is reusable for up to a decade.'* (Oster & Thorton (2009), p.3).

[247] Still unpublished, and thus not included in this literature review, is the research by Linda Scott and several others at Oxford University. They found that after providing free sanitary pads for six months, girls missed significantly less school and reported better concentration, higher confidence and more participation. These effects were particularly strong in a remote village.http://doublex.eyedivision.info/wp-content/uploads/2010/09/University-of-Oxford-Sanitary-Pad-Study1.pdf

8 Management and governance

Education inputs and policies do not operate in a vacuum. The reinforcing impact of different interventions depends on the management and governance of education, ranging from decentralisation of education sector management to school-level management and community and parental participation.

School-based management, school-based governance, school self-management and school-site management are all terms that refer to the trend of allowing schools more autonomy in decisions about their management, in particular in terms of how human, material and financial resources are used. In the case of School-Based Management (SBM), more responsibility is given to officials in the school, in the case of School-Based Governance (SBG) responsibility for the management of the school is transferred to parents and community members (often called 'participation').[248]

Findings

The area of school management and governance is found to be imperative for the success of any education intervention. It takes time for the impact of management and governance to become evident: '*There are few studies of these interventions, the evidence is mixed ... and evidence from the US shows that it takes at least five years for the beneficial effects of school management to be felt*'.[249] However, in recent years the evidence base has improved a lot and is now conclusive on the positive impact on learning of school-based management and participation. Information, e.g. school score cards, can further enhance the effectiveness of school-based governance and management.

School-based management: improving management at decentralized levels

A literature review conducted in 2004 on determinants of primary education effectiveness in developing countries concluded that: '*there is some evidence that more decentralization and school autonomy (school-based management) would be more effective than the currently inefficient bureaucratic structures*'.[250] In Bolivia and Colombia decentralisation was found to have increased investment in education, in particular in areas with higher need.[251]

At school level, the authority to hire and fire teachers and control budgets had been found to have positive effects on pupils' performance.[252] Analyses for Uganda and Zambia provide evidence that investment in school management is a cost-effective way to improve the quality of education. The quality of the head teacher is found to be a significant determinant of learning. This might also explain part of the relative success of private schools.

[248] De Grauwe (2004).
[249] White (2009), citing Borman et al. (2005).
[250] Boissiere (2004), p. 30; see overview by Galiana & Perez-Truglia (2011).
[251] Faguet & Sánchez (2006).
[252] Woessmann (2003) in a study in 39 countries; King & Ozler (2005) for Nicaragua.

However, having qualified head teachers is not enough.[253] Effective management also requires support structures for school-based management, such as district level management and external inspection.

Again in Uganda, an NGO and government joined forces in a project that focused on improving management at both school and district level through training of school management and teachers, improving inspection procedures, supporting district planning and management, providing budgetary support for equipment and development of information management systems. Schools in the project performed 45%-55% better than comparable schools and teacher and pupil attendance improved, in particular because of the training of district and school managers and regular monitoring and inspection.[254]

It has been noted that in many developing countries both decentralisation and school inspections are often politically sensitive and such reforms may be very difficult to implement.[255] However, other research suggests that in fact central decentralisation policies play a relatively minor role. The capacity to exercise autonomy – and the corresponding impact on school quality and performance - will be a function of parents' education, the strength of the community, and the capacity that is in place at decentralised level of government.[256]

School-based governance: community and parental participation

Interventions at school level (e.g. incentives for teachers, access for students with special needs) appear to work better when parents and communities are involved.[257] For example, even in a fragile society such as Afghanistan, village schools with strong community management have seen a positive impact on enrolment and test scores. Moreover, participation was found to be an effective way of addressing gender disparities.[258]

Interesting evidence from Zambia shows that community schools and government schools perform at practically the same level on government 9th grade exams, despite community school having fewer resources and being staffed with less qualified teachers compared to the government schools. The higher level of community and parents' involvement in school management has been put forward as one of the key explanations for this difference.[259]

However, for school-based governance to be effective, it is crucial that participation goes beyond mere involvement (e.g. provision of school meals, teacher assistance, maintenance etc.) and gives parents and communities the authority to play an active role in management of the school, e.g. in such key aspects as monitoring of teachers, input in school development planning, and decisions about resource allocations. This assumes sufficient empowerment

253 IOB (2008 Zambia); IOB (2008 Uganda).
254 IOB (2008 Uganda).
255 IOB (2008 Uganda).
256 E.g. Gunnarsson et al. (2004); Galiani et al. (2008).
257 However, there is also a lot of literature on the challenges of participation (e.g. elite capture).
258 Burde and Linden (2010).
259 Mulkeen (2010). Confirmed by IOB (2008 Zambia).

and a high capacity of parents and community (e.g. to assess teaching practices).[260] Access to information is another crucial input for effective participation.

Information

Both school-based management and governance are facilitated by access to information (e.g. about test scores, budgets, and related areas). For example, in Uganda, government initiated a newspaper campaign to provide information on the distribution of grants to schools. The campaign aimed to improve accountability and involve communities in the process. Research found that the campaign was very effective in ensuring resources reached schools. In turn, test scores of schools in districts that were included in the information campaign were roughly 6% higher than the Ugandan average. More effective management and participation, stimulated by the information campaign, were thought to have played a role in these improvements.[261] Several other studies have shown how access to information benefits the quality of education by improving monitoring and subsequently the performance of teachers (India, Liberia), strengthening village markets for education (Pakistan) and empowering school communities (Uganda).[262]

However, merely providing information is insufficient.[263] The usefulness and content of information has to be considered (e.g. the information needs to be unambiguous and comprehensible), as well as the way in which it is disseminated (e.g. with sufficient repetition, and as part of existing processes). Moreover, information is political: it can be captured and used strategically. This needs to be monitored. Finally, without the authority to act upon the information, i.e. a link with school-based governance, information will have little impact.

[260] Burns, Filmer, & Patrinos (2011).
[261] Reinikka & Svensson (2005); Michaelowa and Wechtler (2006).
[262] All cited in Burns, Filmer, & Patrinos (2011).
[263] Burns, Filmer, & Patrinos (2011).

9 Summary and conclusions

Over the past decades, research on the effectiveness of education interventions has moved from looking at the impact of personal variables such as socio-economic status and the role of traditional inputs (books, teachers, schools) to assessing a wider range of interventions such as incentives for teachers, cost-reducing measures for pupils, school management and community involvement. New techniques for statistical modelling have made it possible to take into account the influence of a large number of variables, and large comparable data sets, on access as well as quality, allow for cross country and within country comparisons. This process is ongoing. As a result, the literature review will never be complete, and needs frequent updating.

A number of promising avenues for enhancing access and improving education quality in developing countries emerge from research evidence. Table 1 below presents a summary of the main findings from the studies reviewed, and seeks to highlight where relatively firm conclusions can be drawn.[264]

However, these conclusions all carry certain reservations as many are context-specific and cannot easily be generalized to suit different contexts or larger scales. The ideal mix of education interventions is likely to vary from setting to setting. It will probably be determined by local context, local conditions, prior experience and the aspirations of parents, communities and government. This explains why research results are not always consistent.

Therefore, once the predominantly quantitative research has provided evidence of what works and what does not work, it is important to investigate '*why*?' Education interventions should not be assessed in isolation, but as a package, in sequencing also matters. This needs to be done using more qualitative research methods to bring to the surface the precise processes that lead to learning.

[264] The table follows the format and borrows from a similar table developed by Michaelowa & Wechtler (2006), and from the concluding comments by Riddell (2008), Boissiere (2004), and White (2009). The table deliberately does not provide estimates of (cost)-effectiveness as those are generally incomparable.

Table 1 What works?	
Policy measure	**Recommendations from literature**
1. Traditional inputs[265]	
Books and learning materials	• Textbooks are an effective input for student learning in developing countries • One book per pupil in core subjects, and no less than one book for every two pupils otherwise • Other teaching aids such as teacher manuals and wall charts are also useful inputs • The evidence for the usefulness of computers is mixed. Computers, where feasible, might enhance learning if they complement rather than substitute for teaching • Books and teaching aids have to be used effectively, after they have been distributed to pupils (with accompanying teacher manuals)
School infrastructure	• There is very limited evidence that expensive school infrastructure has a significant impact on performance • There is some evidence that a minimum standard for classrooms is important (for example, a roof). Given that infrastructure can easily become a high expenditure item, guaranteeing basic requirements for learning are met would be more cost-effective. • Insufficient evidence of the impact of water and sanitation facilities on girls' participation and performance
2. Teachers[266]	
Teachers	• Reducing pupil-teacher ratios brings only modest impact up to a threshold of about 50-60 pupils in primary education • Double shifts are found to reduce effective teaching time and do not lower costs (when shifts are done by different teachers) • Contract teachers can have a positive impact, but not always and the sustainability of this approach is doubted • Private tutoring has an impact on learning, but raises equity concerns given the cost
Teacher training	• Teacher training can improve performance of pupils • Quality of training for teachers, both at pre- and in-service level, is far more important than the number of years spent studying
Incentives for teachers	• In some cases, incentives and effective control (based on teacher inputs and test results) are found to have reduced absenteeism and improved students' performance • Community and parents' monitoring can be a useful addition to accountability mechanisms • Accommodation and improved access to schools is found to reduce absenteeism • The effectiveness of incentives is more evident in developing countries (where, amongst others, standard salaries are lower) • However, incentives should be designed carefully and closely monitored in order to avoid negative side-effects (such as concentration on final tests, better pupils)

[265] Barret et al. (2007); Barrow et al. (2009); Birdthistle et al. (2011); Boissière (2004); Duflo (2000); Glewwe & Jacoby (1994); IEG (2006); Linden & Barrera-Osorio (2009); Michaelowa & Wechtler (2006), as well as IOB (2008a) ; IOB (2008b) ; IOB (2011a) ; IOB (2011b).

[266] Atherton (2009); Banerjee and Duflo (2006); Barrett et al. (2007); Bennell & Akyeampon (2007); Bruns (2011); Cobbold (2006); Duflo and Ryan (2010); Glewwe, Ilias & Kremer (2003); Glewwe & Kremer (2005); Glewwe, Holla & Kremer (2008); Michaelowa (2001); Riddell (2006); Verspoor (2003); White (2009), as well as IOB (2008a); IOB (2008b); IOB (2011a); IOB (2011b).

Policy measure	Recommendations from literature	
3. Inputs for healthy learning[267]		
Nutrition, school meals, iron supplementation	• Effective in improving attendance and enrolment • Mixed evidence of impact on performance • May produce unexpected effects when school meals reduce class time • Full school meals are costly in terms of food and effort • Therefore, snacks of high nutritional value as an alternative to a full meal might be more useful	
Other health: Deworming	• Regular deworming improves attendance and performance for pupils at primary level • Only relevant in high prevalence areas	
4. Cost-reducing measures for pupils[268]		
Conditional cash transfer programmes	• There is evidence of impact on enrolment and on increasing years of schooling when targeted at pupils who are otherwise unlikely to enrol • The evidence on performance is inconclusive	• Experiments are mostly in Latin America (which has a relatively large private sector), so it may not be possible to replicate it elsewhere • Requires careful assessment against alternative use of resources for improving education access and quality, given considerable expense and lack of evidence of impact on performance • Requires careful design (for example timing and targeting of transfers)
School vouchers	• Only applicable where there is excess capacity in the private sector. • Though reducing costs, mainly intended to improve quality. Yet, limited evidence of effect on quality of increased choice • The evidence on attendance and performance is inconclusive.	
Scholarships and school fees	• Abolishment of school fees has large effect on school enrolment • Merit scholarships can improve attendance and learning outcomes • Has positive effects on peers • Has been combined effectively with rewards for teachers, parents and pupils • Again, careful design is required taking into consideration side effects and considering context as it may not be possible to replicate uniformly	
Financing school uniforms (where relevant)	• Found to be effective in reducing absenteeism, and improving performance • Only applicable in countries where school uniforms are required (social pressure can exist even if they are no longer obligatory)	
Other observations	• Cost-reducing interventions are generally effective in increasing demand for education in developing countries. • Additional targeting might be required for particular disadvantaged and excluded groups of children • (Perceived) quality and relevance of education also affect demand for education (see role information below) • Need to consider side effects, both positive and negative, on other pupils and children in the household	

[267] Bobonis et al. (2004); Boissière (2004); Cueto & Chinen (2008); Damon & Glewwe (2007); Michaelowa & Wechtler (2006); Miguel & Kremer (2004); Oster & Thornton (2009); Taras (2005); Vermeersch & Kremer (2004); White (2009).

[268] Angrist Bettinger, & Kremer (2005/6); Barrera-Osorio et al. (2011); Barrera-Osorio, Patrinos, and Wodon (Eds) (2009); Bobonis and Finan (2008); Cattaneo (2009); Damon & Glewwe (2007); Evans, Kremer & Ngatia (2009); Fernald, Gertler, & Neufeld (2009); Kattan (2006); Kremer, Miguel, & Thorton, (2004); Kremer, Miguel and Thorton (2009); Rawlings & Rubio (2005); Reiners et al. (2006); Schultz (2004); Schwartzman (2005); Sparrow (2007); White(2009). With regard to school fees and scholarships, see also IOB (2008a); IOB (2008b); IOB (2011a); IOB (2011b).

Policy measure	Recommendations from literature
5. Policy choices outside primary education[369]	
Early childhood development	• Highly effective in promoting cognitive development and school readiness • Improves performance in school at higher levels • Though costly, still more cost-effective than remedial programmes • Spin-off effects on health and parental involvement in schooling • Of particular benefit to pupils from disadvantaged backgrounds
Technical and vocational education	• In selected countries in East Asia and Latin America, vocational education can provide employment opportunities (but often at relatively high costs per student) • It has a mixed impact on gender differences in the labour market • There is limited evidence for other developing countries and an absence of research for early TVET compared to post-secondary TVET
6. Management and governance[270]	
Education management (e.g. decentralization, inspectorates)	• Effectiveness depends on capacity of sub-national government levels, schools, parents and communities. Improving capacity of district or municipal officers can improve school performances • Important to monitor equity implications arising from varying financial and institutional capacities • School inspections can reduce teacher absenteeism and improve performance of pupils
School-based management (head teachers)	• Enhanced school management (head teachers, directors) improves learning, for example by improving teacher attendance and teaching, and enhance the use of resources • Head teacher supervision, combined with inspections, can improve teaching processes
Parent and community participation	• Can affect pupil and teacher attendance • However, participation has to have clout, i.e. authority to act rather than merely being involved in school activities
Information (for example on school test results, budgets)	• Information has an impact on access to education and quality of education, through its use in management and governance (for example monitoring and signalling) • Information requires careful design (with regard to the content, use, avoidance of misuse and manipulation)
7. Interventions for girls[271]	
• General policies affecting distance to school, cost of education and quality of education improve girls' enrolment and performance • Specific gender policies that are effective include female teachers and incentives for households to enrol girls in school • Research has identified that inadequate menstrual care forms a barrier to schooling for girls. However, further research is needed to identify what interventions remove such barriers to girls' participation and performance (including provision of sanitary pads, single sex toilets). • Given that there is often a different effect of interventions for girls and boys, it is important to monitor the impact of education policies on both girls and boys	

[269] Anderson et al. (2003); Angrist et al. (2002); Currie (2001). Dearden et al. (2002); Edqual (2010). Engle et al. (2007); Engle et al. (2011); Engle and Black (2008) ; Glick (2008); Heckman and Masterov (2007); Horowitz & Schenzler (1999); Hyde (2006); Lazar et al. (1982); Lloyd, Mete & Sathar (2005); Michaelowa (2001); Newhouse & Suryadarma (2009); Patrinos, Ridao-Cano and Sakellariou (2006); Reinikka & Svensson (2005); Sakellariou (2003); Sakellariou (2006); UNESCO (2005); White (2009).

[270] Boissiere (2004); Bosu et al. (2010); Burns, Filmer, & Patrinos (2011); Burde & Linden (2010); De Grauwe (2004); Faguet and Sánchez (2006); Galiani et al. (2008); Galiana and Perez-Truglia (2011); Gunnarsson et al. (2004); King and Ozler (2005); IOB (2008a); IOB (2008b); Michaelowa & Wechtler (2006); Mulkeen (2010); Reinikka & Svensson (2005); Riddell (2008); White (2009); Woessman (2003) as well IOB (2008a); IOB (2008b); IOB (2011a); IOB (2011b).

[271] Angrist et al (2002); Glick (2008); Lloyd, Mete and Sathar (2005); Michaelowa (2001); IOB (2011a).

To sum up this wealth of information, supply-side interventions such as books, learning materials, classrooms and other infrastructure are considered rather cost-effective ways of improving learning in low-income countries where such inputs are still relatively scarce. Every child should have at least one book for key subjects at primary level. Without teachers, however, there will be no learning. Yet, in order for textbooks to be used and the contact between teachers and pupils to be productive, effective management of schools and of the education sector as a whole is required. When parents and communities become involved in schools, this also has a positive effect on the learning environment. In terms of the demand for education, cost reducing measures that target pupils and their households mostly address access to education rather than learning. Merit-based scholarships seem to be a more cost-effective demand-side intervention that does affect student performance, albeit with mixed evidence from different contexts.

All incentive schemes, such as vouchers but also schemes for teachers, require careful planning, particularly with regard to targeting and timing. It should also be kept in mind that targeted interventions can have side effects that may not be immediately obvious. For example, thought should be given to the potential effects of a scholarship on other children in the household and in the community. Also, teachers can easily improve student test scores if poor performing students do not participate in the tests. Therefore, some incentive schemes included both the number of students participating in the final tests and the test scores as indicators.

It is also important to monitor the effect of education interventions on girls compared to boys. Evidence suggests that girls also benefit from several interventions that target them explicitly, such as recruiting female teachers or offering stipends for girls' education. In the area of sanitary provisions (such as single sex toilets, sanitary pads), there is still limited evidence of effectiveness. This is surprising given that such measures are often included in strategies targeting girls because of evidence that this is a significant barrier to access for girls.

However, when allocating resources, policy makers do not base their decisions solely on whether an education programme is efficient and cost effective. Certainly, these are important, but there are many other factors that are considered. Feasibility, including political feasibility, matters, as well as the internal politics of the education sector. For example, in many countries, teachers' unions play an important role in determining what education reforms are feasible, and not only with regard to teacher incentives. Issues such as, for example, the decentralization of the education system and the feasibility of school inspections are often politically sensitive. It has also been argued that it is actually not the economic rationale that drives states to provide education, but the importance the state attaches to socialization and the 'inculcation of beliefs'.[272]

[272] Pritchett (2008).

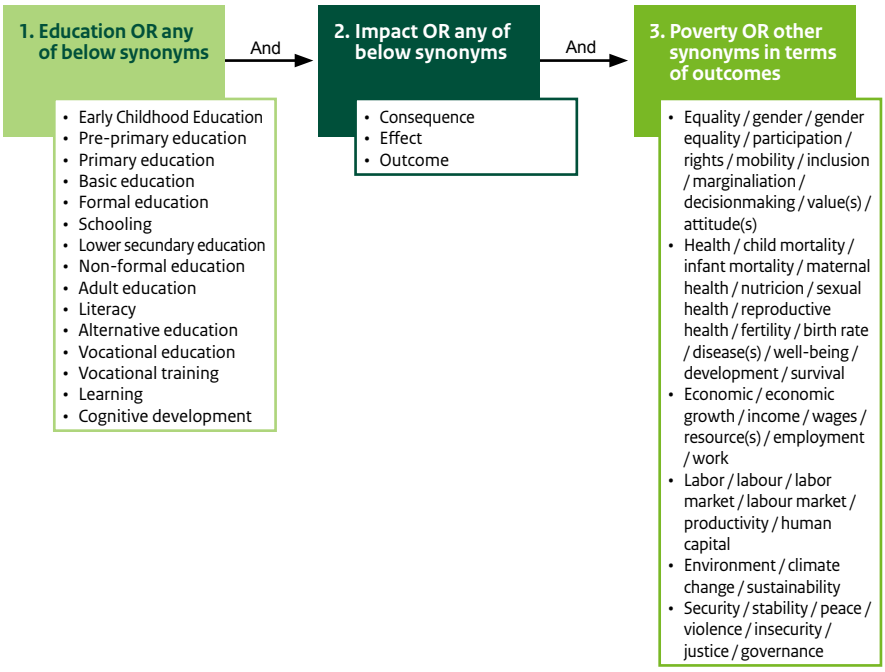
Annexes

Annex 1 Methodology literature review

This literature review is conducted according to a rigorous, transparent and replicable methodology. It covers published peer reviewed research as well as grey literature published by reputable sources, and includes articles reporting impact evaluations, literature reviews and meta-analyses, and studies of (cost)-effectiveness and cost-benefit. Qualitative and quantitative studies, as well as mixed studies, were included, though the majority of identified articles are based on quantitative research. However, rigorous impact evaluations are the exception rather than the norm. The study covers the period 2005 through 2011. Some earlier articles – dating back to the 1980's and 1990's were included in view of their significance for this study.

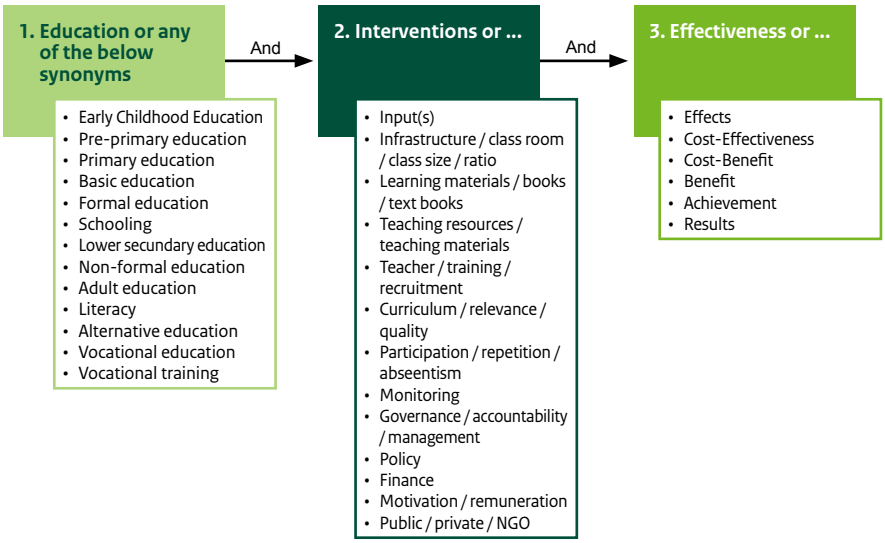
So-called tailored Boolean searches were carried out to identify relevant studies both sections separately, using the search terms specified in the diagrams below.[273]

Figure 7 *Key words and search terms for Education – Poverty studies*



[273] Boolean searching uses symbolic logic by employing terms such as AND, NOT and OR. It makes for more effective searches and will cut out unrelated documents

Figure 8 *Key words and search terms for effectiveness studies*



Online databases were the primary source of literature reviewed for this study. A systematic search was conducted of websites and sources. Main sources were on-line libraries and search engines, sources aggregating academic research (Google Scholar, ERIC); databases of published journals; on-line websites, and databases of reputable organizations (e.g. UNESCO, World Bank, etc.).

On line libraries:	ERIC – Education Resources Information Centre, Ingenta Online, JSTOR, Picarta, Google Scholar, ProQuest Education Journals, PsycINFO, Social Sciences Citation Index, Sociological Research Online, Wilson Education Abstracts
Grey literature	ADEA – Association for the Development of Education in Africa, EDQUAL – DfID funded research consortium, GMR - Global Monitoring Reports including background documents, IIEP – International Institute for Education Planning, OECD – Organization for Economic Cooperation and Development, including the DAC Evaluation Resource Centre (DERec), PAL - Poverty Action Lab, Massachusetts Institute of Technology, RECOUP - Research Consortium on Educational Outcomes and Poverty, SACMEQ – Southern and Eastern Africa Consortium for Monitoring Educational Quality, PASEC – Programme d'Analyse des Systèmes Educatifs de la CONFEMEN (Conférence des Ministres de L'éducation Nationale), UNDP – United Nations Development Programme, UNESCO – United Nations Educational and Scientific Organization, UNICEF – United Nations Children's Fund, WHO - World Health Organization, WB - World Bank
Journals	African Development Review, American Economic Review, American Journal of Sociology, Comparative Education, Comparative Education Review, Compare, Development in Practice, Economic of Education Review, Education Economics, Educational Evaluation and Policy Analysis, Health Education Research, Health Policy and Planning, International Family Planning Perspectives, International Journal for Quality in Health Care, International Journal of Educational Development, International Journal of Qualitative Studies in Education, Journal of Development Economics, Journal of Development Studies, Journal of Economic Literature, Journal of Educational Psychology, Journal of Health, Population and Nutrition, Journal of Public Economics, Quarterly Journal of Economics, Review of Educational Research Studies in Educational Evaluation, Studies in Family Planning, The Lancet, World Bank Economic Review, World Development

The search strategy followed the following steps:

1. A first selection of studies and reports using the pre-defined search terms. The initial search for relevance of inclusion was done on article titles and abstracts.
2. Careful evaluation of the outcome of the search strategy and refinement of the search strategy (key words, definition of themes, sources, full articles rather than abstracts)
3. Further identification of studies and reports following from the refined search strategy which included adjustments to the key words and sources. References cited by retrieved research papers were included in this phase.
4. Assessment and scoring of the identified studies and reports using assessment criteria and an assessment table developed for this study.

In the first stage, articles were eliminated if they:

- Were obviously not relevant to the focus of the inquiry
- Concerned an opinion piece not reporting any empirical research or containing no substantial review of the literature
- Were published before 2005, or referred to data from before 2000 (this was flexibly applied depending on the importance of the article and the amount of information collected in that area)

- Only described the development, content or theoretical background to the issue as opposed to reporting original research
- Did not give any indication of sample size or the methodology was obviously weak

After this first round, all remaining articles were assessed on relevance, focus, methodology and quality of analysis (table 2).The methodology was weighed double because of its importance for the reliability of the research results. Studies could receive a minimum of 0 and a maximum of 10 points (ranging from 0-2 points for very weak to 9-10 for strong across all areas). Only studies marked 6 points and above were retained for the detailed review.

Table 2 Assessment of studies		
Dimensions of the study	**Assessment guideline**	**Key issues to assess**
Relevance and type of study (maximum 2 points)	Exclude if not in line with key areas of inquiry Exclude if concerns an opinion piece not reporting any empirical research or containing no substantial review of the literature	Relevance to key areas of inquiry • Geographical focus • Level/area of education • Countries prioritized by the study
Focus (maximum 2 points)	*Insufficient/basic:* Not enough information to make judgment (0 points) *Satisfactory:* Information on key aspects but no great depth (1 point) *Comprehensive:* In-depth discussion, clear aims and outcomes (2 points)	Primary research: • Clarity of research questions • Previous studies/theory discussion • Population studied • Intervention that is being studied or situation being observed • Outcomes considered Secondary research provides adequate information on: • The purpose of the review and/or rationale of the study • Research question • Previous data or theory on study population, context or issue of study

Dimensions of the study	Assessment guideline	Key issues to assess
Methods (maximum 4 points)	Will distinguish between explanation of methodology and the tools used (with 2 points for each). *For methodology (max 2 points) the following applies:* *Insufficient/basic:* not enough information, rudimentary or partial presentation (0 points) *Satisfactory*: information about methods of study supplied (largely descriptive) (1 point) *Comprehensive:* in depth discussion of rationale for and limitations of methodology (2 points). *For choice and suitability of tools (2 points max)* *Insufficient/basic:* Sampling not purposeful or of adequate size, approach not suited to question, some tools employed but with no sophistication. For secondary research: choice and range of materials inadequate or not systematically assessed (0 points) *Satisfactory*: approach suited to question, most key elements considered (1 point) *Comprehensive*: tools employed cover all key elements and show sensitivity to the context (2 points). For secondary research: rationale for choice of tools, attention to validity and reliability, limitations considered (2 points)	Primary research: • Design (experimental, quasi-experimental, etc.) • Research tools appropriate to questions being asked • Adequate sampling, purposeful sampling, adequate sample size • Triangulation for qualitative studies • Control group if large n, Response rate and/or participation • Measures in place to reduce bias • Gender issues considered Secondary research: • Search of review materials was taken from multiple sources • Specified inclusion and exclusion criteria to reduce biased sampling • Methodology was carried out systematically • Included published and unpublished literature • Covers a comprehensive collection of materials relevant to the research area.

Dimensions of the study	Assessment guideline	Key issues to assess
Analysis (maximum of 2 points)	*Insufficient/basic:* Not enough information to make judgment – only results no or very basic analysis, no or insufficient linking to key questions (0 points) *Satisfactory:* Information on key aspects but no great depth – satisfactory but may not take account or control for external factors (1 point) *Comprehensive:* thorough reporting of results, disaggregated and analysed by range of factors, employing measures to account for bias (2 points)	• Appropriate use of qualitative/quantitative analytical tools for data analysis • Thorough reporting of key findings • Gender issues considered
Conclusion and discussion (maximum of 2 points)	*Insufficient/basic:* Not enough information to make judgment or basic conclusions based on evidence but little consideration of implications and limitations (0 points) *Satisfactory:* Key conclusions, implications and limitations discussed (1 point) *Comprehensive:* In-depth discussion which cover all elements and show sensitivity to context. (2 points)	• Sufficient evidence to justify relationship between evidence and conclusion • Discussion of study implications • Discussion of methodological limitations • Identified areas of future research • Gender issues included

In addition to this extensive search, a process of snowballing was used where additional in-text references of relevance were identified and included in the assessment process, if they had not already been identified during the initial search process. These additional articles were retrospectively scored and included in literature review if they had a sufficiently high score. All papers were stored in a database and in the writing process both the abstract and the full text of the articles were reviewed.

The methodology for this literature review drew on a tested approach used in two other studies, namely the evidence of quality review by the Quality Assurance Project the United States Agency for International Development (USAID) (Quality Insurance Project et al., 2008) and a study by the UNAIDS Inter-Agency Task Team (IATT) on Education which examined the quality of published evidence on the impact of education on HIV and AIDS (O'Meara & Samuels, 2009). This methodology fulfils all requirements for systematic reviews according to the Campbell collaboration (use of protocol, clear inclusion/exclusion criteria; explicit search strategy including unpublished reports; systematic analysis), except that the selection has not been undertaken by at least two reviewers and it has not been submitted to peer review.[274]

Almost 220 articles (170 on poverty impact and 48 on effectiveness) were obtained through the initial search process. A total of 108 articles (72 on poverty impact and 36 on effectiveness) were retained against the knock off criteria and submitted to the assessment process. With additions from the snowballing process, a total of around 170 articles (about 100 on poverty impact and 70 on effectiveness) were used for the actual literature review.

[274] http://www.campbellcollaboration.org/what_is_a_systematic_review/index.php

Annex 2 Bibliography

1 Introduction

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Section I

1 Linking education to development

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Section II: What works?

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This systematic literature review was conducted as part of a broader policy review of the Dutch support to basic education in the past ten years, titled 'Education matters'. The report consists of two parts. The first assesses the evidence on the impact of education on poverty reduction, which formed the justification for the investments made by the Dutch government in basic education. The second part reviews the literature on the effectiveness of key education interventions, which were often included in the basic education sector strategies supported by the Netherlands.

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