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About this systematic review summary report

3ie systematic review summary reports distil key analyses and present the findings and recommendations of a full systematic review for policymakers and programme managers. *The impact of education programmes on learning and school participation in low- and middle-income countries* is based on a full review, *Interventions for improving learning outcomes and access to education in low- and middle-income countries: a systematic review*, which is available on the 3ie website. The summary report was peer-reviewed internally and by members of the expert advisory group convened for the full review.

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The impact of education programmes on learning and school participation in low- and middle-income countries

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Foreword

Across the world, governments are increasingly aware that improving access to schooling does not assure student learning. Student attendance and numbers of teachers on the job are important indicators of a functional education system. But these do not automatically imply that the imparted learning is effective or, more importantly, that the student is achieving a rewarding life experience.

Global monitoring reports show that education reforms in several countries face multiple and complex challenges that require long-term vision, political will and ability to innovate, and the financial resources to support the implementation of effective education policies.

At a time when resources are scarce and needs are large, it is critical that policymakers have quick and easy access to evidence on the impact of policies and programmes designed to improve education outcomes. To make the case for the use of public money for education reforms and for scaling up the right interventions, we clearly need high-quality evidence to support the decision-making process.

In this context, I welcome this comprehensive systematic review summary report on the impact of education programmes on learning and school participation. In the past few years, there have been several attempts at such reviews. This one stands out because of the range and total number of programmes it covers. It includes studies assessing the impact of 216 programmes implemented across 52 low- and middle-income countries. And it moves beyond examining whether a programme works or doesn't work. By examining the multiple factors that influence the effectiveness of education programmes and by getting into the black box of programme operations, it offers many valuable lessons for all those who are working in the education sector across the world.

Having access to evidence on how education policies can be made to work better is critical evidence for a host of government actors. The Ministry of Education in Peru strongly believes in using evidence for informing its policies. We now have an innovation lab for piloting and evaluating new interventions, using both impact and process evaluations – an important step towards institutionalising the culture of using evidence for informing education policies. Improving education quality is a high priority in Peru, with particular importance given to the curriculum and on teachers' training. Extending the school day, using text messages to disseminate information about the provision of bilingual education, and offering merit-based incentives to teachers are just some of the many policies that are currently being implemented and concurrently being evaluated.

From the perspective of a country like Peru, which has a huge challenge of making education a real pathway for prosperity for all its citizens, 3ie's systematic review and its summary report offers critical insights on the effectiveness of structured pedagogic programmes, additional instructional time, remedial education and community engagement. I am sure it will be extremely useful for all government actors, researchers and programme implementers throughout the world.

Jaime Saavedra

Minister of Education, Peru

Summary

Introduction

Education is a fundamental human right that is critical to people's well-being. The United Nations' Sustainable Development Goal (SDG) for education emphasises the importance of equitable access to quality education for improving people's lives and for the sustainable development of countries. Although significant progress has been made in improving children's access to education in low- and middle-income countries (L&MICs), around 263 million children and youth were still out of school at the end of 2014. This included 61 million children of primary school age (6–11 years), 60 million young adolescents of lower secondary school age (12–14 years) and 142 million youth of upper secondary school age (15–17 years) (UIS & GEM 2016). In L&MICs where access to education has improved, this has not necessarily led to improved learning. According to the *Education for all global monitoring report* (UNESCO 2014), approximately 250 million children in L&MICs cannot read, write or do basic maths. This number includes more than 130 million children who have not acquired these basic skills, despite being enrolled in primary school.

To achieve the ambitious SDG education targets by 2030, the UN Educational Scientific and Cultural Organization (UNESCO) has estimated that more than double the current levels of spending (on a per primary school student basis) would be required in low-income countries. The shortfall in funding for universal and good-quality pre-primary, primary and secondary education in L&MICs has been estimated to be US\$39 billion per year (UNESCO 2015). Funding for education is constrained, so funds should be spent on programmes that are most likely to improve outcomes. This systematic review provides decision-makers with evidence on the effects of a range of education interventions in L&MICs. We analyse the effectiveness of these interventions in improving children's enrolment, attendance, completion and learning outcomes in primary and secondary school.

Results

We synthesised evidence from 216 programmes reaching 16 million children across 52 L&MICs. The results demonstrate there are no 'magic bullets' to ensure high-quality education for all, but there are lessons to be learned for improving future education programmes.

Children and households

A range of different programmes address barriers and constraints to school participation and learning faced by children and households. These programmes typically aim to address the constraints that children face due to poor health and malnutrition, by providing material incentives for schooling for children and/or parents or by reducing the cost of schooling. Some programmes are designed to address multiple barriers to education, such as school-feeding, which aim to both improve nutrition and reduce the cost of schooling.

The results, based on evidence from 107 studies, show that programmes that address child and household constraints to children's education may be particularly effective at improving participation outcomes. Cash transfers are most effective in improving school participation, while merit-based scholarships have been more successful in improving learning outcomes. School-feeding is a promising intervention for improving both school participation and test scores. Despite being widely implemented, the effects of providing information to children and/or parents, reducing user fees and school-based health programmes are not clear because few studies have been conducted.

Schools and teachers

Programmes that address the constraints schools and teachers face when attempting to improve the classroom environment are particularly important for improving learning outcomes. Such programmes typically focus on improving the effectiveness of lessons directly, by changing the curriculum and how it is delivered, providing additional materials, introducing new technology and/or by improving the quantity and quality of teachers through incentives, training or changes in hiring practices. Several programmes include a combination of different components.



Evidence from 61 programmes addressing constraints at the school and teacher levels shows that such programmes can improve children's learning outcomes. Programmes using structured pedagogy to change the classroom environment had the largest and most consistent positive effects on learning of any programme included in the review. Remedial education, additional instructional time and construction of new schools are also promising for improving learning outcomes, but more research is needed to assess these interventions. Providing education-related 'hardware', such as materials and technology, may be necessary but not always sufficient for improving learning outcomes. Such programmes are not effective if they are poorly designed or implemented. Despite the popularity of teacher-focused interventions, we find limited evidence on intervention effects, and are unable to draw any strong conclusions about the effects of specific programmes. However, teacher incentives appear to have small effects on some aspects of teachers' behaviour and children's learning outcomes.

Systems

There is an increasing focus on systems interventions that aim to improve education outcomes by changing the education system at the community, local, provincial or national level. Such programmes aim to improve the way schools are run by changing the governance and financing of education. We synthesised the evidence from 37 studies assessing the effects of three such commonly implemented programmes: community-based monitoring interventions; school-based management interventions; and public-private partnerships.

The evidence suggests public-private partnerships (low-cost private schools) and community-based monitoring may improve school participation outcomes in some contexts, with community-based monitoring also improving learning in some contexts. The results for school-based management are less encouraging, with small overall effects, and zero or small negative effects in some cases.

Conclusions

The results from this systematic review provide several important findings to inform future programmes. Firstly, these results demonstrate that programmes can improve school participation and learning outcomes in L&MICs. Secondly, looking across more than 20 different types of intervention we find that, with a few exceptions, programmes typically improve either school participation or learning outcomes, but not both. The exceptions are community-based monitoring, school-feeding and multi-component interventions. The evidence suggests these interventions have improved both school participation and learning outcomes in some contexts, although more evidence is needed to confirm this finding. Thirdly, some programmes are more effective than others. There is fairly strong and consistent evidence that cash transfer programmes have relatively large positive effects on school participation outcomes, while structured pedagogy programmes have the largest and most consistent positive effects on learning outcomes. A range of other interventions have also improved outcomes substantially in some contexts and are considered promising.

Fourthly, children face multiple barriers to school participation and learning. It is therefore not surprising that we observe effects of a relatively small magnitude or improvements in a limited set of outcomes for many interventions that address only one type of barrier. New programmes may be more effective if the design is informed by an analysis of the main barriers to improved outcomes in a particular context, including the capacity of other parts of the school system closely linked to an intervention. Such analysis will allow new programmes to target the main constraints and therefore achieve better outcomes.

In some contexts, strategies addressing multiple constraints may be necessary to achieve larger overall effects across multiple outcomes. The most appropriate strategy, or set of education strategies, would depend on which constraints are most pressing in a particular context. In contexts with weak education systems and low levels of human capital, it may be necessary to intervene across more than one sphere to improve the chances of seeing substantial improvements in one or more outcomes.

For example, cash transfer programmes are likely to reduce the cost of schooling and improve children's participation. But if the existing curriculum content, materials and available teachers are not of sufficient quality, the programme will not improve learning outcomes. To also improve learning outcomes, it may therefore be necessary to adopt interventions that address learning more directly.

Finally, there are key gaps in the current evidence base. Studies are unevenly spread across interventions and countries. In particular, there are few studies of programmes that target teachers. Studies of promising programmes will help reach more certain conclusions. While the included studies use rigorous designs to assess the effects of interventions, there is a lack of data on how programmes affect different sub-populations, as well as studies of process, implementation and costs. Future mixed-method impact evaluation studies can help address this evidence gap.

As national governments work on strategies for meeting the ambitious SDGs and targets by 2030, we call for increased use of evidence when deciding on education investments. To ensure inclusive and equitable access to quality education for all, we need to work both on generating and using more and better evidence. And the time to act is now.



Education is a fundamental human right that is critical to people's well-being. The United Nations' Sustainable Development Goal (SDG) for education emphasises the importance of equitable access to quality education for improving people's lives and sustainable development. Research clearly illustrates the importance of education in different spheres of life. Individuals with high levels of education are more likely to be employed, earn a higher income, overcome economic shocks and maintain healthier families (World Bank 2011). Education also contributes to health equity; it is closely linked to people's access to, experiences of and benefits from healthcare (CSDH 2008). Countries with good education systems do better on indicators of human development such as health status, maternal and infant mortality, lower population growth and reduced crime (Hannum & Buchmann 2003; Hillman & Jenkner 2004; Glewwe 2013).

Governments in low- and middle-income countries (L&MICs) have made significant progress in improving access to education, but challenges still remain. The net enrolment rate for children of primary school age increased from 80 to 91 per cent between 1990 and 2015 (UN 2015). However, improvements in enrolment rates slowed down considerably after 2004. Around 263 million children and youth are still out of school. This number included 61 million children of primary school age (6–11 years), 60 million young adolescents of lower secondary school age (12–14 years) and 142 million youth of upper secondary school age (15–17 years) for the school year ending in 2014 (UIS & GEM 2016). In terms of completion, as of 2008, only two thirds of adolescents in L&MICs finished lower secondary school, a figure that falls to just one third in low-income countries (UNESCO 2015).

Improvements have been uneven among regions and different populations. For example, more than half of the children of primary school age who remain out of school (39.1 million) are in Sub-Saharan Africa (UNESCO 2014). Moreover, girls are still more likely than boys to miss out on schooling. Girls' participation rates remain lower than those of boys in 53 developing countries, with gender disparities particularly pronounced in West Asia and Sub-Saharan Africa (UN 2015). Children from poorer families are also more likely to miss out on education: the probability that children from the poorest quintile of households in L&MICs would not complete primary school in 2010 was more than five times higher than the corresponding probability of children from the richest quintile not doing so (UNESCO 2015). Disparities in access to education are also variable across age groups in different regions. In South Asia and Sub-Saharan Africa, at least half of all youth are not in school. In South Asia, in particular, youth of upper secondary school age are eight times as likely not to be in school as children of primary age (UIS & GEM 2016).

1.1 Improved access has not led to improved learning

Unfortunately, improved access to education has failed to translate into increased learning in many L&MICs, where studies consistently find low levels of learning outcomes among school children (Pritchett 2013; Robinson 2011; UNESCO 2015). According to the *Education for all global monitoring report* (UNESCO 2014), approximately 250 million children in L&MICs cannot read, write or do basic maths. This number includes more than 130 million children who, despite being enrolled in primary school, have not acquired these basic skills.

These challenges shifted the focus of education policies of major development agencies, such as the UK Department for International Development and the World Bank (World Bank 2011; DFID 2013). Initiatives that traditionally concentrated on improving school access are now increasingly focused on improving learning for all children (Pritchett 2013; Robinson 2011) and on targeting hard-to-reach children.

The change in focus is also reflected in the UN's development goals. Millennium Development Goal 2 was to achieve universal primary education, but SDG 4 on education emphasises the improvement of learning outcomes, skills development and ensuring equal access across sexes and vulnerable populations (UN 2015).

To achieve the ambitious SDG education targets by 2030, UNESCO has estimated that the spending per primary school student in low-income countries would need to more than double. Domestic financing for education has been strong (accounting for 86 per cent of education spending in L&MICs) but the shortfall in funding for universal and good-quality pre-primary, primary and secondary education in low- and lower middle-income countries has been estimated to be US\$39 billion per year (UNESCO 2015).

1.2 Education aid is declining

It is particularly worrisome that aid for education is declining. According to estimates made by the Global Partnership for Education, based on the Organisation for Economic Co-operation and Development's (OECD) Development Assistance Committee data, aid for basic education fell by almost eight per cent between 2010 and 2013 (GPE 2016). Achieving the ambitious SDG targets will require more investment in education programmes that work.

1.3 Getting evidence to inform more education investments

To make the case for more funding and ensure existing resources are used as efficiently and effectively as possible, we urgently need high-quality evidence on the effectiveness of education interventions. Systematic reviews provide one such source of evidence. They use transparent and systematic methods to identify, appraise and synthesise evidence from all relevant studies, to identify both generalisable and context-specific findings. In doing so they aim to provide decision-makers with unbiased, high-quality evidence to inform decisions.

1.4 About this summary report

This report summarises the findings of a 3ie in-house systematic review (Snilstveit et al. 2015)¹ that we conducted using the Campbell and Cochrane Collaborations' handbooks (Shadish & Myers 2004; Hammerstrøm, Wade & Klint Jørgensen 2010; Higgins & Green 2011; Campbell Collaboration 2015). This summary report is written primarily for policymakers and programme managers to inform their decisions about policies, programmes and further research.

The review being summarised focused on assessing the evidence on the effects of a broad range of different education interventions on the enrolment, attendance, completion and learning outcomes of children in primary and secondary school in L&MICs. It included evidence from impact evaluations to synthesise evidence on effects, as well as from other qualitative and quantitative studies to address the questions relating to process, implementation and context.

The aim of this comprehensive and systematic approach was to move beyond just assessing *what works* and *what doesn't* in improving education effectiveness. By exploring evidence on process, implementation and context, the review also addressed why programmes succeed or fail and for whom. It is the most comprehensive systematic review of education programmes conducted to date, addressing the following questions:

- What are the effects of different education interventions on enrolment, attendance, drop-out rates, completion and learning outcomes for primary and secondary school aged children in L&MICs?
- Do the effects differ among sub-populations (due to sex, age or socio-economic determinants)?
- What intervention designs and implementation features are associated with the relative success or failure of programmes in improving educational outcomes?
- What are the contextual barriers to and facilitators of the effectiveness of educational interventions?

In the following sections, we first describe how we conducted the review and outline the conceptual framework informing the review and the characteristics of the evidence base. In chapters 4 through 6, we discuss the findings from studies of the effects of a broad range of education programmes, organised according to the main settings where they are implemented: households and children, schools and teachers, and systems. Chapter 7 provides a summary of results across the review and outlines implications for policy, programming, practice and research.

This summary report is written primarily for policymakers and programme managers to inform their decisions about policies, programmes, practice and further research.

2.1 Reporting and interpreting results in this summary report

Most results presented in this report are based on meta-analyses of standardised mean differences (SMDs; Cohen's *d*) calculated using data from the included studies. Converting effect estimates into this common metric is the only way we can make comparisons across the broad range of measures and scales used by different researchers to measure similar outcomes. While interpreting the magnitude of effect sizes, we use the term 'small' to describe overall effects that are close to zero. However, when an effect is described as relatively large, this should be interpreted in the context of the effects observed for other programmes in the review.²

Box 1: Categories for reporting on the results of this summary

What works in most contexts?

More than six studies, with the average effective size relatively large in magnitude.

What is promising (may work in some contexts)?

- a) Few studies (2–4), with the average effect size relatively large in magnitude
- b) More studies (4–10), with the overall effect size relatively large in magnitude, but with some imprecision.

What doesn't always work?

More than six studies, with the average effect size suggesting small or negative effects, with evidence of negative effects in some contexts.

What is unknown?

- a) Two studies or fewer available
- b) Few studies (2–4) with average effect small in magnitude, but with a large amount of variation.

The categories in Box 1 below provide the framework we used for interpreting and presenting the results of the systematic review. They are adapted from Sherman *et al.* (2002) and are based on a combination of the number of impact evaluations, the magnitude of the overall effect and precision (confidence) of the estimates. Using this framework provides a basis for presenting and interpreting the results of the analyses in a consistent way throughout the report.

2.2 How is this review different from other systematic reviews on education?

Over the last decade, several authors have reviewed the education literature with the aim of synthesising the evidence on the effects of education interventions (for example Petrosino *et al.* 2012; Baird *et al.* 2013; Morgan, Petrosino & Fronius 2013; Glewwe *et al.* 2011; McEwan 2015; Glewwe & Muralidharan 2015; Masino & Niño-Zarazúa 2015). A recent 3ie evidence gap map identified 21 systematic reviews of interventions for improving primary and secondary education outcomes in L&MICs (Snilstveit *et al.* 2015a). While the evidence gap map shows that there are a number of well-conducted systematic reviews in the sector, it also highlights that many of the existing systematic reviews suffer from limitations related to scope and/or method.

Many of the reviews focus on selected education interventions, or review only restricted outcomes. For example, some only assess the effects of programmes on enrolment, attendance and completion, while others examine only learning outcomes. Some reviews focus on studies with specified research designs (such as randomised controlled trials, RCTs), which limits the number of included studies. Finally, the majority of existing systematic reviews do not use statistical meta-analysis to synthesise findings. Other synthesis methods, such as vote counting, rely on counting the statistical significance and direction of effects based on estimates reported in individual studies, without taking the size of the effect into account. Meta-analysis is a systematic and transparent approach to the statistical synthesis of standardised estimates from individual studies to estimate an overall average effect across a number of similar studies (Borenstein *et al.* 2009). It increases the statistical power of the analysis and allows the analyst to identify findings that are both generalisable and context specific.

The review on which this report is based attempts to address these limitations and does not draw on the analyses done in the other systematic reviews. However, studies included in these reviews that met our selection criteria were included in our review. The review includes studies of a wide range of education interventions that were selected based on predetermined selection criteria (see Snilstveit *et al.* 2015 for detailed outline of inclusion criteria).³ We included impact evaluations that used experimental and quasi-experimental methods to examine the impact of programmes on several education-related outcomes: enrolment, attendance, drop out, completion and learning (see Box 2 for definitions).

Box 2: Definition of outcomes

Primary outcomes

Enrolment

Students registered for education at the start of primary and/or secondary education or a given grade year.

Attendance

Whether the child of a given school age was reported attending school over a time interval (last day, month or year). Drop out: child who enrolled in school but ceased to attend at some point in the school year.

Completion

Students completing primary and/or secondary education or a given grade.

Learning outcomes

Test scores for the following subjects were included as measures of learning: (1) maths, (2) 'language arts', including measures of reading, writing, literacy and language that were either in local or official languages of a country, (3) cognitive and problem-solving skills and (4) composite scores combining scores from more than one subject, including at least one of the measures above.

Secondary outcomes

Teacher attendance

The share of total school days for which teachers were present either in the classroom or in school.

Teacher performance

Any measure of teachers' knowledge, practice, motivation or satisfaction.

Our review followed a theory-based approach for synthesising evidence. A theory-based approach involves developing a theory of change to chart out how a programme is intended to work and outlining the assumptions behind the theory. This approach helps structure an analysis of intervention effects along the theorised causal chain, adding depth to the synthesis. It also provides a framework for an analysis of intervention design, process and implementation issues that may explain results.

To analyse the programme effects, we conducted a meta-analysis for each intervention area. We also carried out variation and sensitivity analyses to explore the variation in findings for different sub-populations across studies. We conducted over 100 meta-analyses of different combinations of intervention and outcome. Appendix 1 provides an overview of the results of these analyses across the review.

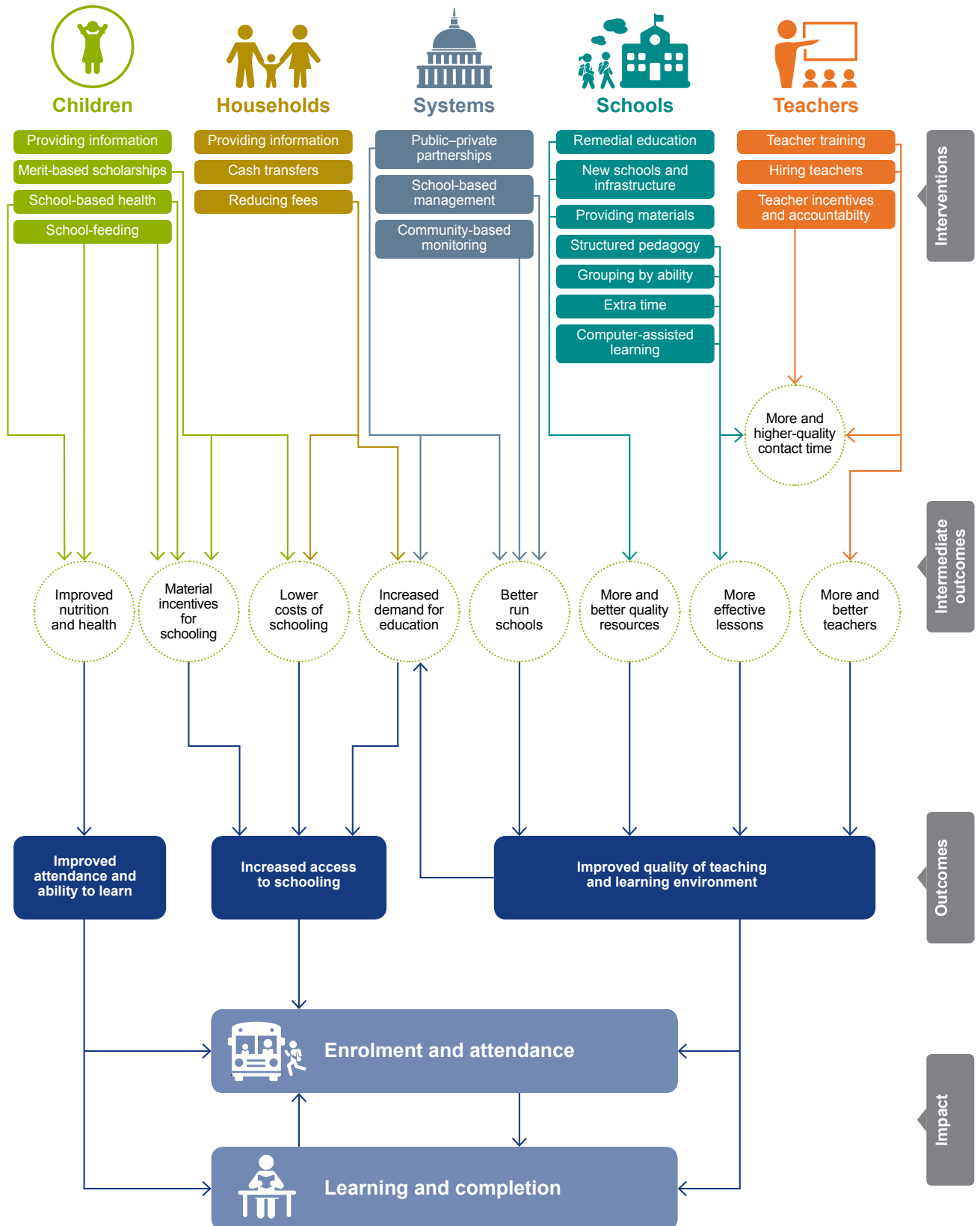
2.3

The conceptual framework for the review

A complex set of social and structural determinants influence children's access to schooling and education quality. Examples of social determinants include ethnicity, the sex of the child, whether parents are in the household and the language used at home. Structural determinants include the distance to school, availability and quality of teachers and a household's ability to cover the cost of schooling. In addition, there may be direct costs, such as school fees, books, school uniforms and transportation, and indirect costs such as the opportunity cost of sending a child to school and parents' time investment (Tikly 2011; DFID 2013). A child's health and nutritional status is also a critical factor influencing the likelihood of their attending school and their ability to benefit from schooling.

To deliver high-quality education, schools need to be equipped with the requisite infrastructure, qualified teachers, teaching materials and pedagogical approaches. At a more systemic level, the governance of educational institutions, national policies and budgets are crucial factors that will influence access to schooling and the quality of education. Finally, context-specific factors also influence several education outcomes. These include socio-cultural attitudes towards schooling in general and the education of girls specifically, local political and socio-economic conditions, and security risks associated with attending school.

Figure 1: How education interventions may work





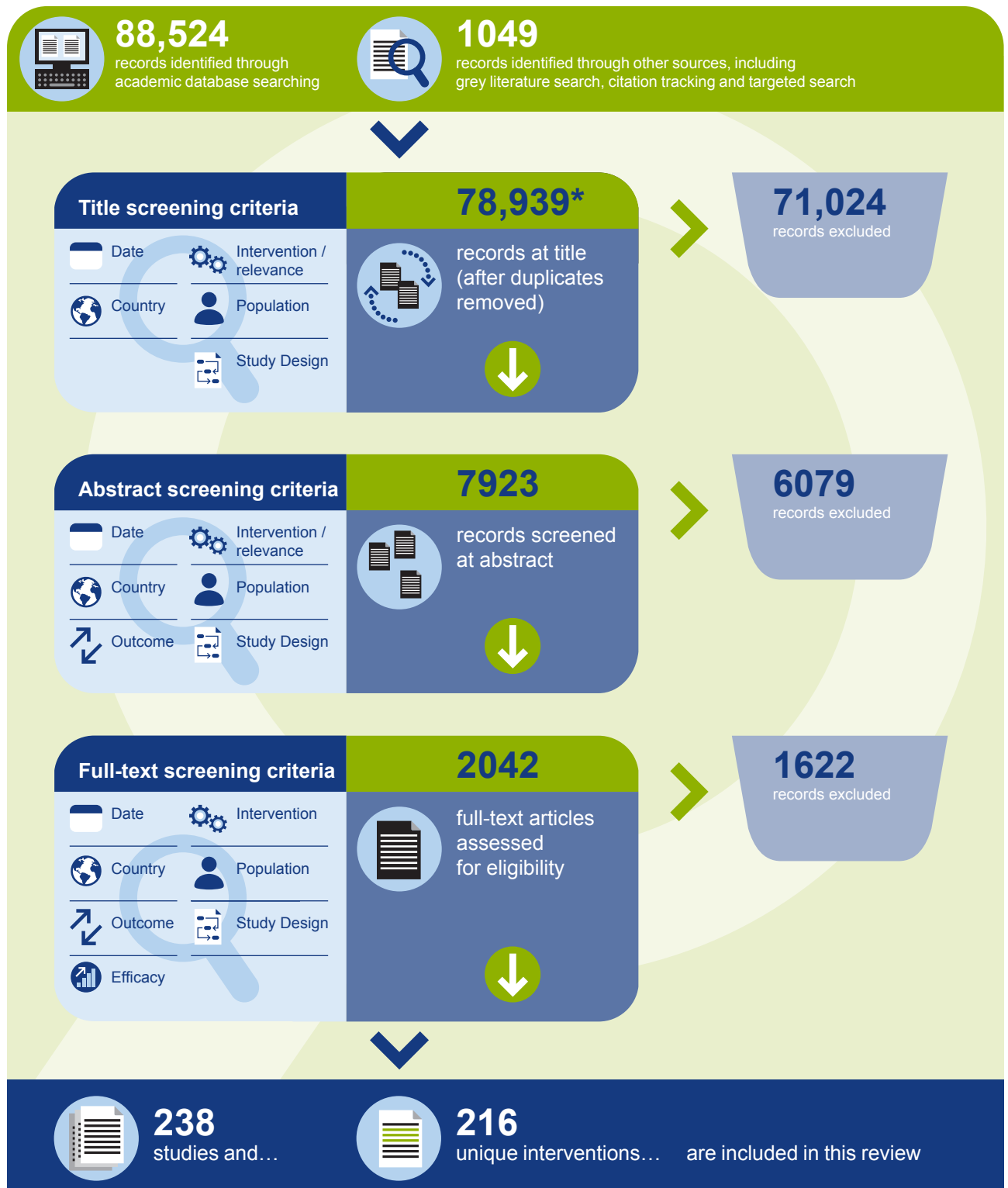
To better understand the different ways that education interventions are designed and targeted, we categorised them into five levels: children, households, systems, schools and teachers (see Figure 1). These levels provide a conceptual framework for the review. Figure 1 outlines the main pathways through which interventions can influence education outcomes.

The framework is helpful in mapping out the nature of causal links between each component or aspects of an intervention and its outcomes. In an example of a child-level intervention, a school-feeding programme aims to provide students with the nutrition they need to learn. Such interventions may also provide an incentive for parents to send their children to school. The theory supporting the causal link is that better nourished children are less likely to miss school as a result of illness and are better able to concentrate, which in turn potentially affects learning outcomes (Kristjansson *et al.* 2009).

We carried out an extensive search for studies evaluating the effects of different interventions. Figure 2 shows the search and screening process in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram.

Figure 2: PRISMA diagram

*Note: The numbers at each stage don't accurately account for excluded records because new studies were added at each screening stage.



The search covered studies published between January 1990 and June 2015. The initial search identified 78,939 potentially relevant citations. The titles and then the abstracts of these citations were screened to shortlist relevant articles. We finally reviewed the full text of over 2000 papers. This led to the identification of 420 papers that met our inclusion criteria, covering 238 impact evaluations examining the effects of 216 unique programmes.⁴ We also drew on 121 qualitative research studies and process evaluations associated with the programmes studied in the impact evaluations.⁵ The number of studies included in this review is larger than that of any other systematic review on this topic conducted to date.

3.1 Distribution of studies is uneven across interventions

The distribution of impact evaluations of education interventions is uneven across different areas. Figure 3 shows this uneven distribution. Interventions such as cash transfers, structured pedagogy and computer-assisted learning programmes have been studied quite extensively. For other programmes, such as school-based health, information to children, teacher interventions, remedial education and school day extension, the evidence is more limited. This is significant because development assistance has been directed to many of these understudied areas.

Figure 3: Distribution of studies across interventions

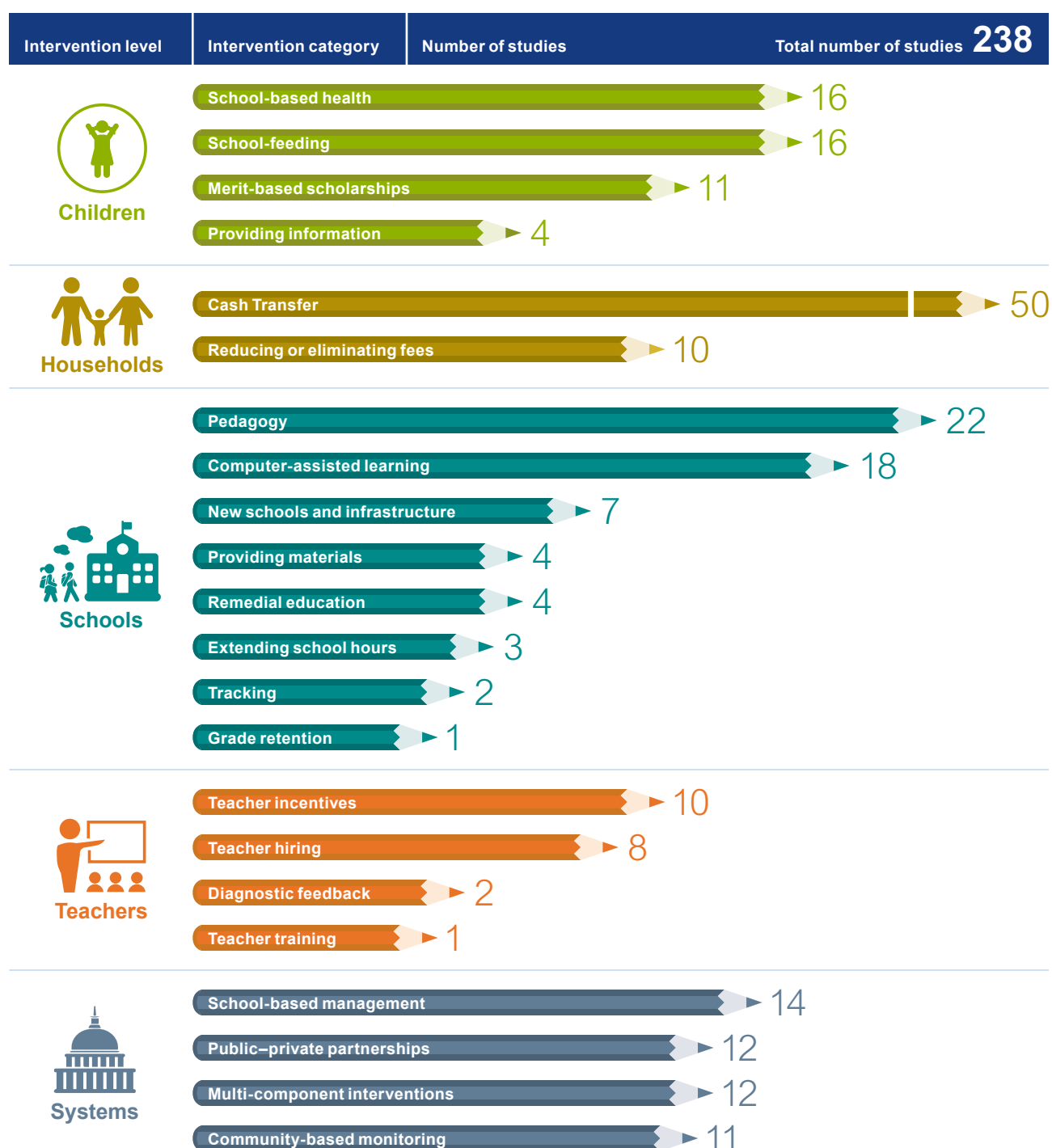
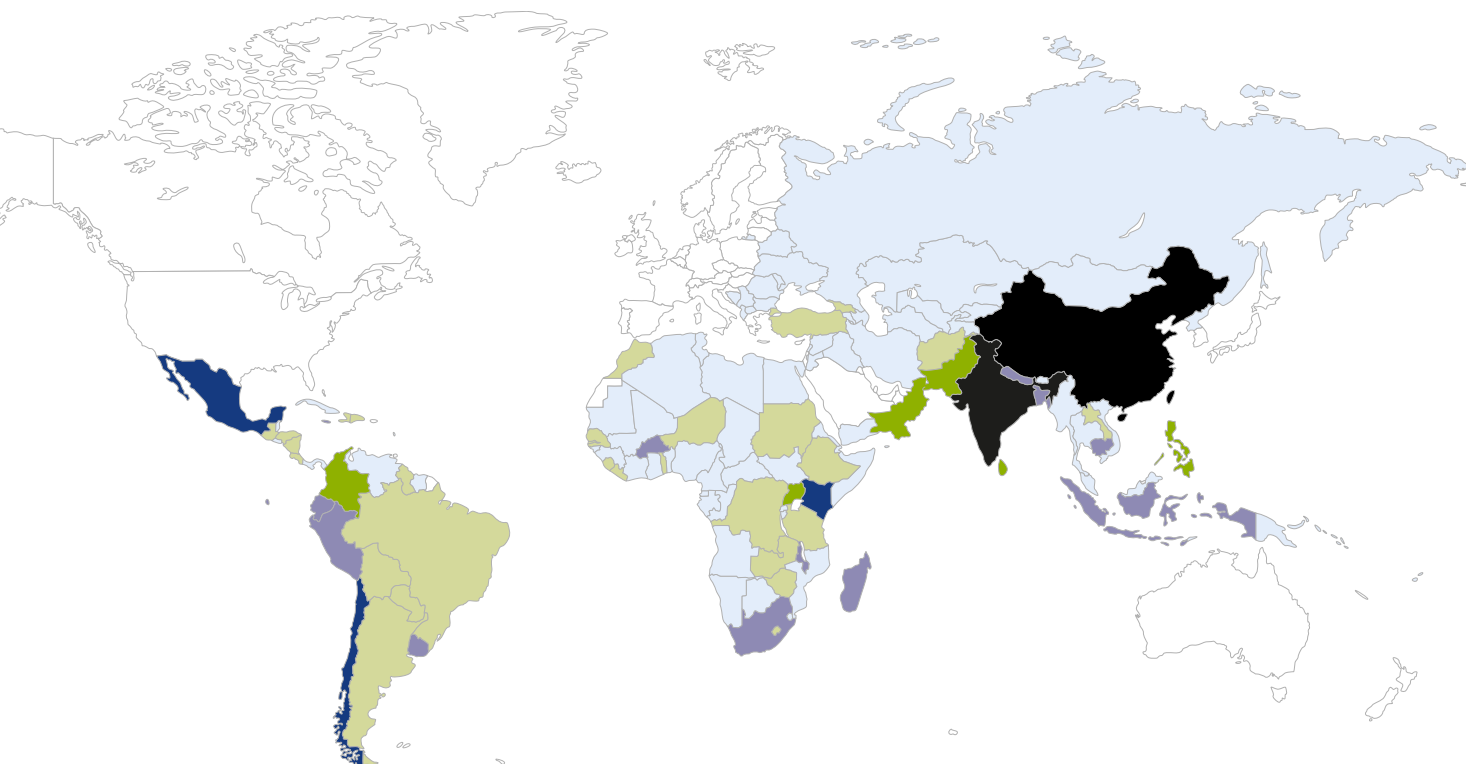


Figure 4: Map of included studies

Incidence of included studies by country

- 19–27
- 12–19
- 7–12
- 3–7
- Fewer than 3
- No data available



The number of studies included in this review is larger than that of any other systematic review on this topic conducted to date.

3.2 Distribution of studies across regions and countries is also uneven

The geographic distribution of studies is also uneven, particularly within regions (see Figure 4). The 238 included impact evaluations across 52 L&MICs. This included 59 studies from Sub-Saharan Africa, 38 from East Asia and the Pacific, 87 from Latin America and the Caribbean and 51 from South Asia. We identified only two studies conducted in the Middle East and North Africa and one from Europe and the Commonwealth of Independent States. Countries where several studies have been conducted include Brazil, Chile, China, India, Kenya, Mexico, South Africa and Uganda. For most countries in Sub-Saharan Africa we identified few or no studies. It is also notable that evidence from several countries with large populations, such as Indonesia, Nigeria and Bangladesh, is limited or non-existent.

3.3 Distribution of studies across impact evaluation methods

Over 50 per cent of the included impact evaluations were cluster RCTs and eight per cent were RCTs (where assignment was randomised at the individual level) (see Table 1). Twenty-four per cent of the studies used a controlled before and after evaluation design, with estimation strategies, such as difference-in-difference and propensity score matching to control for potential selection bias. The remaining studies used natural experiment and regression discontinuity designs.

Table 1: Study designs

Study design	Number	Per cent of total
Cluster randomised controlled trial	122	51%
Controlled before and after	56	24%
Regression discontinuity design	25	11%
Randomised controlled trial	19	8%
Natural experiment	16	7%



3.4 Distribution of studies across outcomes

The most frequently reported outcomes are maths test scores (126 studies), followed by language test scores (114 studies) as shown in Table 2, below. Few studies assessed cognitive outcomes (13 studies), and those that did were primarily about school-feeding and school-based health interventions.⁶ The most frequently reported school participation outcomes were enrolment (74 studies), attendance (68 studies) and drop out (46 studies). Few studies included in the review provided any analysis of sub-populations, including factors such as sex or socio-economic status, or measured the long-term effects of programmes. Box 2, on page 8, provides definitions of all outcomes.

We now move on to presenting the results of the analyses of the effectiveness of different education interventions. Chapter 4 summarises findings for child- and household-level interventions, Chapter 5 presents the findings on school- and teacher-level interventions and Chapter 6 summarises the findings on education system interventions.

Table 2: Outcomes reported in studies

Primary outcomes	Number	Per cent of total
Maths	126	29%
Language arts	114	26%
Enrolment	74	17%
Attendance	68	15%
Drop out	46	10%
Cognitive outcomes	13	3%



In this section, we look at education interventions that are targeted directly at households and children. Such interventions are primarily demand driven, and address education-related barriers and constraints faced by households and children.



4.1 Improving children's health and nutrition



Well-nourished children who are free from disease are better able to participate in school and learn. Conversely, micronutrient deficiencies and diseases, such as malaria and worm infections, can affect children's performance in the classroom. Evidence suggests that ill health and malnutrition have serious negative effects on education outcomes (Bundy 2005; Glewwe & Miguel 2008; Jukes, Drake & Bundy 2008).

In this section, we assess the evidence for programmes that address the constraints that children face due to poor health and malnutrition. School-feeding programmes can alleviate short-term hunger and address micronutrient deficiencies. They can also work as an indirect income transfer to parents: by reducing the cost of sending a child to school, it is thought these programmes also incentivise school enrolment and attendance. School-based health interventions are thought to have the potential to improve school performance by reducing absence due to illness and thereby increasing the total amount of time a student spends in school. This additional attendance, as well as improved learning abilities while the student is in school, may in turn lead to improved academic achievement.

4.1.1 School-feeding



Nearly every country in the world has some form of school-feeding programme in place (WFP 2013). These programmes typically provide children with a meal or snack at school (in-school feeding) or to take home. They vary in terms of the timing of the meal, nutritional content and local implementation arrangements.

Food provided through these programmes is sometimes fortified with essential minerals or vitamins to tackle multiple nutritional deficiencies (Bundy *et al.* 2009). Organisations such as the World Food Programme (WFP) have made a case for micronutrient fortification to always be an integral part of school-feeding if there is a demonstrated need (Bundy *et al.* 2009). Researchers and programme managers have also argued for school-feeding programmes to adopt an integrated approach that combines health, nutritional and educational components to increase their effectiveness (Powell *et al.* 1998; Jomaa, McDonnell & Probart 2011).

What is the evidence base?

We identified studies that evaluated 15 school-feeding programmes implemented in Argentina, Burkina Faso, Cambodia, Chile, China, Guyana, India, Jamaica, Kenya, Laos, the Philippines, Peru, Senegal and Sri Lanka. All of these programmes targeted primary school children. Two studies evaluated the largest school-feeding programme in the world, the Indian Midday Meal Scheme (Afridi, Barooah & Somanathan 2014).

All of the programmes included an in-school feeding component. The WFP feeding programmes in Burkina Faso and Laos also included an additional treatment group who received take-home rations. In Cambodia, the WFP school-feeding programme also introduced take-home rations for girls alongside the in-school feeding, and later provided deworming and complementary health activities.



What have we learned?

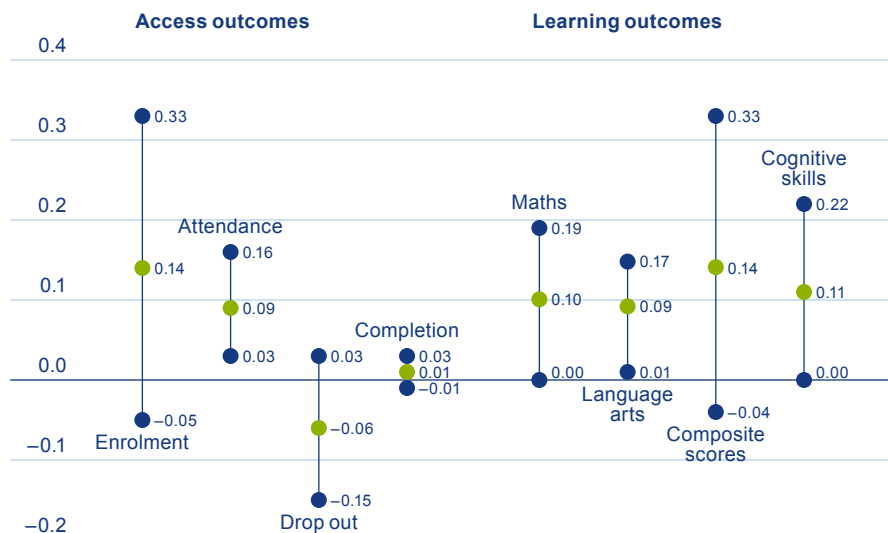


- **School-feeding is one of the few interventions that shows promise for improving both school participation and learning** (see Figure 5). For example, both language arts and attendance improved by 4.5 per cent overall. The overall effect on enrolment is positive but imprecise. However, in some contexts, such as Burkina Faso, Cambodia and Guyana, programmes clearly increased school enrolment. The effects on student drop out and school completion are less clear, because few studies measure these outcomes. A WFP feeding programme in rural Senegal that provided hot lunches through canteens in primary schools had a substantially large effect on reducing drop-out rates (Diagne *et al.* 2014).
- **The effect of school-feeding was stronger in areas where there was high food insecurity and low participation in schools.** This finding is based on evidence from programmes that were implemented in diverse contexts, including Burkina Faso, Cambodia, Guyana and Jamaica. For example, the Hinterland Community-Based School Feeding Programme in Guyana (Ismail, Jarvis & Borja-Vega 2012) had consistently positive effects on school participation and learning outcomes. This programme was implemented during the global food price crisis of 2007–08, when there was a documented increase in food insecurity for poor families in Guyana. In this context, the feeding programme met a clearly defined need and represented an important income transfer to poor families. Local community involvement was a condition for receiving the programme. Schools and communities had to submit a proposal to receive funding for the programme and participate in training in financial administration, food hygiene and nutritious meal preparation. Schools were required to purchase food produce for the meals from local farmers.
- **School-feeding programmes may not have as much of an effect in areas where malnutrition is not prevalent.** The effects on school participation of the Programa de Alimentación Escolar feeding programme in Chile were found to be small or non-existent. This is not surprising considering extreme malnutrition has been eliminated in Chile and school enrolment rates are already high (Altman 2013; McEwan 2013). Similarly, in Sri Lanka, enrolment was already high in the part of the country where WFP implemented a feeding programme. The observed effects on enrolment are close to zero (He 2010).
- **Local ownership and an integrated approach to feeding may facilitate improved outcomes.** Qualitative evidence for process and implementation from the two feeding programmes in Guyana and Sri Lanka suggests that local ownership over the programme can have a positive effect on education outcomes. For the welfare programme in Sri Lanka (He 2010), the implementation of school-feeding, and decisions about the programme, rested with the local community. The locally implemented programme had larger effects on enrolment than the programme that was centrally implemented by WFP. Similarly, in the case of the Hinterland Community-Based School Feeding Programme in Guyana, implementation of the feeding programme was left entirely up to local communities, supported through funding and training to community members (Ismail, Jarvis & Borja-Vega 2012). The programme led to improvements in participation and learning outcomes that were consistently larger in magnitude than other programmes.

Figure 5: School-feeding may improve both school participation and learning

- Upper and lower confidence intervals
- Average (standardised mean difference)

Note: This figure provides the results of the meta-analyses of the effects of school-feeding for all outcomes where we were able to conduct a meta-analysis. All measures are expressed as SMD (Cohen's d). Each line provides the results of one meta-analysis, showing the average effect and the associated 95 per cent confidence interval (CI). Thus, CI lines that do not cross the horizontal axis in the graph mean that the SMD is statistically significant from zero.



4.1.2 School-based health programmes



With greater awareness of how children's ill health and malnutrition interferes with their participation and learning in school, school-based health interventions have received much attention over the last few decades. The consensus framework for Focusing Resources on Effective School Health (known as FRESH), developed jointly by UNESCO, World Health Organization (WHO), UN International Children's Emergency Fund (UNICEF), the World Bank and Education International, describes health as 'an input and condition necessary for learning, as an outcome of effective quality education and as a sector that must collaborate with education to achieve the goal of Education for All.' (Bundy *et al.* 2006).

School-based health programmes can cover both the prevention and treatment of disease and malnutrition in a school setting. Treatment services include deworming for intestinal worms and schistosomiasis, as well as integrated malaria treatment and prevention programmes. Prevention interventions may include provision of micronutrient supplements or eye tests followed by provision of eye glasses.

Effective school-based health programmes are also broadly considered to be cost-effective. They build on existing health infrastructure and community partnerships, as well as a skilled workforce in schools (UNICEF 2000). Deworming programmes, in particular, have been marketed as the 'best buy for development' as they are inexpensive and considered beneficial for improving health and school attendance (J-PAL 2012). As a consequence, aid agencies and global initiatives have invested millions of dollars in national school-based mass deworming programmes.



What is the evidence base?

We identified studies evaluating 16 school-based health programmes. Five of these programmes were implemented in China, three in Kenya, three in Sri Lanka, and one each in Guatemala, Jamaica, Malawi, the Philippines and Zambia. The programmes cover a diverse set of interventions, some combining several different health services.

Seven programmes provided micronutrient supplementation, six included school-based deworming, four included malaria prevention and control, one evaluated the provision of eye glasses and one provided incentives for anaemia reduction. The School Health and Nutrition Programme in Zambia, the school-based deworming and iron supplementation in Sri Lanka and the School Health and Nutrition Program in the Philippines all provided a combination of deworming and micronutrient supplementation (Grigorenko *et al.* 2007; Ebenezer *et al.* 2013; Jukes *et al.* 2014).



■ **School-based health programmes are widely implemented, but there is a lack of evidence on the effects of each type of service.**

Our results indicate that providing these health services has mostly been beneficial for students, but on average the effects appear small, with large variation across contexts. While we identified studies of 16 different school-based health programmes, these are spread across five different intervention types and eight different outcomes.⁷ Within each of these different intervention types, few studies report effects on the same outcome. Therefore, the findings are based on a small number of studies and all results should be interpreted with caution.

Despite their popularity, evaluations of deworming programmes suggest only small, if any, observable educational benefits for children receiving such programmes. There is an improvement in attendance for children participating in deworming programmes in Sri Lanka (Ebenezer *et al.* 2013) and Kenya (Miguel and Kremer 2004), but not in Guatemala (Watkins, Cruz and Pollitt 1996) and Jamaica (Simeon *et al.* 1995). Results for learning are likewise inconclusive.

Malaria prevention and control programmes have beneficial effects on education outcomes for participating children in some contexts. Improvements in nutrition outcomes are relatively consistent across programmes, but effects on learning are less consistent. A malaria prevention and control pilot project in Sri Lanka had substantial positive effects on learning outcomes (Fernando *et al.* 2006), but the Health and Literacy Intervention had a negative effect on learning in Kenya, as measured by spelling and maths (Brooker & Halliday 2015).

Similarly, micronutrient supplementation had beneficial effects on nutrition and learning in some contexts and negative or no effects in others. Two primary school micronutrient supplementation trials in China – one providing multi-vitamins to grade 4 students (Luo *et al.* 2012) and one providing iron supplements to grade 4 students (Wong *et al.* 2014) – had larger impacts on nutrition and maths tests scores than other similar programmes. Aside from reported high rates of compliance, it is not clear why these programmes were more successful in improving education outcomes.



■ **Implementation issues have influenced the outcomes of some school-based health programmes.**

The adverse impacts of the Health and Literacy Intervention malaria control programme in Kenya are attributed to a combination of high rates of malaria reinfection and issues related to implementation. Many teachers felt that delivering the malaria control programme was disruptive and beyond the scope of their regular work (Brooker & Halliday 2015). In contexts where school resources are limited, an additional emphasis on implementing school-based health interventions could draw school staff away from education-related activities.

Unforeseen events and circumstances disrupted the implementation of a few of these programmes. This may in turn have influenced the impact of these interventions. In the Philippines for instance, there was a series of issues that hindered children's participation in school during the deworming and supplementation RCT, including an oil spill that caused many of the students to experience dizziness, headache and respiratory problems. Heavy rains also made many schools inaccessible. The programme had no positive effects on nutrition or test scores (Jukes *et al.* 2014). In the case of the Gansu Vision Intervention Project, the severe acute respiratory syndrome (SARS) epidemic of 2003 resulted in a delay in the implementation of the project by a year (Glewwe, Park and Zhao 2014).



4.2 Merit-based scholarships and incentives



Merit-based scholarships and incentives aim to improve learning outcomes by rewarding students based on their academic performance. Students are offered scholarships, one-off cash payments or prizes as an incentive for improving attendance and increasing their study efforts.

Incentives are considered to be more effective than other interventions because they directly target children, rather than parents, caregivers or teachers. In contexts where staying in school involves a considerable opportunity cost, scholarships are seen as an incentive for children to stay in school instead of working (Liu *et al.* 2013; Yi *et al.* 2015). As is the case with other financial incentives, scholarships are also thought to increase parental involvement in education through their increased monitoring of schools and teachers (Kremer, Miguel & Thornton 2009)

What is the evidence base?

We identified studies of 10 programmes in Benin, Cambodia, China, India, Kenya, Mexico and Nepal. In most of these programmes, some kind of incentive, usually cash, was paid directly to the student. There was only one programme where the scholarships for children were transferred to the school. Some scholarship programmes were more competitive, offering a limited number of awards for top-scoring students. The rest of the programmes offered rewards to all the students who achieved a certain predetermined grade, either in one particular subject or an average score across all subjects. Programmes also varied in terms of whether they assessed performance of the individual student, class or some other assigned group.

What have we learned?



- **Merit-based scholarships and incentives are promising for improving learning outcomes.** Overall, such programmes improve maths and composite scores, as well as cognitive outcomes. Effects on language arts are also positive overall, but the estimate is imprecise and based on few studies. Effects on school participation outcomes are not clear because of the lack of evidence on these outcomes.
- **Scholarships and incentives can lead to an improvement in student effort and motivation.** Student effort has been measured using indicators such as time spent on studying or reported enjoyment of studying. In Cambodia, there was an increase in the amount of time students spent studying outside the school (Barrera-Osorio & Filmer 2013). Similarly, in Mexico, students spent more time studying mathematics and were significantly less likely to text or watch television while doing homework (Behrman *et al.* 2012).
- **Evidence from a few studies suggests that providing incentives to groups of students may be more effective than offering them to individuals.** In China, pairing a high achiever and a low achiever as bench mates and offering them both incentives for learning improved the test scores of low achievers without harming the high achievers. Offering only the low achievers incentives for learning, however, had no effect (Li *et al.* 2014). In Benin, teams that had to compete with each other to win a prize performed better than either individuals or teams who were offered cash rewards for achieving a specified performance standard. Offering incentives to groups may have prompted the high achievers to help the low achievers boost the performance of the group (Blimpo 2010).

4.3

Lowering the cost of education



Interventions targeted at households – such as cash transfers, merit-based scholarships and removing user fees – are designed to improve access to education by reducing the costs associated with participating and learning in school.

4.3.1

Cash transfers



Cash transfers are social safety net programmes that provide funds directly to mothers, households or children. Cash transfer programmes are very popular in Latin America, and are now being implemented in many countries. According to the World Bank (2015), 718 million people are enrolled in cash transfer programmes.

The main causal mechanism through which cash transfers are thought to affect education outcomes is through the removal of financial barriers to education (Miller & Tsoka 2012). By providing families with additional funds, cash transfers aim to increase school enrolment and attendance, and reduce the risk of children dropping out of school, by decreasing the direct costs (such as uniforms and textbooks) and indirect costs (such as loss of income) of schooling.

Broadly, cash transfer programmes are typically classified into two categories: conditional cash transfers and unconditional cash transfers. Conditional cash transfers transfer money to households or children contingent on certain behaviour, such as school enrolment or attendance above a certain minimum number of days. Unconditional cash transfers also involve a money transfer, but they do not come with any explicit conditions (Baird, McIntosh & Özler 2010). In practice, cash transfer programmes do not fall neatly into this binary distinction, but are rather spread across a continuum. Examples include *labelled* transfers, where participants are explicitly told that funds are to be used for education; conditional transfers, where transfers are not monitored or enforced; conditional transfers where the conditions are monitored imperfectly and with little enforcement; conditional transfers where school enrolment is monitored and enforced; and conditional transfers where school attendance is monitored and enforced (Gaarder 2012; Baird *et al.* 2013).

The evidence from 50 studies suggests that cash transfer programmes have had consistent and substantive positive effects on school participation outcomes.

The question of whether conditions should be tied to cash transfers has been the subject of considerable global debate. The proponents for unconditional cash transfers argue that cash is the key constraint for poor people and that the poor do not lack the knowledge to decide what is best for them (Baird *et al.* 2013). On the other hand, conditionality is thought to be particularly effective in low-income settings, where parents may not consider their children's education to be a high priority (Akresh, De Walque & Kazianga 2013). There is also the political economy argument that taxpayers may be less averse to paying for cash transfers that reward specific behaviours instead of just giving handouts (Fiszbein & Schady 2009). Conditional cash transfers do, however, have a higher cost attached to them because of the resources required to monitor and enforce conditionalities (Benhassine *et al.* 2013). As a result of these costs, the extent to which conditions are monitored and enforced varies among programmes.

What is the evidence base?

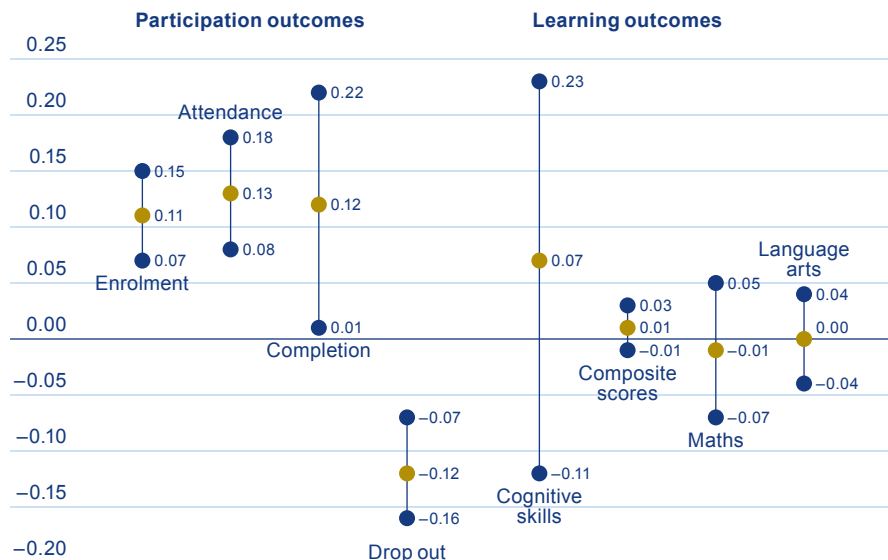
The evidence base for the effects of cash transfers in education is substantial. We identified 50 studies evaluating 38 unique programmes. Approximately half of the programmes evaluated are in Latin America and the Caribbean, with the remaining studies covering programmes in Sub-Saharan Africa, East Asia and the Pacific, the Middle East and North Africa, and Europe and Central Asia.

The majority of the programmes included some kind of conditionality, typically school attendance and enrolment. However, the intensity of the conditionality varied between programmes. For example, approximately one quarter of the programmes monitored and enforced school attendance. Over half of the programmes were targeted at primary and secondary school children, with the remaining programmes focusing only on either primary school or secondary school students. Eight programmes were targeted only at secondary school students. The amount of the cash transfer ranged widely, from US\$20 to US\$1625 per year.

Figure 6: Cash transfers get children to school but do not improve learning overall

- Upper and lower confidence intervals
- Average (standardised mean difference)

Note: This figure provides the results of the meta-analyses of the effects of cash transfers for all outcomes where we were able to conduct a meta-analysis. All measures are expressed as SMD (Cohen's d). Each line provides the results of one meta-analysis, showing the average effect and the associated 95 per cent CI. Thus, CI lines that do not cross the horizontal axis in the graph mean that the SMD is statistically significant from zero.



What have we learned?



- Cash transfers improve school participation outcomes in most contexts.** The evidence from 50 studies suggests that cash transfer programmes have had consistent and substantive positive effects on school participation outcomes: school enrolment, attendance, completion and drop out (see Figure 6). Cash transfers have by far the most consistent and robust positive effect on school participation across all intervention areas covered in the review. However, there is a large amount of variability between different programmes. For several programmes, including those in South Africa, Turkey and Tanzania, we observe no effects or negative effects. While our analysis of what may lead to this variability was hampered by small samples, we find indicative evidence that transfer size and tighter monitoring and enforcement of conditions may matter (Snilstveit *et al.* 2015).
- On average, cash transfers do not appear to improve learning outcomes.** In contrast to the large number of studies on school participation, relatively fewer studies measure the effects of cash transfers on learning outcomes. Studies of 11 programmes measured the effects of cash transfers on maths or language arts. Overall, researchers found that the programmes had no effect on either outcome (see Figure 6). This finding is in line with what has been reported by other reviews (Baird *et al.* 2013; Krishnaratne & White 2013).

The lack of effect on learning outcomes is also relatively consistent across the different programmes included in the review. There are a few exceptions, however. Cash transfer programmes improved maths test scores in Colombia, Malawi and Morocco, but the estimates are imprecise. In the case of the Zomba cash transfer programme in Malawi, there also appears to have been a relatively large improvement in cognitive test scores.





4.3.2 Removing user fees



Following the World Education Forum and the establishment of the Education for All movement in 2000, several governments started eliminating or reducing school fees. The School Fee Abolition Initiative, launched by the World Bank and UNICEF, and the Millennium Development Goals also spurred national fee removal policies (Morgan, Petrosino & Fronius 2014). As the payment of school fees was considered a barrier to access to education for low-income households, the elimination or reduction of user fees was believed to be a suitable approach for increasing enrolment and retention (Evans, Kremer & Ngatia 2012). The potential trade-off between abolition of fees and school quality as a result of an increase in demand has, however, remained the subject of debate.

What is the evidence base?

We identified studies evaluating the impact of 10 programmes that eliminated or reduced school fees in China, Colombia, Ecuador, the Gambia, Haiti, Indonesia, Kenya, Nepal, South Africa and Uganda. Eight out of these 10 programmes were implemented by a government agency. All of the programmes either eliminated the fees or reduced them in some way. They covered costs incurred on tuition fees, school uniforms, contributions to parent-teacher associations and field trips. A few programmes included additional components, such as media campaigns, grants for the schools and payments to cover living expenses of children living away from home.

What have we learned?



- **The overall effect of programmes that remove or reduce user fees on participation is not clear.** Overall effects appear small across measures of enrolment, attendance, drop out, completion and attainment. However, all estimates are imprecise. Apart from enrolment, all analyses are based on only two to four estimates per outcome, with considerable variability across different contexts and sub-populations.
- **The reduction of user fees may reduce quality of schooling in the short term if additional resources are not made available.** The universal primary education reform in Uganda, which started in 1991, abolished fees for all primary grades (Grogan 2008). The sudden increase in enrolment led to shortages of teachers and textbooks. Classrooms were reported to be overcrowded, which in some cases led to the creation of multiple school shifts during the day. However, investments in teacher education, textbooks and school construction in subsequent years markedly improved the resources available to students and teachers (Grogan 2008). Similarly, there was evidence of decreased quality in both no-fee and fee-paying schools in South Africa following the implementation of the no-fee policy, as well as increases in class sizes (Nkosi 2011; Garlick 2013).

4.3.3 Providing information to children and parents



Providing information to children and parents about the potential future benefits of education, in terms of income, employment and social status, is suggested to increase school participation and continuation in contexts where families underestimate the actual returns on education (Nguyen 2008). This problem is argued to be most acute for students living in rural, isolated areas or urban slums where there are few examples of similar students going on to higher education (Jensen 2010). One simple means of improving this information gap is to seek statistics about average earnings for each additional level of education. Other interventions make use of role models, who share their experience of education and current achievements with children, with some examples using a combination of channels (Nguyen 2008).

What is the evidence base?

We identified four studies of experimental trials to provide information about the returns on schooling to children and/or parents. These took place in four diverse contexts: China, Chile, the Dominican Republic and Madagascar. All four programmes shared information with children on the returns on education as measured by potential earnings, either via written information or through meetings to present the returns on education (potential earnings) after leaving school. The trial in Chile also provided participants with additional information about available academic scholarships and student loans for further study.

What have we learned?



- **The effects of programmes providing information on the benefits of schooling are not clear due to a lack of evidence.** The studies report on different outcomes and we are therefore unable to draw conclusions about overall effects on specific outcomes. However, across programmes in Chile, China, the Dominican Republic and Madagascar, school participation outcomes improved. For example, a programme in Madagascar that provided information about the economic returns on education led to relatively large improvements in school attendance (Nguyen 2008), while in the Dominican Republic, a similar programme improved completion rates (Jensen 2010). Evidence on learning outcomes is even more limited, with more uncertainty, although there may be some improvement in test scores.







Investments have been made in programmes that address the constraints schools and teachers face in their efforts to improve the classroom environment and consequently children’s learning outcomes. Traditionally, education programmes and policies have focused on improving outcomes by expanding the quantity and quality of schools and teachers. ‘Hardware’ in the form of buildings and books has been provided based on the assumption that ‘if we build it, children will come and learn’. In the past few years, there has been a gradual shift towards improving the ‘software’ of learning, meaning more investments in programmes that emphasise pedagogy, curriculum development and teachers’ training. In this section, we assess the evidence on a range of such programmes targeted at schools and teachers.

5.1 Structured pedagogy programmes



Structured pedagogy programmes seek to directly address several barriers to learning. These barriers could be in the form of inadequately trained teachers, lack of appropriate materials, curricula and instructional approaches. Structured pedagogy programmes usually combine the provision of both ‘hardware’ and ‘software’. A central element of most interventions is the development of evidence-based curricula and instructional approaches, along with lesson plans and training for teachers in delivering new content and material for students. Evidence-based education, in this case, implies that the curriculum and instructional approaches were designed on the basis of evidence for their effectiveness in experiments. Some programmes also include regular monitoring and mentoring of, and feedback to, teachers on their delivery of the new material.

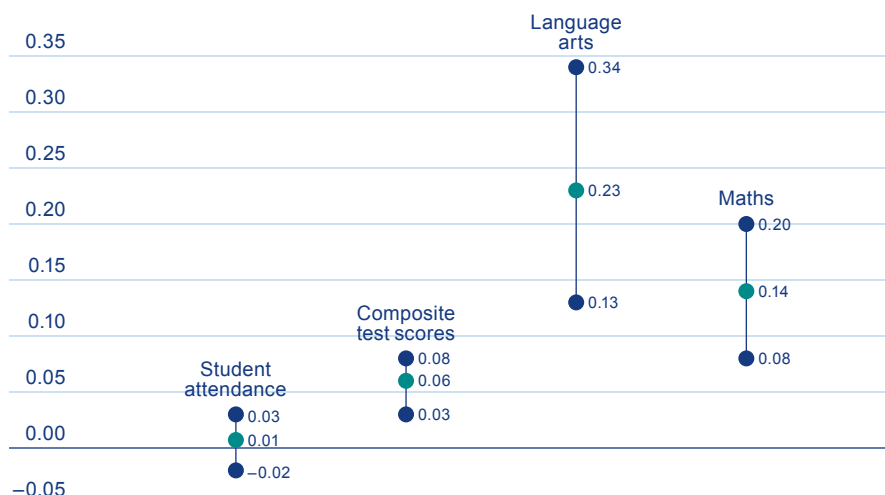
What is the evidence base?

We identified studies of 21 differently structured pedagogy programmes in Brazil, Cambodia, Chile, Costa Rica, Kenya, Liberia, Mali, the Philippines, South Africa, Sudan and Uganda. With one exception, all programmes targeted primary schools. The interventions included different combinations of some of the key components of structured pedagogy programmes. The majority of programmes focused on language, but a few focused on maths or a combination of both maths and language. Two programmes were designed to introduce new pedagogical approaches that were not specific to a given topic.

Figure 7: Average effects of structured pedagogy across all outcomes

- Upper and lower confidence intervals
- Average (standardised mean difference)

Note: This figure provides the results of the meta-analyses of the effects of structured pedagogy for all outcomes where we were able to conduct a meta-analysis. All measures are expressed as SMD (Cohen’s d). Each line provides the results of one meta-analysis, showing the average effect and the associated 95 per cent CI. Thus, CI lines that do not cross the horizontal axis in the graph mean that the SMD is statistically significant from zero.





- **Structured pedagogy programmes have improved learning in most contexts.** As shown in the forest plot in Figure 7, we observe relatively large improvements in test scores for both language and maths. The results also vary across studies – some programmes, such as the Primary Math and Reading Rural Expansion Program in Kenya and the School Readiness Programme in Cambodia, produced substantially larger improvements in language test scores than the average (Nonoyama-Tarumi & Bredenberg 2009; Piper, Zuilkowski & Mugenda 2014). Few studies measure school participation outcomes, but where data are available these programmes do not appear to have affected attendance in participant schools.
- **An important factor that influences generally positive outcomes is that, by design, most of these interventions have components to address multiple constraints to learning.** All of the programmes combine several components that address different constraints in schools, such as the low level of training among teachers, lack of materials and lack of structured content. For example, the Primary Math and Reading Rural Expansion Programme in Kenya combined curriculum-based content in Kiswahili, English and maths with materials for students and teachers, training for teachers to plan and implement lessons, and regular supervision and coaching of teachers by trained tutors (Piper *et al.* 2014).
- **Some successful programmes also used school materials that were tailored to their specific context.** For example, materials and teaching may be more effective when delivered in children’s mother tongues. Many of the programmes emphasised the importance of teaching in the languages children speak at home, instead of the official language of the country. Notably, some of the programmes that had only small effects on learning were either designed or delivered in a national language, rather than the children’s mother tongue (Kenya programme reported in He, Linden & MacLeod 2007; Spratt, King & Bulat 2013; Lucas *et al.* 2014). For example, the Reading to Learn programme in Kenya included training for teachers, head teachers and school management committees, as well as instructional materials and stationery for creating visual aids. The materials were designed to be taught in the children’s mother tongues. However, in reality, many teachers used English and even punished children who used the local language (Lucas *et al.* 2014).

An important factor that influences general positive outcomes is that, by design, most of these interventions have components to address the multiple constraints to learning.

- **Where programmes were not successful, inputs may not have been sufficient to address low levels of teacher experience and a lack of resources** (He, Linden & MacLeod 2007; Lucas *et al.* 2014; Kerwin & Thornton 2015). This may have reduced programme effectiveness. An impact evaluation of the Northern Uganda Literacy Project illustrates this issue through a comparison of two versions of a mother-tongue literacy programme. The first version was a full-cost version of the programme, including highly structured content for mother-tongue literacy instruction, teacher’s guides with scripts for each lesson, student materials (primers, readers and slates), intensive teacher training by a local NGO and parent and community engagement. In the second version, costs were cut by removing the individual slates for students and by delivering the teacher training through coordinating centre tutors, who are employed by the Ministry of Education and Sports to provide teacher training and supervision across Ugandan primary schools.

The evaluation found that the more intensive programme had large positive effects across most literacy outcomes. The students who received the low-cost version performed worse than the children in the comparison schools on a range of outcomes, including writing. The authors offer a number of reasons for why this may have been the case. Firstly, attendance rates were higher in the more intensive programme. Secondly, the lack of slates in the Ugandan schools may have led teachers to focus on the easier parts of the curriculum, where there was less focus on writing. The curriculum included highly organised lesson plans, with instructions for teaching different literacy skills. Intervention designers presumed that the schools not receiving slates would instead use exercise books for children to practise writing. However, in many cases, such books were not available and teachers used air writing as a replacement, focusing on letters and words. This meant that children in the low-cost programme did not get the writing practice that was part of the curriculum and lesson plans, which may have affected the children’s writing skills.

5.2 Targeted attention to students



Over the last decade, the approach of teaching at the student's level instead of using the prescribed curriculum has gained popularity. Several interventions aim to improve learning outcomes by targeting individual students based on their ability and performance in the classroom. Some programmes, such as tracking and grade retention, do this by grouping students by ability. Other programmes, such as remedial education, provide tailored assistance to students who are lagging behind their peers.



5.2.1 Remedial education



Remedial education programmes are structured programmes that are designed to help students who need extra attention to improve their performance in the classroom. These programmes provide remedial instruction that supplements regular classroom teaching in specific subjects. Students who are lagging behind their peers receive more individual attention as they are taught in smaller groups.

What is the evidence base?

We identified studies of four different remedial education programmes in Chile, India and Mexico (Banerjee *et al.* 2007; Cabezas, Cuesta & Gallego 2011; Lakshminarayana *et al.* 2013; Gutierrez & Rodrigo 2014). The programmes targeted students who had been identified as lagging behind their peers or being from particularly disadvantaged communities. The programmes provided tailored tutoring in core skills, such as numeracy and literacy, typically to groups that were smaller than the usual class. The tutors in the programmes were either volunteers (Cabezas, Cuesta & Gallego 2011; Lakshminarayana *et al.* 2013; Gutierrez & Rodrigo 2014) or hired from the local community (Banerjee *et al.* 2007). The tutors were not trained teachers but the programmes offered either some training or supervision.

What have we learned?



- **Remedial education may improve the tracking of learning outcomes.** The evidence from four studies suggests that overall effects can be relatively large, although the results are imprecise. The STRIPES programme in India had much larger effects on all outcomes in comparison to other programmes. STRIPES provided remedial after-school instruction on maths and language to children in government-run primary schools. The lessons reinforced the school curriculum and were tailored to the students' learning levels.

There are two potential reasons for STRIPES having a larger impact. Firstly, the effects of the programmes in Chile and Mexico were measured after very short follow-up periods (two and six months, respectively) (Cabezas, Cuesta & Gallego 2011; Gutierrez & Rodrigo 2014). The follow-up period for STRIPES on the other hand were 21 months. It is therefore not surprising that observed effects for the other programmes were more limited. Secondly, STRIPES appears to have been a more intensive programme than those assessed in the other studies. It was also the only programme that involved a community outreach component. Implementers informed parents in the community about the programme. They encouraged parents to enter into verbal contracts with the implementers to ensure their children attended the additional classes. As part of the programme, children were also provided learning materials (Lakshminarayana *et al.* 2013).

This example highlights the importance of conducting more studies with sufficiently long follow-up periods. This would help ascertain whether the positive effects of STRIPES can be replicated in other contexts.

5.2.2

Programmes tracking students by ability



Programmes that involve tracking and grouping children by ability have been implemented across a range of countries over the last decade. The main assumption underlying such an approach is that grouping students with similar levels of ability will make teaching more targeted and efficient (EEF 2016). However, there has been a debate about the effects that these types of programmes may be having on more disadvantaged learners (Loveless 2013). The approach has been criticised because grouping children could involve an inadvertent association between student achievement and characteristics such as class, ethnicity and language (Loveless 2013).

What is the evidence base?

We identified two studies evaluating the effect of tracking interventions, in Kenya and India (Duflo, Dupas & Kremer 2012; Duflo & Dupas 2015). In the Indian Learning Enhancement Programme, students were briefly assessed on their Hindi skills at the start of the academic year. They were then taught in groups allocated according to ability for a portion of the school day, regardless of age and grade. In the Extra Teacher Programme in Kenya, schools were provided with an additional teacher, allowing them to split their first grade classes in two. Students were then 'tracked' into each class based on initial achievement.

What have we learned?



- **Based on the evaluation of two tracking programmes, the overall effects are relatively small on both maths and language test scores.** But in the case of the Indian Learning Enhancement Programme there was a larger improvement in students' Hindi test scores, with slightly larger benefits observed for girls compared to boys.



5.3

Providing buildings and books



Many education programmes and policies have aimed to improve outcomes by increasing the quantity of education inputs. The emphasis has often been on the provision of hardware in the form of buildings and books, and in this section we review the evidence on the effects of such programmes.

5.3.1

New schools and infrastructure



New schools and infrastructure programmes involve school construction in areas where there were none previously. They may also focus on the improvement or rehabilitation of existing school infrastructure. There are three main channels through which new schools and infrastructure programmes are expected to improve education outcomes. Firstly, they improve access to schooling by increasing the availability of schools, and reducing the distance to school and travel time for children (Burde & Linden 2009). Secondly, new or refurbished schools may also attract better qualified teachers and reduce teacher absenteeism, particularly if the community is able to provide an adequate and accessible working environment (Levy *et al.* 2009). Thirdly, by improving the learning environment through better facilities, students' learning experiences and expectations of schooling may improve (Hunt 2008). Potentially, this could lead to higher enrolment and attendance rates and lower drop-out rates. The provision of separate toilet facilities for boys and girls, for example, may be important for ensuring the retention of girls in school (Colclough, Rose & Tembon 2000).

What is the evidence base?

We identified studies of seven programmes that provided improved school infrastructure. This included latrine construction in India and Kenya (Freeman *et al.* 2012; Adukia 2014), establishment of new, community-based schools in Afghanistan and Niger (Dumitrescu *et al.* 2011; Burde & Linden 2013) and improved school infrastructure in Bolivia, Georgia and India (Newman *et al.* 2002; Lokshin & Yemtsov 2004; Borkum, He & Linden 2013).



- **Programmes for building new schools in Afghanistan and Niger improved average enrolment and attendance.** But improvements were only substantial in Afghanistan, with effects of smaller magnitude observed in Niger. The partnership for Advancing Community-Based Education in Afghanistan specifically aimed to increase girls' participation in primary education by reducing the distance they needed to travel to school. The programme increased school enrolment among both girls and boys, but benefits were substantially larger for girls. The evidence also suggests substantial improvements in maths test scores.
- **Construction of latrines improved school participation in both India and Kenya, particularly for girls.** The School Sanitation and Hygiene Education programme in India aimed at increasing latrine coverage in schools. The construction of toilets increased enrolment and reduced drop-out rates. The increase in enrolment was particularly substantial for young children. The construction of unisex latrines had a greater impact on pubescent boys than pubescent girls. However, pubescent girls benefited substantially when separate toilets were provided for boys and girls. Safety and privacy concerns of pubescent girls have been highlighted to explain this result (Adukia 2014).

In Kenya, the provision of latrines, as well as a water treatment and hygiene promotion intervention, led to an overall improvement in school attendance. The improvement in attendance was once again found to be particularly substantial for girls (Freeman *et al.* 2012).



The lack of sufficient and appropriate school materials can significantly affect the performance of education systems. Programmes providing schools with materials such as blackboards, textbooks and notebooks aim to improve education outcomes by addressing supply determinants of educational quality (Farrell & Heyneman 1989; Glewwe & Miguel 2008; Hunt 2008). Such programmes may improve outcomes in a number of ways. Increased availability of learning materials can help children engage with the curriculum and promote self-study. They can also improve the quality of teaching by assisting teachers in delivering their lessons (Krishnaratne & White 2013). Finally, additional materials may increase expectations from schooling among students and parents. This could increase motivation to enrol, stay in school or attend classes more often (Hunt 2008).

What is the evidence base?

We identified studies of four programmes that provided materials to schools in India, Kenya and Sierra Leone (Glewwe *et al.* 2004; Glewwe, Kremer & Moulin 2009; Das *et al.* 2013; Sabarwal, Evans & Marshak 2014). These programmes either provided learning materials directly to the school, or they gave a grant to the school to purchase learning materials. For example, a programme in Sierra Leone provided a set of core textbooks to every child (Sabarwal, Evans & Marshak 2014), while the programme in India provided a per-pupil school grant to be spent on materials used directly by pupils (Das *et al.* 2013).⁸





- **The results suggest a relatively consistent pattern of no effects on learning outcomes, as measured by maths, language and composite test scores.** In the case of the Schools Assistance Programme in Kenya, there was a negative effect on maths test scores (Glewwe, Kremer & Moulin 2009). Similarly, the government-run textbook programme in Sierra Leone failed to have any impact on students' learning outcomes. The programme did however appear to have improved teachers' performance and student attendance, particularly for older girls. The study authors suggest that the enhanced access to textbooks may have made teaching easier and increased teachers' motivation (Sabarwal, Evans & Marshak 2014).

Textbooks and writing materials are widely assumed to be essential in supporting children's learning. So, why do programmes that are focused on providing materials have a limited effect on learning outcomes?

- **The evidence suggests that many of these programmes experienced implementation challenges.** For different reasons, the distribution of textbooks among students did not meet the programme goals in India, Kenya and Sierra Leone (Glewwe, Kremer & Moulin 2009; Das *et al.* 2013; Sabarwal, Evans & Marshak 2014).

In Sierra Leone and India, many schools did not receive the textbooks that were due to be provided as part of the programmes (Das *et al.* 2013; Sabarwal, Evans & Marshak 2014). There were also reports in Sierra Leone that a large share of the textbooks was often kept in storage and not distributed to students. School administrators who did not expect to receive the textbooks were more likely to store them as they were uncertain if the supply of books would be sustained in the future (Sabarwal, Evans & Marshak 2014). In Kenya, there were reports that some schools used the grants meant for textbooks on other investments, such as classroom construction (Glewwe, Kremer & Moulin 2009).

- **Materials that are provided to students may not contribute to their learning if they are not appropriately customised for students.** In Kenya, the textbooks were in English, which for most students was their third language, and the textbooks were therefore too difficult to comprehend (Glewwe, Kremer & Moulin 2009).

The four programmes reviewed in this section focused on increasing the supply of materials, without addressing other constraints to learning. Other programmes that have more promising effects on learning outcomes, such as structured pedagogy and remedial education, also provide materials. But in these cases, materials are part of a package and typically integrated with a tailored curriculum. In contexts with a range of constraints, such as low baseline learning levels and poorly trained teachers, materials are a necessary but not sufficient condition for children's learning.





5.4 Computer-assisted learning



Computer-assisted learning programmes use laptops or computer labs as tools to support children's learning. They are sometimes delivered as an integrated package that includes new content and instructional approaches, as well as training for teachers in delivering this material. In other cases, the focus is simply on providing children with access to computers or laptops.

At the crux of this debate is how to move beyond thinking that technology can be the 'magic bullet' to improve education outcomes.

Computer-assisted learning programmes have become increasingly popular in recent years. For instance, more than 11 million laptops have been distributed to children in the Latin American and Caribbean region alone (Severin & Capota 2012 cited in Ortiz & Cristia 2014). The non-profit organisation One Laptop Per Child has worked with governments to distribute laptops in several countries, including Argentina, Ethiopia, Mexico, Mongolia, Peru, Rwanda and Uruguay (OLPC n.d.). But the provision of low-cost computing devices to students, particularly as part of large-scale national programmes, has been the subject of considerable debate among policymakers, programme managers and academics. At the crux of this debate is how to move beyond thinking that technology can be the 'magic bullet' to improve education outcomes.

What is the evidence base?

We identified studies assessing the effects of 16 different programmes implemented in a range of countries, including Chile, China, Colombia, Ecuador, India, Mexico, Nepal, Peru and Uruguay. The programmes provide different combinations of intervention components, such as laptops or computer labs, training for teachers and new content.



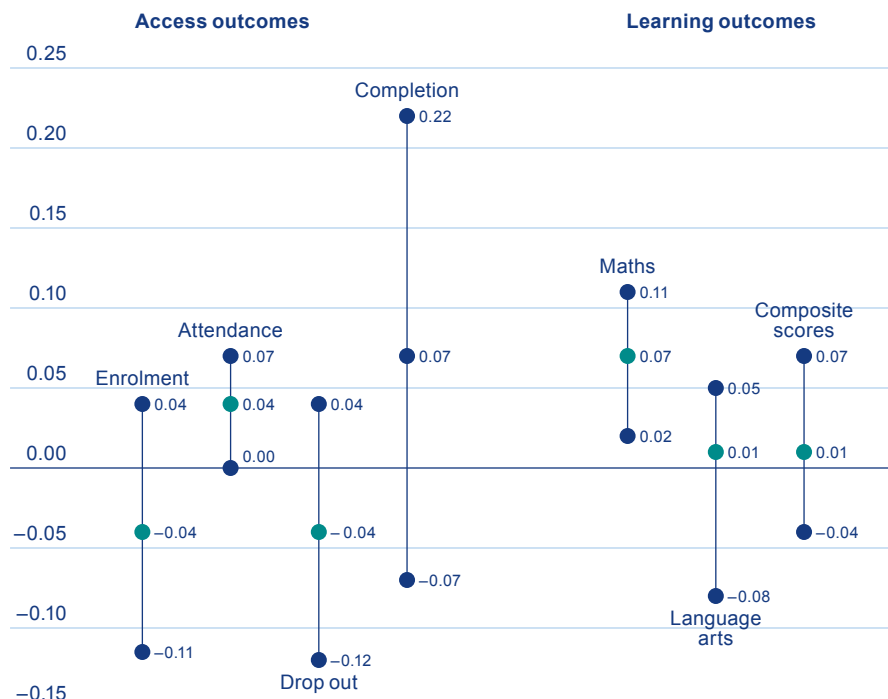
- **Overall, computer-assisted learning programmes have had decidedly mixed effects.** They have not generally had positive effects on language arts and composite test scores (see Figure 8). The effects on maths test scores are more encouraging, but there is a lot of variation between programmes. The few studies that had data on participation outcomes suggest small, if any, positive effects.

Computer-assisted learning is one of the few interventions for which we also observe substantive negative effects in some contexts. For example, the Gyan Shala in-school programme in India (Linden 2008), a maths programme in Costa Rica and the One Laptop per Child programmes in Nepal and Peru (Cristia *et al.* 2012; Sharma 2014) reduced maths and/or language test scores among the children participating in these programmes. A combination of factors related to intervention design and implementation explain these findings.
- **Programmes where computer-assisted learning substituted for other lessons were more likely to produce negative outcomes.** We do not observe negative effects for all of the computer-assisted learning programmes that substituted normal school hours with computer-assisted learning. However, all of the programmes that had negative effects used computer-assisted learning instead of other approaches. An impact evaluation of the Gyan Shala programme in India found that the variant of an in-school programme that substituted for a regular three-hour session in the ordinary school curriculum had substantial negative effects on language, maths and composite test scores. However, when computer-assisted learning was offered as an additional session out of school, students benefited from them quite substantially (Linden 2008). However, if the computer-assisted lessons are of a lower quality than the lessons they are replacing, they may have a negative impact on children's learning.
- **Many programmes experienced technological problems, including insufficient, damaged and/or dysfunctional equipment, lack of electricity and internet access.** A range of technological problems affected programmes in Chile, Colombia, Mexico, Nepal, Peru and Uruguay. Most schools that were part of the impact evaluation of the One Laptop Per Child programme in Nepal, for instance, reported that it took at least five weeks to repair laptops. The delays in maintenance may have dissuaded teachers from regularly using these laptops in classrooms (Sharma 2014).
- **In many cases, the new technology was not integrated into existing learning approaches.** The use of laptops and relevant software were reported to either be minimal or unrelated to the curriculum. In some programmes, computers were not provided with educational software linked with the curriculum. The One Laptop Per Child programme in Peru, for example, took a non-prescriptive approach in terms of how the laptop could be integrated with teaching activities. The laptops came pre-installed with a set of standard applications, games, music and programming, but insufficient training was provided to teachers on how the laptops could be used as part of pedagogical practices (David and Quispe 2013). Qualitative research showed that some of the teachers felt that using computers during regular, non-computer-oriented classes was a hindrance because it required instructors to simultaneously teach students how to use the computer and the course material (Villanueva-Mansilla & Olivera 2012).
- **The lack of integration of computer-assisted learning with teaching has also meant that students are not always using the laptops for the intended purposes.** The impact evaluation of the One Laptop Per Child programme in Nepal showed that, although the majority of the students (93 per cent) reported being able to use the laptops, only two thirds of grade 4 and 5 students reported using the laptops to read the educational materials developed as part of the programme (Sharma 2014). Similarly, the students in Uruguay were mainly using the laptops provided by the Plan Ceibal programme for searching for information on the internet (de Melo, Machado & Miranda 2014).

Figure 8: Average effects of computer-assisted learning across all outcomes

- Upper and lower confidence intervals
- Average (standardised mean difference)

Note: This figure provides the results of the meta-analyses of the effects of computer-assisted learning for all outcomes where we were able to conduct a meta-analysis. All measures are expressed as SMD (Cohen's d). Each line provides the results of one meta-analysis, showing the average effect and the associated 95 per cent CI. Thus, CI lines that do not cross the horizontal axis in the graph mean that the SMD is statistically significant from zero.



■ **Teachers were not always given sufficient training on using the laptops as a teaching aid.**

In Nepal, Peru and Uruguay, the lack of training to use laptops as part of teaching was considered a major reason for there being no effect on learning. In Uruguay, training was optional for teachers, except those who were involved in the implementation of the programme (de Melo, Machado & Miranda 2014). Twenty-five per cent of the teachers in the Nepal study reported not taking the training and a vast majority did not attend the refresher training (Sharma 2014).

The One Laptop Per Child pedagogical support pilot programme in Peru focused on improving the teacher's ability to integrate laptops into their lesson plans, but it did not have lasting effects. While a positive effect on teachers' computer skills and laptop use for lessons was observed in the third week after the programme, the effect faded after two years (Humpage 2013). The evidence for teacher training suggests that, while the implementation of training is an issue, programme designs need to also consider teachers' workloads, as well their attitudes and motivation for making radical changes to the way they teach.

■ **Computer-assisted learning programmes can improve learning outcomes, in particular for maths test scores.**

In a number of contexts, including China (Lai *et al.* 2011; Lai *et al.* 2013; Yang *et al.* 2013; Mo *et al.* 2014), Chile (Imbrogno 2014), Ecuador (Carillo, Onofa & Ponce 2010), India (Banerjee *et al.* 2008; Linden 2008) and Mexico (Imbrogno 2014), computer-assisted learning programmes have improved maths test scores quite substantially. The programmes where computer-assisted learning improved outcomes share a number of characteristics. Firstly, they were all focused on maths as a subject, with the majority of the programmes providing new content in addition to the computers or laptops. Secondly, most were pilots implemented by researchers or NGOs, rather than large-scale government programmes. And finally, the follow-up periods were relatively short for most of these interventions: all but two studies had follow-up periods of fewer than 12 months.

5.5 Programmes investing in teachers



Programmes that target teachers are designed to improve teachers' qualifications, skills, knowledge and commitment. They may also aim to increase the supply of teachers to reduce the pupil-teacher ratio. Teacher incentives, teacher hiring, teacher training and diagnostic feedback are examples of widely implemented approaches. In this section, we summarise the evidence on the effects of these programmes.

5.5.1 Teacher incentives



Teacher incentive programmes seek to improve the working conditions in schools so that teachers are motivated to come to work and improve their performance. Such interventions take many forms, including direct payments to teachers based on their attendance or on the achievements of their students, and teacher surveillance and monitoring (Glewwe *et al.* 2010; Cueto *et al.* 2008).

What is the evidence base?

We included studies of 10 different teacher incentive programmes in Chile, China, India, Kenya, Mexico, Pakistan and Peru. All 10 programmes provided an incentive or reward to teachers based on their performance. The programmes all aimed at incentivising teacher effort and rewarding excellence, but the designs varied considerably. Some provided individual incentives, while others were group incentive schemes or a combination of both. Most programmes rewarded improvements in student learning outcomes, except in India and Peru, where bonuses were conditional on improved teacher attendance (Cueto *et al.* 2008; Duflo, Hanna & Ryan 2012).

Teachers do not seem to alter their teaching approach and instruction techniques in response to incentives, except for increasing preparatory sessions for tests.

What have we learned?



- **Overall, the effects of teacher incentives on teacher performance and student outcomes have been small.** The overall effects range from small negative effects on some measures of teacher performance (use of materials) to no effects on a range of student participation outcomes (student attendance, drop out, completion) and learning outcomes (language arts, composite scores). Maths test scores, where programmes led to a small overall improvement, are an exception.

Effects vary greatly across different programmes. While the average effects show no or very small improvements, there are a couple of exceptions, such as the Seva Mandir Teacher Incentive programme in India and the Mejor Educación a través de más Tiempo en el Aula programme in Peru, where there was some improvement in learning outcomes.

- **Teacher incentives may improve teacher attendance if it is an explicit condition for a bonus.** The Seva Mandir Teacher Incentive programme (Duflo, Hanna & Ryan 2012), which improved teacher attendance, was specifically designed to incentivise teacher attendance. The Kenyan International Child Support Teacher incentive programme and the randomised evaluation of teacher incentives in Andhra Pradesh, India showed that incentives improved teacher attendance. In these cases, incentives were based on improvements in student learning (Glewwe, Ilias & Kremer 2010; Muralidharan & Sundaraman 2011).
- **Incentives linked to student achievement may encourage teachers to 'teach to the test'.** The findings suggest that teachers do not seem to alter their teaching approach and instruction techniques in response to incentives, except for increasing preparatory sessions for tests. The evaluation of the Carrera Magisterial suggested that teachers dedicated extra time to test preparation; the study authors hypothesise that this additional effort might have been partly responsible for the positive effects observed in some programmes (Santibañez *et al.* 2007). These findings align with some of the theories of change for teacher incentive programmes which suggest that teachers may focus on improving the observable measures of their performance that are rewarded.

The lack of improvement in most learning outcomes is not surprising. The evidence on intermediate outcomes suggests that teachers do not improve their attendance or alter their instruction techniques in response to incentives (with the exception of an increased focus on preparing for tests).

5.5.2 Teacher hiring



Teacher hiring interventions are designed to increase the number, quality or motivation of teachers in schools. Some interventions focus on hiring additional teachers to reduce class size and pupil-teacher ratios and decrease the need for multi-grade teaching. Other interventions promote the employment of contract teachers instead of permanent civil service teachers. These programmes are guided by the idea that employing teachers on short-term contracts can be economical and increase incentives for teacher attendance and performance, while still ensuring that teachers are qualified and capable. Other teacher hiring interventions are designed to introduce new hiring and promotion processes for improving the quality of new appointees.

Contract teachers' relative pay and conditions are important determinants of their job satisfaction and possibly of their commitment and performance.

What is the evidence base?

We included studies of eight programmes implemented in India, Kenya, Mexico, Pakistan and Togo. The programmes used a variety of mechanisms to achieve their goals. Two programmes implemented new teacher hiring procedures, four recruited additional teachers for schools and five hired contract teachers with the aim of providing schools with lower paid, but similarly qualified, teachers.





■ **Hiring additional contract teachers may improve student outcomes in some contexts, based on evidence from three studies.** The overall effect is relatively small, but this is due to the considerable variation in the effects of different programmes. The Extra Teacher Programme in Kenya led to substantial improvements for some learning outcomes, in particular composite outcome test scores (Duflo, Dupas & Kremer 2012). However, an attempt to replicate this through another programme in Kenya and India failed to show the same results (Bold *et al.* 2013; Muralidharan & Sundararaman 2013b). The evidence suggests that this may be because the reduction in class size was less than intended, not all vacancies were filled and teachers were often asked to cover other grades or were reallocated within schools (Bold *et al.* 2013).

■ **Contract teachers may perform better than civil service teachers in some contexts.** We included three studies that looked at contract teachers. The overall performance of contract teachers in Pakistan and Kenya, as measured by maths, language and composite outcome test scores of students, was superior to that of their civil service peers. However, in Togo, students of contract teachers performed worse than those of civil service teachers on maths tests (Vegas & De Laat 2003).⁹

What explains these results? The theory behind contract teacher interventions assumes that teachers on contracts are more economical and that they are an equally qualified and better motivated workforce. Contract teachers in all three interventions received less pay and fewer benefits than their civil service peers. Despite these relatively poorer conditions, unemployed teachers in Kenya still actively sought contract teaching positions (Duflo, Dupas & Kremer 2012). Moreover, in Pakistan, contract teachers were still better paid than teachers working in low-cost private schools, and this may have been a motivating factor (Bau & Das 2014).

But there is also the danger that poorer employment conditions may result in a 'disgruntled worker effect' that negatively affects performance and the quality of candidates. The evidence presented here suggests that both these scenarios may occur in different contexts, and that contract teachers' relative pay and conditions are important determinants of their job satisfaction and possibly of their commitment and performance. In Togo, contract teachers were paid worse and more likely to report that they received their pay on a very irregular basis than civil service teachers. This may have resulted in less qualified candidates filling vacancies (Vegas & De Laat 2003).

■ **Teacher hiring interventions may also challenge existing teachers and be difficult to implement.** The qualitative evidence suggests that teacher hiring interventions are not always easy to implement, as they can threaten existing jobs or provoke opposition because they can mean lower pay, fewer privileges and less job security. In Kenya, the government ended a contract teacher intervention early and acquiesced to union demands to absorb contract teachers into civil service employment (Bold *et al.* 2013). The authors conclude that contract teacher hiring may be effective on a small scale, but that a large cohort of teachers employed at wages far below levels paid to their civil service peers can be difficult to implement, particularly where teachers are unionised and politicised. Similarly, in Mexico, teacher unions opposed a programme that was changing recruitment procedures so that teachers would be selected based on their achievement in a competitive exam rather than traditional recruitment by a committee (Estrada 2013).



There is an increasing focus on interventions that aim to improve education outcomes through changes to the education system at community, local government, regional government or national levels. Such programmes are primarily related to education management, governance and financing. Policymakers may delegate more decision-making powers to direct service providers, and in many cases make them more directly accountable to children and their parents. Such interventions can also channel government revenues through the private sector, which is seen to be more responsive to the needs of service users. Here we present evidence on the effects of three such types of interventions, namely community-based monitoring, school-based management and public–private partnerships.

6.1

Community-based monitoring



Community-based monitoring interventions provide information about public services and fora for public participation to improve the accountability of service providers, governments and other public bodies to the communities they serve (Westhorp, Walker & Rogers 2013). The ultimate aim is to motivate parents to demand better education and to motivate schools to perform better. Improved school responsiveness may lead to improved teacher attendance, teaching quality, school management or resource allocation in the education sector, which in turn leads to improved learning outcomes for children.

Community-based monitoring interventions are usually centred on an information campaign either to promote awareness of an existing accountability mechanism or to provide information about the current performance of education providers, often through report cards. The campaign is sometimes coupled with capacity-building activities, such as providing monitoring tools, training on how to monitor services or training on how to assess a child's learning. Interventions can involve active parental engagement through meetings in schools or in the village (Banerjee *et al.* 2010) or less direct approaches such as newspaper or local TV campaigns (Reinikka & Svensson 2007).

What is the evidence base?

We identified studies of nine different community-based monitoring programmes in Brazil, Chile, India, Kenya, Madagascar, Pakistan and Uganda. The programmes are relatively diverse in their design, varying by the type of information provided, the intensity of delivery and delivery mechanisms. For example, a newspaper campaign in Uganda (Bjorkman 2006; Reinikka and Svensson 2007) had the broad ambition of reducing corruption in the education sector by publishing data in national newspapers on the monthly transfers of education grants. Other programmes simply provide information about average school examination results to parents to highlight shortcomings in schools, for example, the disclosure of the National Secondary Education Examination policy in Brazil (Camargo *et al.* 2012). Four of the programmes incorporated some kind of capacity building, such as training parents to produce a score card, while a programme in Kenya trained parents to monitor teacher attendance and performance.



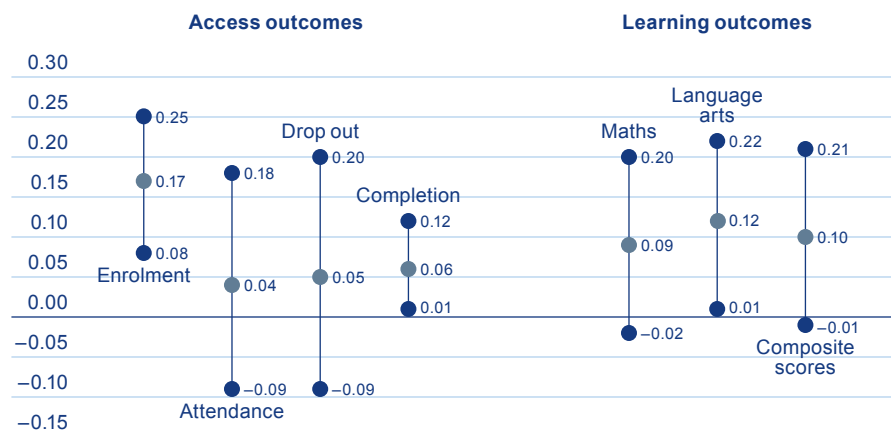
- Community-based monitoring improves school enrolment in some contexts.** However, the effects vary greatly. Effects on other participation outcomes, such as student attendance, completion and drop out is less clear (see Figure 9). Reviewing the results in more detail reveals there are two programmes in particular that are driving the overall positive effect on enrolment: a report card programme in Pakistan (Andrabi, Das & Khwaja 2013) and a newspaper campaign to reduce corruption in Uganda (Bjorkman 2006; Reinikka & Svensson 2007)
- Community-based monitoring improves learning in some contexts.** We find that community-based monitoring initiatives can have substantial benefits on student test scores, but that effects vary between contexts and even within the same country. In Kenya, Pakistan and two out of three Indian states, community-based monitoring initiatives substantially improved children’s test scores in maths and language arts (Pandey, Goyal & Sundararaman 2011; Duflo, Dupas & Kremer 2012; Andrabi, Das & Khwaja 2013). But in other contexts, programmes had negligible or even negative effects on learning outcomes. For example, there was no effect of the Encouraging Participation in Sarva Shiksha Abhiyan programme implemented in Uttar Pradesh in India (Banerjee *et al.* 2010).
- Parents and education committees had limited knowledge of monitoring institutions.** In these kinds of interventions, the knowledge of parents and school committee members in relation to their roles and responsibilities, and the status of education in their area, are important process outcomes. For parents and committees to participate in collective action to improve schools, they must first be aware of the local education situation and what they can do to intervene. In two programmes in India where this process outcome was measured, there was little change in parental and committee knowledge (Banerjee *et al.* 2010; Pandey, Goyal & Sundararaman 2011).
- In many contexts, parents’ participation in school monitoring activities did not increase.** Community meetings to disseminate information were well attended in the four cases where this was measured (Banerjee *et al.* 2010; Pandey, Goyal & Sundararaman 2011; Lassibille *et al.* 2010; Zeitlin *et al.* 2012), but this often failed to translate into active participation in monitoring activities. A key intermediate stage in the theory of change is that once parents are empowered with the knowledge and tools to hold providers accountable, they decide to take action and participate collectively in monitoring activities, such as joining a school education committee. However, evidence from the Amélioration de la Gestion de l’Education à Madagascar initiative, the score card programme in Uganda and the two community-based monitoring interventions in India suggest that the programmes did not lead to increases in parents’ participation in school management and monitoring (Nguyen & Lassibille 2008; Banerjee *et al.* 2010; Pandey, Goyal & Sundararaman 2011; Zeitlin *et al.* 2012).

What explains the variance in outcomes across contexts? Qualitative and implementation evidence suggest several factors.

Figure 9: Average effects of community-based monitoring across all outcomes

- Upper and lower confidence intervals
- Average (standardised mean difference)

Note: This figure provides the results of the meta-analyses of the effects of community-based monitoring for all outcomes where we were able to conduct a meta-analysis. All measures are expressed as SMD (Cohen’s d). Each line provides the results of one meta-analysis, showing the average effect and the associated 95 per cent CI. Thus, CI lines that do not cross the horizontal axis in the graph mean that the SMD is statistically significant from zero.



For parents and committees to participate in collective action to improve schools, they must first be aware of the local education situation and what they can do to intervene.

- **Community human capital may influence intervention effectiveness.** Several of the included programmes were implemented in areas where parents had high rates of illiteracy (Pandey, Goyal & Sundararaman 2011; Andrabi, Das & Khwaja 2013; Lassibille 2013), although illiteracy is not consistently reported by authors as a barrier or facilitator. Andrabi, Das and Khwaja (2013) report that, in Pakistan, high rates of illiteracy among parents (37.3 per cent in sample villages) may lead to more involvement in efforts to improve schools, because such parents are less able to increase involvement in their children's education at home. Pandey and colleagues' evaluation of an information campaign in three Indian states found greater improvements in student achievement in villages with low literacy rates. They suggest this is because villages with more illiterate parents have a greater demand for schooling. On the other hand, Lassibille (2013) suggests that wealthier and more literate parents are better able to use the information provided by the report cards, and are presumably better able to monitor school activities.
- **Lack of teacher responsiveness may be a barrier to improving outcomes.** A key assumption at the last stage of the theory of change is that education providers respond to increased parental demand. A community-based information campaign in three Indian states informed parents and school committees of their oversight roles and responsibilities in education. Researchers found that when parents raised concerns regarding their children's learning with teachers, they were frequently met with a negative or angry response (Pandey, Goyal & Sundararaman 2011). Evidence from the programmes in India, Pakistan and Uganda also suggests that the incentive structures for teachers in these contexts may limit their responsiveness to parents' demands, and thus the power of accountability mechanisms.

- **Private providers may have stronger incentives to respond to community demands for better education.** Limited evidence suggests that the responsiveness of the education providers may vary by school type. Three of the eight programmes covered both public and private schools in Brazil, Chile and Pakistan. The studies in Brazil (Camargo *et al.* 2012) and Pakistan (Andrabi, Das & Khwaja 2013) found substantially larger improvements in student test scores in private schools following publication of information on school performance. For example, the report card experiment in Pakistan reported large improvements in enrolment and learning outcomes. The programme presented raw test scores of children and schools in a defined 'school market', that is, in schools that would be considered as viable options for a parent living in a given village. Both public and private schools were included in this 'school market'. Separating results by school type, the authors find that effects were larger for private schools that initially performed poorly, with only very small improvements in public schools. Similarly, the Exame Nacional do Ensino Médio policy of publishing school test scores in Brazil improved composite outcome test scores only in private schools (Camargo *et al.* 2012) and had no effect in public schools.
- **Community-based monitoring programmes may not be sufficient to produce sustainable improvements in learning outcomes.** By design, community-based monitoring programmes focus on addressing barriers to quality education resulting from information asymmetries and lack of accountability between service users and providers. Addressing these issues may help facilitate better education outcomes. Such programmes may not be sufficient to improve outcomes unless they also address resource constraints (such as lack of trained teachers or sufficient school materials). The newspaper campaign in Uganda (Bjorkman 2006) aimed to address a large shortfall in funding to schools due to leakage of funds before they reached schools. The campaign led to a large increase in the financial resources reaching schools, which may explain the relatively large improvements in student achievement.

Community-based monitoring programmes may not be sufficient to improve outcomes unless they also address resource constraints.

6.2

School-based management



School-based management interventions decentralise authority to the local level, handing decision-making over to school leadership, teachers, parents, students or other community members, with the aim of improving the financing and quality of education services (Barrera-Osorio *et al.* 2009; Bruns, Filmer & Patrinos 2011). Such interventions typically work through a school committee with authority and responsibility for one or more of the following: budget allocations, staffing, curriculum development, monitoring performance of teachers and students, and procurement of materials and infrastructure development (Barrera-Osorio *et al.* 2009; Bruns, Filmer & Patrinos 2011). Committees may also devise school improvement plans and receive funds to finance implementation of these plans. The characteristics of such programmes vary widely between countries. Bruns, Filmer and Patrinos (2011) suggest school-based management programmes lie on a continuum from weak to strong, based on the degree of devolution of decision-making power.

What is the evidence base?

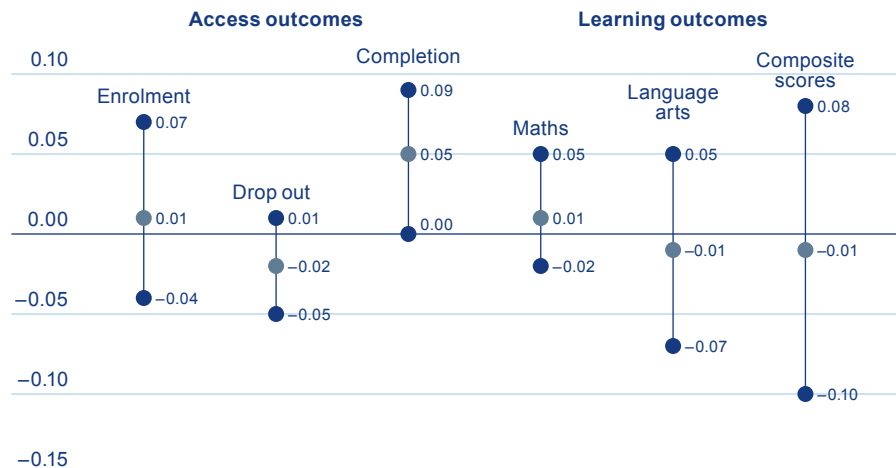
We identified studies of 12 different school-based management programmes in Brazil, the Gambia, Indonesia, Mexico, Niger, the Philippines, Senegal and Sri Lanka. While there is some diversity in programme design, all programmes evaluated contained some of the main components of a typical school-based management programme as described in the literature (Barrera-Osorio *et al.* 2009). All programmes – apart from introduction of democratic school leadership in the Philippines (San Antonio & Diosdado 2008) and Encouraging School Committee Participation in Indonesia (Pradhan *et al.* 2014) – were implemented by national governments.

In the majority of the included programmes, decision-making authority with respect to school operations and funds were transferred to a school management committee. Apart from the Advisory School Council programme in the Philippines (San Antonio & Diosdado 2008) and the Programme for School Improvement in Sri Lanka (Aturupane *et al.* 2014), all programmes gave school stakeholders some control over funds, although the amount and share of total budget varied. For instance, the Quality Schools Programme in Mexico provided schools with an annual grant over five years while the Comité de Gestion de l’Etablissement Scolaire programme in Niger provided a one-off grant of US\$209 on average per school (US\$1.83 per student). Finally, most programmes included a capacity-building component targeted at different school stakeholders, such as orientation workshops and seminars on financial management, project planning or how to develop school improvement plans.

Figure 10: Average effects of school-based management across all outcomes

- Upper and lower confidence intervals
- Average (standardised mean difference)

Note: This figure provides the results of the meta-analyses of the effects of school-based management for all outcomes where we were able to conduct a meta-analysis. All measures are expressed as SMD (Cohen’s d). Each line provides the results of one meta-analyses, showing the average effect and the associated 95 per cent CI. Thus, CI lines that do not cross the horizontal axis in the graph mean that the SMD is statistically significant from zero.





- **School-based management programmes do not appear to improve school participation on average**, as measured by enrolment, completion and drop-out rates (see Figure 10). This finding is consistent across programmes and outcomes, although the results for enrolment are based on few studies.
 - **The average effect of school-based management on learning outcomes is small**, but there is a large amount of variability in effects across contexts. We were able to examine the effects of school-based management on maths, language and composite test scores using meta-analysis. Overall the results suggest no or small average effects on test scores. One reason for some of the relatively small average effects is the large amount of variation observed for most of our analyses. In some countries – including the Gambia, India, Indonesia, Mexico, Niger and Senegal – there may have been negative effects on some groups, although the estimates are imprecise. However, for the Third Elementary Education Project and the Basic Education Sector Reform Agenda (BESRA) programme, both implemented in the Philippines, we observe consistently larger effects than the average, as measured by language, maths and composite test scores (Khattri, Ling & Jha 2012; Yamauchi 2014).
 - **School-based management programmes led to a substantive improvement in grade completion in Mexico and Brazil**, but not on average in Indonesia and Niger. In the Plano de Desenvolvimento da Escola in Brazil, there was an increase in students completing their grade among first to eighth graders. In Mexico, the pass rate for third graders in the Programme to Strengthen and Invest Directly in Schools improved substantively, but for sixth graders there was no difference.
 - **School-based management programmes do not appear to improve teacher attendance on average**. But there is significant variability between contexts. The evidence suggests there was a substantial increase in teacher attendance in the Gambia, whereas in Niger and Sri Lanka there may have been a negative effect. Qualitative feedback from teachers in Niger suggested that they preferred a centralised government and disliked that the communities were in charge of the grant, as it undermined their authority (Beasley & Huillery 2014). In one-teacher schools, attendance improved when parts of the grant were invested in teachers.
- What explains the variance in outcomes across contexts? There are several factors.
- **Comprehensive school-based management programmes can substantially improve learning outcomes**. As was noted above, we observe consistently larger than average effects for the Third Elementary Education Project and the BESRA programme, both implemented in the Philippines (Khattri, Ling & Ja 2012; Yamauchi 2014). Both programmes appear to represent examples of comprehensive school-based management programmes. They included the development of school improvement plans, capacity-building activities and some decentralisation of financial decision-making. The programmes also required schools to develop annual report cards on school performance to be shared with the community at the end of the school year (a feature not included in any other school-based management programme included in this study).
 - **Implementation issues may have influenced programme effectiveness**. For several programmes, grants were not disbursed as intended, with delays to completion of grant disbursement reported for both the Quality Schools programme, Programa Escuelas de Calidad, in Mexico and the Whole School Development (WSD) in the Gambia (Skoufias & Shapiro 2006; Blimpo & Evans 2011). In Mexico, schools also dropped out of Programa Escuelas de Calidad due to changes in leadership; conflict among participating administrators, teachers and parents; and the workload involved in accounting for the grant money.
 - **Limited capacity of the education system may have been a barrier to improved outcomes**. Most school-based management programmes include some change in how resources are allocated, but they do not necessarily provide additional resources. Thus, in contexts with a significant lack of resources, school-based management programmes may not have been sufficient to address the constraints to better education outcomes. For example, in the case of the programme in the Gambia, binding contextual constraints such as low teacher quality and widespread double-shift schools may have reduced the effectiveness of the WSD programme (Blimpo, Evans and Lahire 2015). In Mexico, the authors of the evaluation of Programa Escuelas de Calidad suggest the lack of improvement in student outcomes in some states may be because the departments of education in these states lack capacity to provide support to schools (Murnane, Willet & Cardenas 2006).

■ **In some cases, school-based management may have placed a too heavy administrative burden on teachers and principals, taking away time spent on pedagogical responsibilities**

(Murnane, Willet & Cardenas 2006; Khattri, Ling & Jha 2012; Blimpo and Evans 2015). If teachers need to reallocate a significant amount of time to the implementation of different school-based management components, they have less time for pedagogical responsibilities and teaching, which might adversely affect student learning.

■ **Parents were not always able to participate effectively in school management and hold stakeholders accountable.**

Parents' willingness, authority and capacity to participate in school management are an important prerequisite for parents to hold school stakeholders accountable and help improve school management. School-based management programmes do not appear to consistently increase parents' engagement with schools (Bando 2010; Aturupane *et al.* 2014; Pradhan *et al.* 2014). In some cases, such as in Indonesia, Mexico and Sri Lanka, parents' engagement with school management did not improve, whereas in Niger and Mexico parents' engagement with schools did improve (Skoufias & Shapiro 2006; Gertler, Patrinos & Rubio-Codina 2012; Beasley & Huillery 2014; Santibañez, Abreu-Lastra & O'Donoghue 2014).

However, even when parental involvement improved it is not clear this translated into school councils being a forum for collaborative planning or shared decision-making (Aturupane *et al.* 2014; Beasley & Huillery 2014; Santibañez *et al.* 2014). For example, in the Comité de Gestion de l'Établissement Scolaire programme in Niger, increased parental participation in and responsibility for school management did not translate into improved school quality. Some aspects of school management improved, such as cooperation between school stakeholders, but overall accountability did not change and spending was often non-educational and directed to profit making (such as for agricultural projects and school festival playgrounds). Challenges in establishing effective parental and/or community engagement in school-based management may be particularly pronounced in countries with centralised, hierarchical education systems (Murnane, Willet & Cardenas 2006; Beasley & Huillery 2014).

■ **Existing levels of social and human capital may moderate the success of school-based management.**

The qualitative synthesis suggests existing levels of social and human capital among school stakeholders may influence the extent to which school-based management interventions lead to improved education outcomes (Snilstveit *et al.* 2015).

For example, where school committees were educated or had experience in another community organisation, parents increased the monitoring of teacher attendance in response to the grant (Beasley & Huillery 2014). Moreover, baseline adult literacy was found to mediate the effect of the WSD programme in Gambia. The authors suggest the WSD intervention is likely to improve learning outcomes in areas with high baseline human capital, but could be counterproductive in areas where the basic human capital is very low. On the other hand, in the two programmes in the Philippines where learning outcomes improved, the criteria for receiving the intervention¹⁰ effectively targeted schools in areas with higher human and social capital (Khattri, Ling & Ja 2006; Yamauchi 2014).

■ **School committees not prioritising learning materials and human resources may have been a barrier to improved learning outcomes.**

In Mexico and Niger, grants were focused on construction and other material inputs, rather than books, learning materials or teacher training (Skoufias & Shapiro 2006; Beasley & Huillery 2014; Bando 2010). For example, in both the Apoyo a la Gestion Escolar and Programa Escuelas de Calidad programmes in Mexico, programme funds were used for infrastructure improvements, rather than to purchase books and other learning materials (Skoufias & Shapiro 2006; Bando 2010;). Similarly, in Niger the grant was not used on activities likely to improve learning (Beasley & Huillery 2014). In Senegal, there was a larger positive effect for schools in the south of the country, where projects tended to focus on training human resources (teaching and management) compared to those in the north, where priority was placed on the acquisition of school materials (such as textbooks and manuals).

■ **Programmes may not have been in place long enough to observe improvements.**

School-based management programmes do not typically involve additional resources, but rather a change in the system of delivering education. Such changes take time to be fully implemented at the school level (Cook 2007) and for those changes to translate into improved outcomes. For example, a meta-analysis of studies of programmes implemented in the United States found that it took around eight years for test scores to improve (Borman *et al.* 2003). However, none of the programmes assessed here had been in place longer than three years, and four of these had only been in place for one year or less. Delays in implementation were reported, and in Niger the programme was terminated after only one year due to a political coup (Beasley & Huillery 2014). Longer implementation is not automatically associated with better results in our sample, but the two programmes with consistent improvements in test scores had been in place for two and three years (Khattri, Ling & Ja 2012; Yamauchi *et al.* 2014).



6.3 Public-private partnerships



Public-private partnerships are initiatives where governments contract private-sector partners to operate public schools, or establish voucher programmes that allow students to attend private schools at no or reduced costs (Fielden & LaRocque 2008). Typically, the government develops education policy and provides finances, while private actors (either profit, non-profit or faith-based organisations) deliver services to students (Patrinos, Barrera-Osorio & Guaqueto 2009). Some countries subsidise existing private schools to improve their capacity to educate, while other countries bring in private organisations to manage public schools (Patrinos, Barrera-Osorio & Guaqueto 2009).

Public-private partnerships are thought to improve access to and quality of education through two main mechanisms. Firstly, bringing private sector partners into the schooling system may increase the number of school providers and subsequently improve access to education and school choice (Patrinos, Barrera-Osorio & Guaqueto 2009). Secondly, it is thought competition among private actors may provide incentives for service providers to deliver better quality services and improve institutional accountability towards parents.

However, the role of the private sector in providing education is controversial. For example, the recent announcement of the government of Liberia's plans for its primary education to be managed by a private, for-profit firm through a public-private partnership triggered a vigorous debate, with the UN's special rapporteur on education, Kishore Singh, describing the move as an 'attack' on public schools and teachers (Rumney 2016).¹¹

What is the evidence base?

We identified studies of 13 different programmes in Bangladesh, Chile, China, Colombia, Haiti, India, Pakistan and Uganda. The programmes covered both primary and secondary schools, including private for-profit schools, public schools, community and religious schools, and schools run by charitable foundations. All but three programmes targeted low-income or underserved populations.



- **Public–private partnerships improve school participation in some contexts.** They have relatively large average effects on school enrolment (9.5 per cent), and to some extent the completion of studies (11 per cent). Public–private partnerships involving per student subsidies to low-cost private schools in particular have had substantial effects on school enrolment rates in low-income settings. This finding is replicated across three programmes in Haiti, Pakistan and Uganda. In all three programmes, the payment covered the full cost of tuition and the payment was made conditional on schools agreeing to not charge students tuition fees. In Haiti and Uganda, the benefits were particularly large for girls in the early grades of primary and secondary school respectively.

The effect on school completion is less certain, with improvements in the tuition waiver programme in non-public schools in Haiti driving most of the overall results. Completion also improved among the students participating in the universal voucher programme in Colombia, although at a smaller rate than in Haiti. In the Universal Secondary Education programme in Uganda, the data do not suggest improvements, but the follow-up period of less than 12 months may be too short to observe an improvement in this outcome. Evidence is lacking on other participation outcomes, such as attendance and drop out; however, in the one case where drop out was assessed the authors suggest a relatively large reduction in drop-out rates among children in the Concession School programme in Colombia.
- **Public–private partnerships may improve children’s learning outcomes, but the overall effect across seven programmes is relatively small in magnitude.** Across a range of different variants of public–private partnerships, including low-cost private schools, we observe an overall improvement in test scores, although the magnitude of the effect is smaller than that for participation (two per cent improvement in language arts, 2.5 per cent improvement in maths). But in a few cases, such as the Universal Secondary Education programme (low-cost private school) in Uganda and the universal voucher programme in Colombia, we observe larger improvements in test scores than the average (Barrera-Osorio 2006; Barrera-Osorio *et al.* 2015). In the case of the Andhra Pradesh School Choice project in India, there were no effects on maths and Telugu (mother language) test scores, but there was a small improvement in English test scores and a relatively large positive effect on Hindi test scores (Muralidharan & Sundararaman 2013a). Analysis by the authors suggest time use may explain these results. The private schools spent less time teaching Maths and Telugu than public schools, and instead prioritised teaching English, science, social studies and Hindi.
- **There is some evidence to suggest public–private partnerships schools were of better quality than public schools.** Evidence suggests public–private partnerships schools in China, Colombia, India, Pakistan and Uganda provided a better quality of schooling, as measured by a range of outcomes, such as teacher performance, teacher attendance and availability of materials (Barrera-Osorio 2006; Zhang 2009; Barrera-Osorio & Raju 2011; Muralidharan & Sundararaman 2013a; Barrera-Osorio *et al.* 2015). For example, in both Colombia and India, private schools had better infrastructure, equipment and supplies than public schools. In India, private schools also outperformed government schools on measures of classroom practices, teacher absence and teacher performance (Muralidharan & Sundararaman 2013a), despite having less educated, younger and lower paid teachers. In the Foundation Assisted Schools Programme in Pakistan however, there was an overall increase in the availability of teachers, classrooms and blackboards, but because of the growth in student enrolment, student-teacher and student-classroom ratios did not improve.
- **A range of implementation issues may have reduced the effectiveness of some programmes.** For example, the cases of the Urban Girls’ Fellowship Programme in Pakistan, the Reaching Out of School Children project in Bangladesh and the Programa de Ampliación de Cobertura de la Educación Secundaria in Colombia suggest that a lack of organisational capacity in both government agencies and the implementing partners was a barrier to effective implementation and monitoring (Sniilstveit *et al.* 2015). Reports from both the Bangladesh and Colombia programmes suggest this made it difficult to guard against ‘ghost’ students. However, it is not clear how these issues influenced final outcomes. In the case of Colombia, we observe some improvements across all outcomes, with particularly large effects on completion.

In the previous chapters, we have presented the evidence on the effectiveness of 216 programmes that reached 16 million children across 52 L&MICs. The results demonstrate there are no ‘magic bullets’ for ensuring high-quality education for all. However, the results of the systematic review highlight key findings that should inform future education programmes. In this chapter, we summarise the main findings on which interventions appear to work in most contexts, which are promising (but require further testing), which do not always work and where effects are unknown because studies have not been conducted. In addition, we note cross-cutting lessons across intervention areas. The final section outlines implications for policy, programming and research.

7.1 Findings across the reporting categories

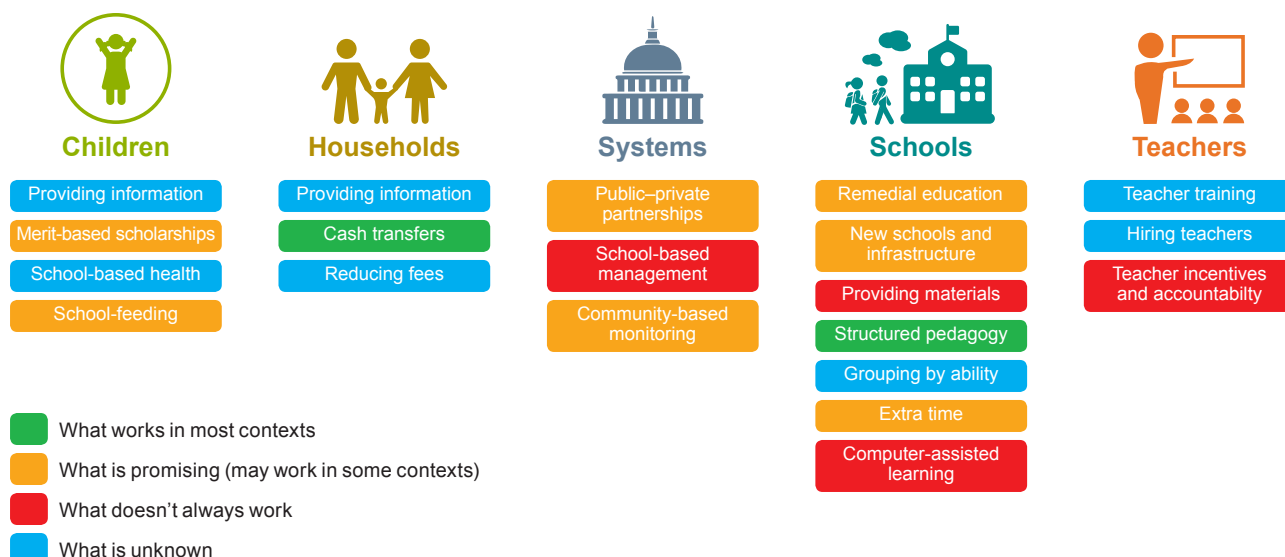
Some interventions, such as cash transfers and structured pedagogy, appear to work in most contexts, while the effects of other interventions, including different types of school-based health programmes and reducing school fees are yet unknown due to lack of sufficient studies. Figure 11 draws on the conceptual framework and the categories of reporting presented in Chapter 2 to provide a visual overview of results across the review.

7.1.1 Main findings: children and households



A range of different programmes address barriers and constraints to school participation and learning faced by children and households. These programmes typically aim to address the constraints that children face due to poor health and malnutrition, by providing material incentives for schooling to children and/or parents, or by reducing the cost of schooling. Some programmes, such as school-feeding, are designed to address several of these constraints.

Figure 11: Visual overview of results across the review



These are the main findings on the effects of such programmes:

- Of all the interventions included in the systematic review, **cash transfer programmes** result in the largest and most consistent improvements in school participation. Such programmes increase school enrolment, reduce drop out and improve completion rates overall. On average, cash transfer programmes do not improve learning outcomes, although some individual programmes show positive results.
- On average, **merit-based scholarships** (where students, rather than parents, are offered financial incentives to improve attendance and effort) improve learning outcomes. Few studies assessed the effects of these programmes on school participation.
- **School-feeding programmes** are one of the programmes included in this review that are promising for improving both school participation and learning outcomes, particularly in contexts with high rates of food insecurity and low rates of school participation. School-feeding programmes have limited effect in areas without malnutrition and where school participation rates are already high.
- The overall effects of **providing information to children or parents, reducing user fees and implementing school-based health programmes** are not clear because there have been few high-quality studies on these interventions.

The results show that programmes addressing child and household constraints to children's education may be particularly effective at increasing school participation. The findings, summarised by programme type, suggest cash transfers are most effective in improving school participation while merit-based scholarships and school feeding have been relatively more successful in improving learning outcomes.

7.1.2 Main findings: schools and teachers



Programmes that address the resource constraints that schools and teachers must overcome in order to improve the classroom environment are particularly important for improving learning outcomes. Such programmes focus on improving the effectiveness of lessons by changing curriculum content and delivery, providing additional materials, introducing new technology and/ or by improving the quantity and quality of teachers through incentives, training or changes in hiring practices. Programmes can also combine these different components. These are the main findings on the effects of such programmes:

- Of the interventions included in this review, **structured pedagogy programmes** have the largest and most consistent positive effects on learning outcomes. Effects on participation outcomes are not clear because few studies measure such outcomes. These programmes typically address several constraints to learning directly, such as lack of appropriate materials, curriculum and poorly trained teachers. In doing so they provide a carefully designed combination of 'software' and 'hardware' components.



- **Remedial education, additional instructional time and construction of new schools** are promising interventions for improving learning outcomes.
- **Construction of new schools and programmes to construct latrines in schools** also appear promising for improving school participation, with greater benefits for girls. More research is needed to assess whether these improvements can be replicated elsewhere.
- For some commonly implemented programmes, the results are less encouraging. Programmes **providing new learning materials** had little or no effect on learning outcomes, when measured in terms of maths, language arts and composite test scores. Qualitative studies suggest several programmes suffered from implementation challenges and that the materials provided to students were not always appropriately customised. This kind of educational ‘hardware’ may be necessary, but does not seem to be sufficient for improving learning outcomes, especially if poorly designed or implemented.
- **Computer-assisted learning programmes** have mixed effects on learning outcomes. These programmes can improve learning, especially in maths. However, results vary greatly by location, and the overall effects on language and composite test scores are close to zero. These programmes have also had harmful effects on children’s learning in contexts where they have been poorly designed and/or implemented.
- **Teacher incentive programmes** appear to have small overall effects on teacher performance and student outcomes, based on the few available studies. The average effects range from small negative effects on some measures of teacher performance (use of materials) to no effects on a range of student participation outcomes (student attendance, drop out, completion) and learning outcomes (language arts, composite test scores). Maths test scores may be an exception, with modest overall improvements. Despite the popularity of such programmes, the evidence suggests that teachers do not seem to improve their attendance or alter their instruction techniques in response to incentives, with the exception of an increased focus on preparing for tests.
- **Teacher hiring interventions** are designed to increase the number and quality of teachers in schools. Few overall lessons can be drawn due to the diversity of programme design and variation in results within this category.

Of the interventions included in this review, structured pedagogy programmes have the largest and most consistent positive effects on learning outcomes.

- The evidence on the effectiveness of **hiring additional contract teachers** is mixed. The Extra Teacher Programme in Kenya led to significant improvements for some learning outcomes, but attempts to replicate these results through new programmes in Kenya and India failed to show the same success. Contract teachers may perform better than civil service teachers in some contexts. The overall performance of contract teachers in Pakistan and Kenya, as measured by the maths, language arts and composite test scores of students, was superior to that of their civil service peers. However, in Togo, students of contract teachers performed worse than those of civil service teachers on maths tests.
- We did not identify studies assessing the effects of **stand-alone teacher training programmes**. However, both structured pedagogy and remedial education interventions typically include elements of teacher training.

Programmes addressing constraints at the school and teacher levels can improve children’s learning outcomes. Structured pedagogy programmes that change the classroom environment had the largest and most consistent positive effects on learning, in comparison to any other programme across the review. Remedial education, additional instructional time and construction of new schools are also promising for improving learning outcomes, but this needs to be further assessed in new studies. Providing education-related ‘hardware’, such as materials and technology, may be necessary, but not always sufficient for improving learning outcomes if programmes are poorly designed and/or implemented. Despite the popularity of teacher-focused interventions, we find limited evidence and are unable to draw any strong conclusions about the effects of specific programmes, although teacher incentives appear to have small effects on teachers’ behaviour and children’s learning outcomes.



7.1.3

Main findings: systems



There is an increasing focus on systems interventions that aim to improve education outcomes through changes to the education system at the community, local, regional or national level. Such programmes aim to improve the way schools are run by changing the governance and financing of education.

- **Community-based management interventions** improve school enrolment in some contexts, but effects on other participation outcomes (such as student attendance, completion and drop out) are less clear. The results also suggest community-based management interventions can improve student test scores, but effects vary between contexts – even within the same country.

- **School-based management interventions**

do not appear to improve school participation, with little or no improvement, on average, in enrolment, completion and drop-out rates. This finding is consistent across programmes and outcomes, although few studies are available to assess the results for enrolment. Similarly, the overall effect of school-based management interventions on learning outcomes is close to zero. But there is a large amount of variability in effects across contexts, with larger improvements in learning outcomes in several programmes in the Philippines.

- **Public–private partnerships** improve school participation in some contexts. They also improve learning outcomes in some contexts, but the overall effect is relatively small, ranging from two per cent improvement in language to 2.5 per cent improvement in maths. Programme context and design are key to the success of public–private partnerships. In particular, we find that public–private partnerships involving per student subsidies to low-cost private schools have substantial effects on school enrolment rates in low-income settings, as replicated across three programmes in Haiti, Pakistan and Uganda.

Programmes that are primarily focused on improving the governance and financing of education attempt to influence education outcomes through systemic changes. The evidence suggests that public–private partnerships (low-cost private schools) and community-based monitoring may improve school participation outcomes in some contexts, with community-based monitoring also improving learning in some contexts. The results for school-based management are less encouraging, with small overall effects, and zero or small negative effects in some cases.

7.2

Cross-cutting lessons about factors that influence effectiveness: implications for policymakers and programme managers

The review finds that the effects of programmes vary greatly across different contexts, with the same type of intervention leading to different outcomes in different countries, or even in different locations within the same country. Most interventions improved outcomes in some contexts. However, when averaged across locations, the effects were small or statistically insignificant. This shows that programme effectiveness is often dependent on programme design and implementation, and the local context. This section summarises cross-cutting findings on process, implementation and contextual factors that affect results. It also suggests what decision-makers in the education sector can take from this comprehensive review.

Successful programmes address constraints at multiple levels. As seen in the analytical framework (see Figure 1, page 9), children’s education outcomes are influenced by a range of factors, such as their health and nutrition, the socio-economic situation of their household, the materials and human resources available in the classroom and the management of these resources.¹² It is thus not surprising that outcomes of any one intervention may be affected by the extent to which other major constraints remain unaddressed. This is illustrated by programmes that seek to reduce schooling costs, such as cash transfer programmes.

Cash transfer programmes were the most effective intervention in boosting school attendance and other participation outcomes. However, they had little effect on learning outcomes, as measured by maths, language and composite test scores. This could be due to the low quality of schools that those children attend. Unless cash transfer programmes are also accompanied by additional resources for schools and teachers, a sharp increase in the number of children enrolled or attending school may reduce the quality of education provided by schools. The same is true for national policies to eliminate user fees, which can lead to a surge in enrolment and a resulting shortage of teachers and textbooks.

Unless cash transfer programmes are also accompanied by additional resources for schools and teachers, a sharp increase in the number of children enrolled or attending school may reduce education quality.

Thus, some interventions may be necessary, but not sufficient, for improved outcomes. For some interventions, such as providing materials and school-based management, we find small average effects, and programmes that just provide materials have a relatively consistent pattern of small or negative effects on learning outcomes. The effectiveness of these programmes could be hampered by problems with implementation. They could also be lacking in terms of design, because they focus on increasing the supply of materials, without addressing other constraints to learning, such as the teacher’s ability to integrate the materials in their teaching.

Other programme types, such as structured pedagogy and remedial education, also provide learning materials, but these programmes have more promising effects on learning outcomes. In these programmes, materials are part of a package and are typically integrated with a tailored curriculum. In contexts where there are several constraints, such as very low levels of learning at baseline and poorly trained teachers, materials may be a necessary but not sufficient condition for children’s learning.

Similarly, programmes that attempt to improve the governance and quality of education systems address barriers such as information asymmetries and lack of accountability between service users and providers. They do not address constraints, such as a lack of trained teachers or insufficient school materials. Thus, in resource-poor contexts, school-based management and community-based management programmes were not always sufficient to improve education outcomes.

Tailoring programmes to suit baseline constraints and capacities can improve the chance for success. Many of the successful programmes were those that were tailored to the human and social capital of the location in which they were delivered.

School-feeding programmes, for example, had the largest effect in areas with high levels of food insecurity, malnutrition and low school attendance. The effects were much smaller in better-off areas where enrolment was already high and malnutrition was less common.

Social capital may be an important factor for interventions intended to improve school governance. Both school-based management and community-based monitoring were most successful in settings with high levels of social capital and a tradition of local participation. In the Philippines, where school-based management had consistently positive effects, the qualitative evidence suggests parents and communities were willing and able to make basic decisions about schooling when given the opportunity to do so. In contrast, results in most other contexts were disappointing. Evidence from Niger and the Gambia suggest that low social and human capital may limit the success of school-based management programmes.

Implementation is key to whether a programme is successful. Challenges with implementation have been frequently reported for a range of programmes, including computer-assisted learning, teacher incentives and school-based management. For example, several computer-assisted learning programmes faced issues, such as insufficient, damaged and dysfunctional equipment, lack of internet access and software not being compatible with hardware. Little or no teacher training was also a challenge for several programmes, including computer-assisted learning. Problems with funding also affected the success of several school-based management programmes. Grants were not disbursed as intended and significant delays were reported for several programmes.

In most cases, these issues are due to lack of implementation capacity at different levels of the supply chain. Implementation problems are also often seen in programmes that include a range of activities, have ambitious goals and long causal chains.

Interventions with relatively short causal chains that directly target barriers to participation and learning may be more effective. Programmes that directly address constraints to improve an outcome appear more likely to succeed. Such programmes have fewer assumptions about how people and systems will respond, and the risk of implementation failure is reduced. For example, if the main constraint to attendance is family resources, it is not surprising that cash transfers consistently improve attendance.

Many of the successful programmes were those that were tailored to the human and social capital of the location in which they were delivered.

The causal chain between cash transfers and their impact on learning is much longer: transfers would need to improve household income to the extent that the learning environment for the child is improved, and the child would then need to study harder and perform better in the classroom. In contrast, structured pedagogy programmes target learning outcomes and provide a range of different components to address barriers to learning at the school and teacher level. The causal chain between the programme and its impact on learning is relatively short. It is therefore not surprising that we find that programmes typically improve either school participation or learning outcomes, but not both.

Programmes involving teachers need to consider the time and motivation required for them to participate. Teachers are the most important actors of the education system. If teachers do not participate in programmes in which they have a key role, the programme cannot be successful. Thus, programmes need to consider their time and motivation. For example, evidence from some computer-assisted learning programmes suggests programme designs need to consider teachers' workloads, and their attitudes and motivation for making radical changes in the way they teach.

Evidence from interventions that are directly targeted at teachers also show that programmes need to carefully consider the incentives that affect teacher behaviour. Teachers do not seem to alter their teaching approach and instruction techniques in response to incentives, except if the incentives are conditional on student performance, which may increase the number of preparatory sessions for tests. Teacher hiring programmes may be difficult to implement in contexts where such reforms are perceived to threaten existing jobs. They may also provoke opposition because they can mean lower pay, fewer privileges and less job security, resulting in a 'disgruntled worker effect' that could negatively affect teacher performance.

7.3

Implications for future research

- **We need more high-quality evidence to inform education policies and programmes.** To improve the effectiveness of policies and programmes, we need to draw on different kinds of evidence. However, this review highlights the paucity of evidence in multiple areas. For several types of education programmes, few impact evaluations have been carried out and effects on final outcomes are therefore unknown.
 - **Very few impact evaluations are being conducted to assess several types of education programme.** Despite the large number of studies identified, the distribution of studies across different intervention areas in the education sector is not well balanced. Cash transfers, structured pedagogy and computer-assisted learning are relatively well studied compared to other intervention areas, where the evidence base is insufficient to draw strong conclusions about effects. It would be particularly valuable to study promising interventions, such as remedial education, new schools and infrastructure, low-cost private schools and school-feeding, to establish whether the effects observed in a few contexts can be replicated elsewhere.
 - **The geographical coverage of impact evaluations is uneven and this limits the generalisability of findings.** As was seen in Chapter 3, some countries with large populations, such as Nigeria, Indonesia and Bangladesh, facing serious challenges in terms of improving access to quality education, have had no or very few education-related impact evaluations. New studies from a more representative sample of countries would help identify effective interventions that would suit a broader range of contexts.
 - **The failure of several large-scale programmes highlights the need for more formative studies and pilot interventions so challenges on the ground are better assessed.** Formative studies can help in customising programme designs to address the specific constraints of a given context. Such studies would help prevent the large-scale programme failures. The evidence from this review also shows that variations in programme design can influence outcomes. The pilot phase of the programme would therefore be important for testing out the different design options.
 - **More qualitative research, process evaluations and monitoring data would help explain findings from impact evaluations.** We found that few qualitative research and process evaluations are being carried out as part of impact evaluations. High-quality qualitative research and process monitoring data are important to provide explanations for programme failures or attempts to replicate successful interventions. Formative research, process evaluations and monitoring data conducted alongside impact evaluations should be a priority for future studies.
 - **Studies are needed to examine effects across different sub-populations.** The Sustainable Development Goals emphasise inclusive and equitable education for all children. However, most studies report average effects on all children, without providing sub-population analysis. New studies should be designed to allow for this analysis by different population characteristics, such as sex, age, ethnicity or disability.
 - **We need more studies to evaluate the long-term impact of education programmes.** Given the complexity of the education process, programmes may take some time to affect education outcomes. In addition, a programme's long-term impact may not be the same as its short-term impact. We therefore need more evidence to compare the impact of a programme in its first year with its impact in its second year. Most experiments only run for a year or two, so this may require developing new methods or better utilisation of administrative education data for evaluating programme effects.
 - **Data are needed on cost-effectiveness to improve the policy relevance of findings.** Few studies collect data on costs. We were not able to do conduct cost-effectiveness analyses because the number of studies with cost data was so small.¹³ This limits the usefulness of findings for informing investment decisions. Collection of cost data as a part of evaluations needs to be a mandatory part of reporting on programme effectiveness. The cost-effectiveness of an intervention is, after all, an important consideration for making choices about programmes, policies and strategies suitable for different contexts.
- As national governments work on strategies for meeting the ambitious SDGs by 2030, we need to draw on evidence for making decisions on investments in education. To ensure inclusive and equitable access to quality education for all, we need to act now to generate and use more and better evidence.

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Appendix 1

Summary of findings for primary outcomes

	Enrolment	Attendance	Drop out	Completion	Cognitive	Maths	Language arts	Composite
Child level								
School-feeding	0.14, 95% CI [-0.05, 0.33] 7 studies	0.09, 95% CI [0.03, 0.16] 6 studies	0.06, 95% CI [-0.15, 0.03] 3 studies	0.01, 95% CI [-0.03, 0.01] 2 studies	0.11, 95% CI [0.00, 0.22] 7 studies	0.10, 95% CI [0.00, 0.19] 10 studies	0.09, 95% CI [0.01, 0.17] 8 studies	0.14, 95% CI [-0.04, 0.33] 3 studies
School-based health: malaria	No studies	No meta-analysis	No studies	No studies	0.03, 95% CI [-0.05, 0.12] 3 studies	0.16, 95% CI [-0.08, 0.25] 3 studies	0.03, 95% CI [-0.49, 0.55] 3 studies	No studies
School-based health: micronutrients	No studies	No meta-analysis	No studies	No studies	0.01, 95% CI [-0.03, 0.05] 2 studies	0.06, 95% CI [0.02, 0.10] 4 studies	No meta-analysis	No studies
School-based health: deworming	No studies	0.04, 95% CI [-0.13, 0.21] 4 studies	No studies	No studies	0.01, 95% CI [-0.03, 0.05] 3 studies	0.05, 95% CI [-0.02, 0.13] 2 studies	-0.04, 95% CI [-0.11, 0.02] 3 studies	No studies
Merit-based scholarships	No studies	0.01, 95% CI [-0.06, 0.08] 4 studies	0.04, 95% CI [-0.11, 0.19] 2 studies	0.32, 95% CI [-0.18, 0.46] 2 studies	No meta-analysis	0.11, 95% CI [0.03, 0.20] 10 studies	0.04, 95% CI [-0.07, 0.15] 3 studies	0.10, 95% CI [0.03, 0.17] 7 studies
Providing information	No meta-analysis	No meta-analysis	No meta-analysis	No meta-analysis	No studies	No meta-analysis	No studies	No meta-analysis
Household level								
Eliminating user fees	0.03, 95% CI [-0.01, 0.06] 8 studies	0.01, 95% CI [-0.13, 0.15] 2 studies	-0.10, 95% CI [-0.23, 0.02] 4 studies	0.02, 95% CI [-0.10, 0.15] 3 studies	No studies	No studies	No studies	No studies
Cash transfers	0.11, 95% CI [0.07, 0.15] 49 studies	0.13, 95% CI [0.08, 0.18] 38 studies	-0.12, 95% CI [-0.16, -0.07] 16 studies	0.12, 95% CI [0.01, 0.22] 28 studies	0.07, 95% CI [-0.11, 0.25] 2 studies	0.01, 95% CI [-0.03, 0.04] 14 studies	0.00, 95% CI [-0.04, 0.04] 14 studies	0.01, 95% CI [-0.01, 0.03] 3 studies
School level								
Computer-assisted learning	-0.04, 95% CI [-0.11, 0.04] 2 studies	0.04, 95% CI [0.00, 0.07] 2 studies	-0.04, 95% CI [-0.12, 0.04] 2 studies	0.07, 95% CI [-0.07, 0.22] 2 studies	No studies	0.07, 95% CI [0.02, 0.11] 19 studies	-0.01, 95% CI [-0.08, 0.05] 13 studies	0.01, 95% CI [-0.04, 0.07] 6 studies
Providing materials	No meta-analysis	No meta-analysis	No meta-analysis	No meta-analysis	No studies	-0.02, 95% CI [-0.06, 0.02] 5 studies	0.00, 95% CI [-0.02, 0.02] 5 studies	0.01, 95% CI [-0.01, 0.02] 5 studies
Remedial education	No studies	No meta-analysis	No studies	No studies	No studies	0.19, 95% CI [-0.05, 0.44] 6 studies	0.16, 95% CI [-0.08, 0.41] 6 studies	0.22, 95% CI [-0.09, 0.53] 5 studies
New schools and infrastructure: hygiene infrastructure interventions	0.11, 95% CI [0.01, 0.20] 4 studies	0.14, 95% CI [0.05, 0.24] 2 studies	No studies	No meta-analysis	No studies	No studies	No studies	No studies
New schools and infrastructure: construction of new schools	0.38, 95% CI [-0.29, 1.04] 2 studies	0.08, 95% CI [-0.04, 0.19] 2 studies	No studies	No studies	No studies	0.19, 95% CI [-0.15, 0.53] 2 studies	0.02, 95% CI [-0.01, 0.05] 2 studies	No studies
New schools and infrastructure: improvement or construction of new school infrastructure	No meta-analysis	No meta-analysis	No studies	No meta-analysis	No studies	No studies	No meta-analysis	No studies
Pedagogy	No studies	0.02, 95% CI [0.00, 0.04] 5 studies	No meta-analysis	0.13, 95% CI [-0.02, 0.28] 2 studies	0.01, 95% CI [-0.04, 0.07] 2 studies	0.11, 95% CI [0.03, 0.18] 18 studies	0.24, 95% CI [0.12, 0.36] 21 studies	0.06, 95% CI [0.03, 0.08] 3 studies

	Enrolment	Attendance	Drop out	Completion	Cognitive	Maths	Language arts	Composite
School level (continued)								
Extra time in school	No studies	No studies	No studies	No studies	No studies	0.09, 95% CI [-0.04, 0.22] 2 studies	0.19, 95% CI [0.15, 0.24] 2 studies	No studies
School participating by ability: grade retention	No studies	No studies	No studies	No studies	No studies	No meta-analysis	No meta-analysis	No studies
School participating by ability: tracking	No studies	No studies	No studies	No studies	No studies	0.02, 95% CI [-0.04, 0.08] 2 studies	0.12, 95% CI [-0.03, 0.27] 2 studies	No studies
Teacher level								
Teacher incentives	0.06, 95% CI [-0.05, 0.16] 2 studies	0.01, 95% CI [-0.04, 0.06] 3 studies	0.00, 95% CI [-0.01, 0.01] 4 studies	0.03, 95% CI [0.00, 0.05] 4 studies	No studies	0.08, 95% CI [0.02, 0.13] 11 studies	0.00, 95% CI [-0.13, 0.12] 7 studies	0.02, 95% CI [-0.02, 0.05] 4 studies
Teacher hiring	No studies	No meta-analysis	No meta-analysis	0.04, 95% CI [0.01, 0.08] 3 studies	No studies	0.10, 95% CI [0.00, 0.20] 2 studies	0.06, 95% CI [0.03, 0.10] 2 studies	0.06, 95% CI [-0.01, 0.12] 3 studies
Teacher training	No studies	No studies	No studies	No studies	No studies	No meta-analysis	No meta-analysis	No studies
Diagnostic feedback	No studies	No studies	No studies	No studies	No meta-analysis	0.01, 95% CI [-0.01, 0.03] 3 studies	0.01, 95% CI [-0.01, 0.05] 3 studies	No meta-analysis
System level								
School-based management	0.01, 95% CI [-0.04, 0.07] 3 studies	No meta-analysis	-0.02, 95% CI [-0.05, 0.01] 7 studies	0.05, 95% CI [0.00, 0.09] 8 studies	No studies	0.01, 95% CI [-0.02, 0.05] 21 studies	-0.01, 95% CI [-0.07, 0.05] 20 studies	-0.01, 95% CI [-0.10, 0.08] 9 studies
Community-based monitoring	0.17, 95% CI [0.08, 0.25] 12 studies	0.04, 95% CI [-0.09, 0.18] 3 studies	0.05, 95% CI [-0.09, 0.20] 3 studies	0.06, 95% CI [0.01, 0.12] 3 studies	No studies	0.12, 95% CI [0.01, 0.22] 9 studies	0.12, 95% CI [0.01, 0.22] 9 studies	0.10, 95% CI [-0.01, 0.21] 7 studies
Public-private partnerships	0.19, 95% CI [0.01, 0.36] 7 studies	No studies	No meta-analysis	0.23, 95% CI [-0.07, 0.53] 3 studies	No studies	0.04, 95% CI [0.00, 0.09] 7 studies	0.04, 95% CI [0.00, 0.09] 7 studies	0.07, 95% CI [-0.07, 0.20] 4 studies
Multi-component interventions								
Multi-component interventions	0.01, 95% CI [-0.06, 0.08] 3 studies	0.16, 95% CI [-0.12, 0.44] 3 studies	0.16, 95% CI [-0.33, 0.02] 3 studies	0.13, 95% CI [0.04, 0.21] 4 studies	No studies	0.16, 95% CI [-0.17, 0.48] 10 studies	0.04, 95% CI [-0.17, 0.26] 14 studies	0.02, 95% CI [-0.08, 0.12] 3 studies

Appendix 2

Intervention result matrix

Outcome	What works in most contexts?	What is promising (may work in some contexts)?	What doesn't always work?	What is unknown?
		a) Few studies (2–4), with average effect size (ES) large in magnitude b) More studies (4–10), ES large in magnitude, but may be imprecise due to heterogeneity	More than six studies, average ES suggests no substantive effects, or negative effects, with evidence of negative effects in some contexts	a) Two studies or less available b) Few studies (2–4) with average effect small in magnitude, but with large amount of heterogeneity.
Enrolment or attendance	Cash transfers	New schools and infrastructure Community based monitoring Public–private partnerships (low-cost private schools) School feeding	Reducing or removing user fees	School-based health Providing information Diagnostic feedback Teacher hiring Teacher training Tracking by ability Grade retention Computer-assisted learning Extending the school day Remedial education Merit-based scholarships Structured pedagogy
Drop out/ Completion	Cash transfers			School feeding School-based health Merit-based scholarships Computer-assisted learning Providing materials Remedial education New schools and infrastructure Diagnostic feedback Teacher hiring Teacher training Tracking by ability Grade retention Public–private partnerships Community-based monitoring Extending the school day Remedial education Structured pedagogy
Test scores	Structured pedagogy	Extending the school day Remedial education Merit-based scholarships Community-based monitoring School-feeding	No studies	School-based health Computer-assisted learning Providing materials Remedial education New schools and infrastructure Diagnostic feedback Teacher hiring Teacher training Tracking by ability Grade retention Public–private partnerships

Endnotes

1

Readers interested in details of study methods and full technical results should consult the full report: www.3ieimpact.org/evidence-hub/systematic-review-repository/improving-learning-outcomes-and-access-education-low-and

2

Standardised mean differences can be difficult to interpret in practice. Therefore we have also calculated the standardised percentage change, assuming a normalised distribution using the binominal effect size display formula (Randolph and Edmondson 2005).

3

Based on the selection criteria, interventions such as early childhood development, distance education, physical education, special needs education and programmes for improving girls' sexual and reproductive health were excluded.

4

The number of impact evaluations is higher than the number of programmes as multiple impact evaluations were conducted for some programmes.

5

These studies were identified using a targeted search – see technical report for more details.

6

These numbers correspond to the number of included studies by outcome for those studies included in the meta-analysis only. Several other studies reported on these outcomes but were not suitable for synthesis.

7

Deworming, malaria prevention and treatment, micronutrients, and one study each for vision correction and incentives based school-based health.

8

The grant was typically spent on notebooks, writing materials, workbooks and stationery.

9

The only learning outcome reported on by this study was maths scores.

10

Schools had to design school improvement plans in order to receive the grants.

11

Recent attempts at summarising the evidence on the effects of public–private partnerships have also attracted controversy. A rigorous literature review commissioned by the Department for International Development in the UK (Ashley *et al.* 2014) sparked a debate about the effects of private provision of schooling. Tooley and Longfield (2015) criticise the approach taken by the original authors. They re-reviewed the evidence included in the study by the original authors, concluding more favourably than the original review. This highlights the need for a systematic review of high-quality evidence on the effects of public–private partnerships.

12

In addition to the examples cited here, results on multi-component interventions (reported in full in the technical report only) also offer some support for this finding. Multi-component interventions were a very diverse group of interventions in terms of design. The only real unifying feature of the included programmes was that the interventions had individual components that tackle different barriers to education. The average effects are relatively large in magnitude for attendance, drop out, completion and maths, as compared to other intervention areas covered in the review. But, apart from completion rates, the confidence intervals of all pooled effects cross the line of no effect. All results are based on a few and very diverse studies. Apart from the analysis of completion, all average estimates are also sensitive to the removal of studies with particularly large effects. The average effects should therefore be interpreted with caution and the effects of multi-component programmes should be investigated in further studies.

13

Other studies, such as McEwan (2013), have conducted cost-effectiveness analysis comparing different programmes. For several intervention areas covered in this review, there were no studies that included cost data, and for other areas the data were limited in quality and quantity. We are therefore not able to make reliable estimates that could be generalised beyond specific programmes, and that could be attached to the average effect estimated for an intervention type (rather than individual programme), allowing a comparison of relative cost-effectiveness across intervention types.

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Improved access to education has failed to translate into improved learning in many low- and middle-income countries (L&MICs). Nearly 250 million children in L&MICs cannot read, write or do basic maths. A range of different education interventions have been implemented to resolve what is being seen as a learning crisis.

To find out what evidence exists about improving learning, 3ie carried out a systematic review that synthesised qualitative and quantitative evidence from 238 impact evaluations of 216 education programmes in 52 L&MICs. This summary report is based on the comprehensive systematic review, which has been published separately on the 3ie website.

This summary report is well-suited for use by policymakers and programme managers. It focuses on the impacts of a range of interventions on a host of outcomes, including children's school enrolment, attendance and learning. The summary report presents key lessons for policy, programming and research stemming from the full systematic review.

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