Transforming the Education Workforce:
Learning Teams for a Learning Generation

the Education Commission

The Learning Generation

The Education Commission is a global initiative dedicated to greater progress on Sustainable Development Goal 4 – ensuring inclusive and quality education and promoting lifelong learning for all. The Commission is helping to create a pathway for reform and increased investment in education by mobilizing strong evidence and analysis while engaging with world leaders, policymakers, and researchers.

Drawing upon new research and analysis from more than 300 partners in 105 countries, the Education Commission's groundbreaking 2016 report – *The Learning Generation: Investing in education for a changing world* – put forward an action plan to deliver and finance an expansion of educational opportunity for the more than 260 million children and youth who are not in school today. *The Learning Generation* report made 12 key recommendations to improve performance, harness innovation, improve inclusion, and mobilize more and better finance.

One of these recommendations was to strengthen and diversify the workforce. Thanks to the generous support of the United Kingdom's Department for International Development, the Commission's Education Workforce Initiative has worked with several Commissioners and many partners to produce *Transforming the Education Workforce: Learning Teams for a Learning Generation* – a report that offers visions for the urgent action needed to strengthen, diversify, and reimagine an education workforce to deliver quality education for all.

Foreword

We live in an age of unprecedented change and disruption. In some places, cars drive themselves, drones deliver packages, and refrigerators tell you when it's time to buy milk – but over 800 million children and youth around the world are not on track to learn the skills needed to thrive now and in the future.

With millions of precious young minds at stake, the harsh reality of the global learning crisis stands in stark opposition to the "progress" promised by the Fourth Industrial Revolution. We are running out of time to respond to one of the world's most fundamental needs: ensuring inclusive, equitable, quality education for ALL our children.

We are just over 10 years away from the 2030 deadline to meet this goal, as outlined by the United Nations' Sustainable Development Goal 4. How can we get there?

Teachers are at the heart of the learning process and teacher quality is the single most important influence on learning outcomes at the school level. But in many countries, teachers are in desperately short supply.

And it is increasingly evident that teachers cannot work alone.

As the African proverb says, "It takes a village to raise a child." When this ethos of collaboration and care is applied to the learning process, we believe it takes a team to educate a child. Teachers need leadership and support to be effective at what they do best and to help reach those with the greatest needs. To build this support team, we must tap the potential of the broader education workforce – school and district leaders, specialists, learning assistants, community experts, entrepreneurs, health and welfare professionals, parents, volunteers, and many others – to create a responsive, evolving system that keeps pace with today's changing world and equips young people with the new skills, knowledge, values, and competences they need to succeed.

The Education Commission's 2016 *Learning Generation* report called for the strengthening and diversification of the education workforce, as well as the establishment of an international expert group to take a fresh look at redesigning the workforce. Thanks to the support of the UK's Department for International Development, the Commission's Education Workforce Initiative (EWI) convened a high-level team of researchers, teachers, and policymakers that spent more than a year digging out data, debating, and developing new approaches to the challenges of workforce reform. This report is the result. (It takes a team to produce a report, too.)
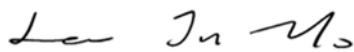
We are grateful to our country partners for their openness in collaborating with EWI to co-create and test concrete proposals for education workforce reform in Ghana; teacher deployment for equity in Sierra Leone; and adaptive high-touch, high-tech learning to support the STEM workforce in Vietnam.

Unsurprisingly, no "one-size-fits-all" model for education workforce design exists given the diverse social and political contexts of each country. But given the workforce is an education system's biggest investment, countries should make it a smart one. Robust learning systems are powerful levers of change, and members of the workforce should be strengthened and empowered to be change agents themselves.

While more research and evidence is needed to evaluate the impact of newer approaches, we do know that many workforce models in use today are outdated, inefficient, and unable to respond quickly enough to the rapidly changing world around us.

The unmet promise to the world's children for universal quality education demands a transformative response. We believe the evidence, innovations, and vision of building collaborative learning teams for a learning generation shared here are a good start.
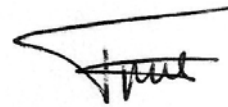
The Education Workforce Initiative Leadership Team

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Executive Summary

Key Messages

The challenge

- The world is not on track to achieve Sustainable Development Goal 4 (SDG 4). There are still more than 260 million children out of school and more than 600 million in school who are not learning the basics or the skills, knowledge, and values required to thrive now and in the future.
- Teacher quality is the most important determinant of learning outcomes at the school level, but in many countries teachers are in short supply, isolated, and not supported to provide effective teaching and learning.

The opportunity

- To meet SDG 4, teachers are critical but they cannot work alone. It takes a team to educate a child – teachers need leadership and support to be effective and to help learners with the greatest needs.
- Achieving inclusive and quality education for all requires urgent action to harness the broader education workforce. The workforce is an education system's biggest investment and one of its greatest levers for change.
- The education workforce must evolve to keep pace with the rapidly changing world and embrace the new opportunities these changes bring.

Three visions for change

We can address urgent education challenges and leverage opportunities for change by embracing three interacting visions.

Vision 1: Strengthening existing systems

- Professionalize teachers and other key roles with appropriate recruitment, training, professional development, career paths, and working conditions to enable them to be effective.
- Improve workforce planning, deployment, and management, which means robust data must be available and utilized.

Vision 2: Developing learning teams

- Develop collaborative teams focused on improving education outcomes in the classroom, within schools, and at all levels in the system to result in more effective teaching and better support for inclusion, on-the-job learning, and motivation.
- Developing learning teams does not necessarily involve hiring new staff – it entails diagnosing the challenges, understanding existing roles and skills, and considering how best to utilize them in a team; realigning roles; focusing any new roles on the areas of greatest need; and enabling more teamwork.

Vision 3: Transforming an education system into a learning system

- Harness learning teams to build networks of schools, professionals, and cross-sectoral partnerships that use data and evidence to transform education systems into learning systems that are self-improving and adaptable to change.

How to get there

- Workforce reform depends on context. Common ingredients for success include: strong leadership; drawing on evidence; engaging with and empowering the workforce to lead change; ongoing communication with key stakeholders; monitoring and adapting implementation; and building the structures to sustain reform.
- Financial support for investments in human *and* social capital of the workforce is needed. Smart investment will deliver longer-term returns through improved efficiencies and greater effectiveness.

Call to action

Collectively, we must take on the challenge of reforming the education workforce to test, analyze, scale and promote changes that better prepare and support the education workforce and young people to learn and work together so they have the skills they need to succeed.

We need to:

1 Develop a workforce diagnostic tool underpinned by reliable data, indicators, and improved costing models to help countries dianose the challenges and improve the design and management of their workforce.
2 Experiment, research, and evaluate to explore what works and at what cost.
3 Lead coalitions for change at all levels.

The role of the education workforce in achieving SDG 4

The challenge

With only 10 years remaining until the deadline, the world is at serious risk of not achieving SDG 4. Today, there are still more than 260 million children out of school and more than 600 million in school who are not learning the basics, let alone the wider breadth of skills required to thrive in this century. The Education Commission estimates that despite some progress, by 2030 more than 800 million children will still not be on track to achieve basic secondary level skills if current trends continue.

Teacher quality is the most important determinant of learning outcomes at the school level, but in many countries teachers are in short supply, isolated, poorly trained, and not supported to provide effective teaching and learning. To meet SDG 4, an estimated 69 million teachers must be recruited globally by 2030, with over 76 percent of these in Sub-Saharan Africa and South Asia. In some of the poorest countries, the required increase in teachers is equal to at least half of the projected number of tertiary education graduates, given low secondary completion rates (less than 25 percent in Sub-Saharan Africa). Teacher shortages occur frequently in vulnerable communities and particular subject areas, exacerbating inequality. On top of this, multiple interacting and often systemwide factors can create conditions where teachers are absent or do not spend enough time on instruction.

In some low-income countries, even where there are teachers, many are poorly trained or unqualified and often have limited pedagogical and subject knowledge. In Sub-Saharan Africa, only 62 percent of teachers in primary schools and only 45 percent of teachers in secondary schools are trained to teach. A study of seven countries in Sub-Saharan Africa found that less than 10 percent of primary school language teachers could demonstrate a minimum level of subject knowledge skill to teach grade four students. Models of initial teacher training and professional development are often outdated and ineffective. In the Gambia, 77 percent of primary school teacher training instructors surveyed had never taught in a primary school themselves. Districts are often not providing effective support. In Zimbabwe, teachers are on average visited every two and a half years by a supervisor and those in rural areas have to wait four years.

Teachers often work in relative isolation and are expected to fulfill increasingly diverse roles and to address a wider range of student learning needs. The education workforce is not designed to deliver inclusive education, and inequities within the workforce itself are rarely recognized or addressed. For example in Sierra Leone, only 27 percent of teachers at primary level and 14 percent at secondary level are female.

Teacher quality is the most important determinant of learning outcomes at the school level, but in many countries teachers are in short supply, isolated, poorly trained, and not supported to provide effective teaching and learning

The opportunity

Teachers are at the heart of the learning process, but this report emphasizes that they cannot work alone. It takes a team of professionals to educate a child – teachers need leadership and support to be effective and to help learners with the greatest needs. Developing an effective teacher workforce by prioritizing the professionalization of teachers and ensuring their effective management is a critical first step to improve education outcomes. However, other roles and relationships, such as school leadership and management roles, are also strongly associated with better education outcomes. Specialist and complementary education support roles have been effective in helping reach those left behind and enabling inclusion. District roles have supported teachers and school leaders to improve their practice and sustain change and in a number of successful systems, state-level (central government) roles have used clear change leadership, coalitions, and evidence-based adaptive policymaking to drive system change. Many of these roles already exist in education systems, but they have received very little attention and there has been limited experimentation on ways professionals with different specializations and levels of qualifications could work together effectively in low-income country contexts.

The education workforce must evolve to keep pace with the rapidly changing world and embrace the new opportunities these changes bring. Experts point out that current education workforce design is still largely based on an outdated model of education created to meet the labor needs of the Industrial Revolution and organized on the principle of mass production. A modern education workforce must be able to respond to the world's demographic shifts, environmental changes, technological innovation, advances in neuroscience, and evolving curricula. As the understanding of what teaching and learning can look like is shifting, some of the best systems have started to adapt and innovate in response. They offer examples of opportunities to think differently about the education workforce.

This report aims to catalyze new thinking on education workforce reform by drawing on existing evidence and promising examples from education and other sectors, and using this to develop visions for the education workforce needed in the future. The report uses a systems lens, considering the education workforce needed at the school, district, and state levels and throughout the workforce life cycle, recognizing the interdependencies between workforce and other education policies, actors, the political economy, and financing. There is no "one-size-fits-all" model. Each system starts from a different point, faces different challenges and expectations, and operates in different social and political contexts.

Achieving equitable, quality education for all requires urgent action to harness the broader education workforce. The workforce is an education system's biggest investment and one of its greatest levers for change.

Teachers are at the heart of the learning process, but this report emphasizes that they cannot work alone. It takes a team of professionals to educate a child – teachers need leadership and support to be effective and to help learners with the greatest needs

An education workforce for today, tomorrow, and the future

This report outlines three interacting and iterative visions for an education workforce to deliver SDG 4: 1) incremental change to address immediate challenges through strengthening the existing education workforce, 2) a shift to a more collaborative education workforce through developing learning teams, and 3) a more radical paradigm-shifting vision through transforming education systems into learning systems.

Three interacting visions for the education workforce to reach system goals

Source: Education Commission, 2019

Education Workforce

Vision 1

Strengthening the education workforce

More effective:

Recruitment

Preparation

Development

Management

Vision 2

Developing learning teams

Skill optimization

Instructional leadership and inclusion

Data-driven improvement

Collaborative policymaking

Teamwork

Vision 3

Transforming into a learning system

Learners as individuals

School networks

Cross-sector partnerships

Research and development

Education system goals

Access   Learning   Equity   Inclusion

Given that challenges vary between and within countries, these visions will need to be adapted to specific contextual needs and are likely to involve hybrid approaches depending on the political economy and financing considerations.

Vision 1: Strengthening the education workforce

Strengthening the education workforce envisions an effective education workforce at all levels in the system, with coherent approaches to the professionalization of teachers and other key roles throughout the workforce life cycle – from recruitment and preparation to professional development and career progression to workforce leadership and management.

This vision aims to address the most pressing challenges and to get the foundations right – by establishing decent working conditions and wages, and raising the status of teachers and other key workforce roles to attract high-quality applicants and address shortages. This will help strengthen the existing "human capital" of the education system.

Addressing teacher shortages is a top priority in many countries. Successful education systems demonstrate that higher-skilled individuals can be attracted by raising the status of teachers, providing fair working conditions, and professionalizing them throughout the life cycle – recruitment, training, professional development, and career progression. Short-term "fast-track" solutions that decrease the entry criteria into teaching, often applied to respond to urgent needs, can have long-term negative consequences for professionalism. Recruitment should be merit-based and, where possible, based on clearly defined dispositions and capabilities. To address teacher shortages in underserved areas, systems should consider hiring more teachers directly from these areas; where necessary they should provide alternative school-based training routes that address their needs. Incentives can be effective for addressing specific subject or location shortages in the short term, but should be accompanied by other efforts to increase motivation and retention over the long term.

The evidence from high-performing education systems shows that investment in improving the standard of initial teacher training is critical to improve learning outcomes. Although reform in this area can be challenging, it can be more cost-effective to invest in high-quality teachers entering the workforce than to rely on remedial in-service training. Teacher training institutions and their workforce should be supported to make reforms based on evidence of what works. This includes putting a stronger emphasis on addressing trainees' foundational subject knowledge before building and applying greater subject and pedagogical knowledge; including more school-based practicum; and aligning teacher training to what is relevant for the curriculum and context. Training courses should be inclusive in terms of trainee accessibility, course content, and diversity of trainers. Structured induction programs should be introduced for teachers and other roles when starting new jobs, and mentoring encouraged during the initial years.

Professional development opportunities should be made available to all teachers and other key roles and evaluated regularly. These should be practice-based cycles of quality improvement oriented towards improving teaching and learning. Evidence suggests that professional development is most effective when it is focused on a specific subject, is tailored to topics relevant to the local context, and provides supporting materials, coaching, follow-up visits, and collaboration opportunities to complement training. Low-tech approaches can facilitate professional development when combined with face-to-face approaches. When there is a large cadre of untrained or unqualified teachers, policymakers could consider a range of pedagogical support strategies including structured pedagogy, frequent rounds of formative assessment to support their development, and pathways to teacher qualifications or alternative education support roles (see Vision 2) if more appropriate. Career progression should be based on achievement of professional skills and competencies and result in salary increases.

Workforce planning, deployment, and management need to be improved, which means robust data must be available and utilized. Deployment systems should use data to better match supply and demand, and consider workforce preferences and equitable distribution of resources. This requires robust data on the workforce, but a 2016 mapping found that only half of the countries surveyed had any data available on teacher attrition rates or teacher training from the previous year. Data should also be used to target specialized support to schools, prioritizing the most marginalized. Workforce management policies must address the root causes of workforce absenteeism. This includes setting salaries at the same level as similarly qualified professionals and paying the workforce on time and in an easily accessible way. In addition, requests for teachers to undertake activities that impact scheduled class time should be minimized and fair accountability mechanisms established.

Vision 2: Developing learning teams

The current education workforce model in most education systems is built around a "one teacher to one classroom" model. Teachers work in relative isolation, with limited support and often with challenging conditions such as large class sizes. To address this and other challenges, this report proposes the development of learning teams aligned with evidence on what works to improve education outcomes.

Learning teams collaborate inside the classroom, within schools, within districts, and even at national and international levels. These teams of professionals collectively focus on improving the learning and inclusion of all students and continually learn themselves.

The learning team approach is based on a concept of professionalism that leverages the collective capacity of a group of people as opposed to just focusing on developing the skills of individuals to do their work better. **It is about investing in the "social capital" as well as the "human capital" of the workforce.**

A learning team approach at the class level ensures that all the critical education functions are shared across a team and not concentrated on a single teacher

A meta-analysis of factors influencing student achievement identified collective teacher efficacy as the single most powerful characteristic of highly effective schools and the leading factor influencing student achievement. A study in New Zealand found that teacher-peer collaboration doubled student achievements, but in a survey of 25 countries, only one-fifth of teachers reported participating in mentoring or collaborative work. Team-based approaches are integral in other sectors such as early childhood development (ECD) and health, where they have demonstrated improvements in service delivery, health outcomes, and cost-effectiveness.

Learning teams can include a variety of professionals – qualified teachers, trainee teachers, other teaching and learning roles, leadership and management, and welfare professionals – within and across schools and at all levels in the system. A learning team approach at the class level ensures that all the critical education functions are shared across a team and not concentrated on a single teacher. The diagram below illustrates the shift from a typical current class design to a learning team design, which reorganizes key functions into teaching and learning, student welfare, instructional leadership, and operations and administration.

Comparison between current class design and learning team design

Source: Education Commission, 2019

Current class design → **Learning team design**

● **Learners**
⬚ **Teacher**

Key to functions:
● Teaching and learning
● Operations and administration
● Student welfare
● Instructional leadership
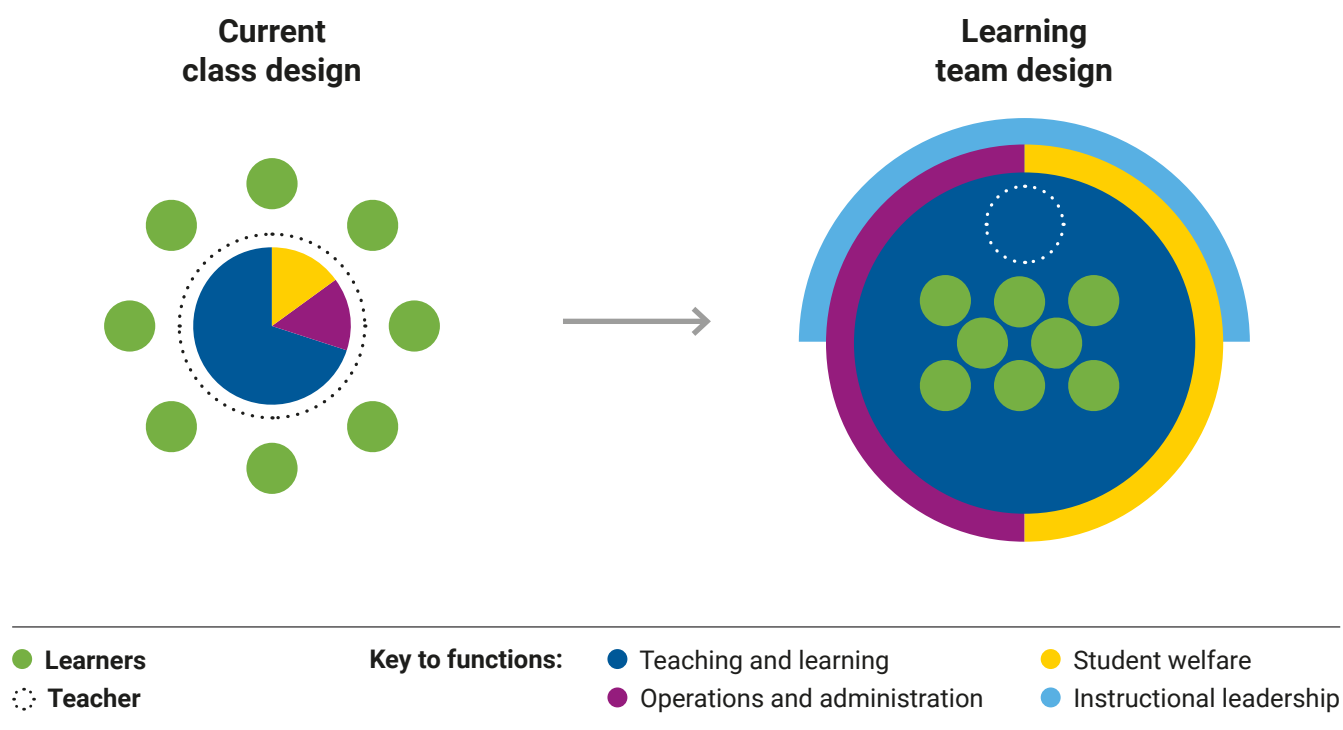
Note: In the learning team design, the functions are shared between a team and would be undertaken by different roles depending on the context.

Developing learning teams does not necessarily involve hiring many new staff – it entails diagnosing the challenges, understanding existing roles and skills, and considering how best to utilize them in a team; realigning roles; focusing any new roles on the areas of greatest need; and enabling more teamwork. To develop learning teams, the following approaches are proposed:

1. **Optimizing the right skills and expertise of the workforce.** This includes repurposing existing roles to align with learning, equity, and inclusion and leveraging the expertise of higher-performing teachers and those with specialist skills by teaming them with less experienced teachers, trainees, and learning support staff. It also involves engaging learning support staff and/or a community education worker for the most marginalized learners to improve foundational learning, student inclusion, well-being, and welfare. A teacher-led team supported by community resources could help manage large class sizes, multiple languages, and diverse learner needs while teacher pipelines are being developed. Specialists may need to be shared across schools; technology could enable this if conditions allow.

2. **Developing instructional leadership.** This includes reorienting school leader and district roles towards instructional leadership, i.e. guiding teaching and learning through clear educational goals, curriculum planning, supporting and providing feedback to teachers, and creating an enabling environment for learning, including for the marginalized. Although school leaders are increasingly viewed as instructional leaders, in practice they tend to focus on administrative and supervisory activities and are rarely selected or supported to lead activities that enhance learning. The shift towards instructional leadership at the school level can be facilitated by training school leaders to undertake instructional leadership and provide the necessary tools; task-shifting administrative activities to technology or support staff where possible; and strengthening district capacity to provide coaching and support for school leaders to develop instructional leadership skills.

3. **Data-driven improvement.** This includes reorienting district staff to support schools with data-driven improvement, targeting those most in need. In many systems, roles at the district level (such as supervisors) focus on compliance monitoring, which on its own does not have a strong effect on teaching and learning quality. In an analysis of Education Management Information Systems (EMIS) use, only 7 percent of countries used student assessment data to identify support needed for teachers. Evidence shows that the district can be more effective if it supports data-based school self-evaluation, builds school improvement capacity and resources, and provides regular and sustained professional development. The data analysis function at the district level should shift to support data-driven planning and providing analysis to help leaders identify performance gaps and prioritize district-wide resources.

4. **Increasing workforce collaboration in policymaking.** In the latest *Status of Teachers* survey, 29 percent of unions responded that they were rarely or never consulted on education policy. State-level policymakers should draw on research, evidence, and data, but should also engage with the school- and district-level workforce, developing strong feedback loops to inform and drive strategic change.

A teacher-led team supported by community resources could help manage large class sizes, multiple languages, and diverse learner needs while teacher pipelines are being developed

5. **Creating team-based structures and practices.** These should enable staff to work in learning teams at all levels in the system and be embedded in initial training and professional development. They can include professional learning communities; peer collaboration; developing training or qualifications for key roles beyond teachers including managerial and technical career paths; and providing team-based goals and incentives. Consideration should be given to professionalization of other key roles such as school and district leaders so they are supported to do their job effectively.

The benefits of the learning team approach include: better teaching through planning and teaching in teams, peer collaboration, coaching, and mentoring; capacity to support proven teaching and learning strategies with learning assistants and trainee teachers; increased instructional time through sharing of non-instructional duties; greater access to specialist expertise; better support for inclusion through more dedicated roles; on-the-job training; and improved motivation. In some low-capacity and low-income contexts, governments may not feel ready to consider the learning team approach. However even in these contexts, learning teams provide new ways to address immediate challenges and leverage existing expertise to develop a more effective workforce.

Even in low-income contexts, learning teams provide new ways to leverage existing expertise to address challenges

The diagram below shows the four functions in an education system (leadership and management; teaching and learning; student welfare; and operations and administration) at the school, district, and state levels. It illustrates potential shifts in how the functions are performed when using a learning team approach. Given that every country is at a different stage of development, some of these shifts may have already been undertaken.

As the idea of learning teams is relatively new in education especially in low-income contexts, testing the approach at a larger scale and evaluating its long-term benefits is critical for successful implementation.

Key shifts for a learning team approach by function at each level in an education system

	Leadership and Management	Teaching and Learning	Student Welfare	Operations and Admin
State	State collaborates with the workforce to create a shared vision that aligns elements, actors, and relationships in the system	State uses robust data to drive strategic change through policymaking, planning, and school improvement	State uses robust data to develop policy	State sets standards and builds workforce capacity to deliver standards, including qualifications for new roles and diversified career tracks
District	District leads data-driven cycles of improvement and holds schools to account through supervision based on feedback and building capacity	District builds teaching and learning capacity by providing school-based pedagogical coaching and specialist support and supports peer professional learning	District provides specialist support to schools based on need	District produces reliable, accurate data to support local decision-making and accountability, especially around equity metrics
School	School principals focus on instructional leadership, supporting teachers to use data to improve teaching and learning outcomes	Teams of professionals work together to ensure foundational learning, including qualified teachers, trainee teachers, learning support roles	Specialist expertise and roles beyond the teacher ensure inclusive learning and student welfare	Technology used to automate where possible. Admin staff part time or shared across schools

Access Learning Equity Inclusion

Vision 3: Transforming to learning systems

Learning systems harness learning teams, networks of education professionals, cross-sectoral partnerships, data, and evidence to create a system that is coherently organized with a focus on learning and the ability to learn and adapt itself.

A learning system approach builds on the learning team approach to maximize the collective capacity of professionals in a system. The vision is informed by research on the power of networks and improvement science, public service reform, systemic innovation literature, innovative education models, emerging thought leadership, and global and education trends.

As the capacity of education professionals grows, school networks can become the engine of professional development: skilled school-based practitioners can share their expertise and knowledge across school networks and beyond. Such networks can successfully organize the diverse expertise needed to solve complex educational issues and quickly spread lessons learned in one part of the network to another. A networked education system can engage and connect to other actors – such as employers, new innovators, and other sectors – who can work in partnership with schools to improve student outcomes and close achievement gaps for marginalized students more rapidly.

To transform education systems into learning systems, the following approaches are proposed:

1. **Exploring innovative learning configurations to address individual needs.** Schools and systems can pilot and develop alternative learning configurations, including technology-assisted learning, to address individual learning needs and give learners access to a wider variety of knowledge sources and ways of learning.

2. **Developing school networks and harnessing system leaders.** Learning systems are highly networked, enabling schools and districts to generate and exchange evidence and knowledge about effective instruction and management approaches. Policies need to foster the conditions for working across networks, allowing schools to work as networks and roles such as system leaders to work across schools.

3. **Leveraging cross-sectoral partnerships to support broader education goals.** Policies, funding, and governance structures should enable greater cross-sectoral working when it facilitates better education outcomes. These partnerships enable, for example, the involvement of a wider range of professionals and community members in schools to support applied and real-world learning, bridge the gap between school and work, and enhance school resources; closer coordination between health and social service sectors to meet learner needs and address systemic barriers to learning; and collaboration with technology providers to develop, test, and scale cost-effective technology-based solutions.

A learning system approach builds on the learning team approach to maximize the collective capacity of professionals in a system

4. **Encouraging a research and development culture at all levels in the system to identify and scale high-impact innovations.** Governments should introduce policies, systems, and structures that support evaluative research, use of data for decision-making, sharing of lessons, and scaling or targeting of effective innovations across the system. Policy is informed by frontline evidence as well as national and international research, and adapted to meet changing needs.

While some of today's best performing systems already incorporate elements of a learning system, this future vision by its very nature draws on more limited evidence from education systems in low-income countries. This means that some aspects of a learning system approach may seem aspirational for some countries. This report recognizes, however, that countries do not develop in a linear way and should have the opportunity to leapfrog. More research is needed to prototype and evaluate these approaches for education, especially in low-income contexts.

The diagram below shows the four functions in an education system and illustrates potential shifts in how the functions are performed when moving to a learning system.

Key shifts across functions at each level to transform into a learning system

	Leadership and Management	Teaching and Learning	Student Welfare	Operations and Admin
State	Continues to provide political leadership; strategy and policy development; performance management Establishes culture of trust and professionalism	State promotes an R&D culture, supporting experimentation for the continuous improvement of learning outcomes	Continues to develop policy e.g., safeguarding but works more closely with the workforce Establishes cross-sectoral partnerships	Use of data analytics, including big data, open data, machine learning Strategic education workforce management
District	Leadership for area-based school improvement Sets collaborative frameworks for shared performance monitoring	Facilitates teacher collaboration Quality assurance of teacher-led CPD Innovation leadership Cross-sectoral alliances to supplement teaching and learning	Strategic partnerships with other services Brokers resources for area-wide equity	Use of data analytics Strategic workforce management such as school leadership succession planning
School Networks	System leaders lead networks of schools in generating and sharing evidence and surfacing innovations around common challenges	Peer coaching and collaboration Shared professional development Shared specialist expertise	Shared services and expertise	Technology-enabled data collection and analysis Shared operations and admin services
School	Self-evaluation External relationship building Instructional leadership School improvement	A differentiated workforce utilizes more diverse learning configurations, to address individual needs and provide greater opportunities for more sophisticated learning	Collaboration with other services Greater connection to wider expertise, the workplace and the community	HR and financial management Data collection and analysis

Access **Learning** **Equity** **Inclusion**

How to get there

Workforce reform is not easy, but it is possible with the right leadership, data and evidence, navigation of the political economy, resources, and a workforce empowered to lead change.

Navigating the political economy of education workforce reform

Before embarking on reform, policymakers should analyze the political context to understand what is possible and identify windows of opportunity for major reform. Elements of political context – such as election cycles and the level of decentralization in a system – will influence reform options. It may not be possible to achieve the desired change through a single reform; sequencing, strategic bundling of reforms, and gradual integration of reforms are options to consider.

Workforce reform needs to be undertaken with a deep understanding of the political context

Reform processes must recognize the members of the education workforce and their representative organizations as change agents and engage them in genuine dialogue to design, implement, and sustain education workforce reform. Instead of being valued and empowered to innovate, teachers are too often perceived as obstacles rather than agents of change. In the latest *Status of Teachers* survey, 33 percent reported that they are not consulted on the development and selection of teaching materials, and 25 percent reported not being consulted on curriculum development.

Policymakers also need to engage other key stakeholders including parent groups, civil society, and government bodies in other sectors to identify risks and opportunities and ensure joint ownership. They should draw on robust evidence, both international and local, to build the case for reform and to clarify options. In designing a reform, careful attention should be given to best practice delivery and change management approaches should inform implementation.

Ongoing communications with all stakeholders, monitoring and evaluation, and adapting approaches as necessary are critical to implementation. Success measures at all levels in the system should be defined, measured, and analyzed. To sustain change, reform goals must be embedded in sector plans and where appropriate in legislation. Building the capacity of accountability structures and recognizing reform leaders is also crucial.

Costing and financing education workforce reform

Financial support for investments in the human and social capital of the workforce is needed to ensure the fundamental right to education and meet SDG 4. Smart investment in the workforce will lead to longer-term returns through improved efficiencies and greater effectiveness. Some of the proposals outlined in this report require an increase in investment (e.g. hiring sufficient trained and qualified teachers, specialist teachers, or formal support roles), while others may produce efficiencies or improve cost-effectiveness of workforce investments (e.g. redistribution of teachers, reorientation of roles towards learning, use of differing learning configurations). Choices with respect to teacher allocations, supplementary roles, improved leadership at the school, district, and national levels, and their associated unit costs will be highly context-specific.

To unlock resources, ministries of education need to make a convincing investment case for change. By using cost-benefit analysis, reformers can compare options and demonstrate the learning gains workforce reform can achieve as well as the economic and social returns improved learning can generate. Investments in the education workforce should be prioritized towards the poor and most marginalized to deliver the greatest returns.

As the education workforce becomes more diverse and multifaceted, costing models need to reflect a wider range of roles, levels, geographies, and composition of the workforce. Systematic collection of additional data on the current workforce (including roles beyond teachers) is needed and cost-effectiveness analysis should be undertaken when possible to consider different options.

Call to action

In parallel with the development of this report, three countries have been working with the Education Commission's Education Workforce Initiative to draw on the report's evidence and new thinking to address their own education workforce challenges. Sierra Leone is considering how to improve workforce planning and management to enable more efficient allocation and deployment of teachers, better matching of supply and demand, and closing of its teacher gap. Ghana is redesigning its education workforce to better align with learning, inclusion, and more effective management. And Vietnam is prototyping a high-touch, high-tech learning approach with changed workforce roles to explore how it may lead to greater personalized learning and higher-order outcomes in mathematics. Potential tools to help policymakers think through education workforce reform are included in Annexes A, B, and C.

The Education Commission calls on countries to take on the challenge of reforming the education workforce, working with the members of their workforce, national and international organizations, and researchers to

Smart investment in the workforce will lead to longer-term returns through improved efficiencies and greater effectiveness

test, analyze, scale, and promote reforms that better support the education workforce and young people to learn and work together and build the skills they need to succeed.

This report recommends:

1 Developing a workforce diagnostic tool underpinned by reliable data, indicators, and improved costing models for countries to use to inform workforce design and management

The first step to education workforce reform is understanding the long-term needs of an education system and diagnosing the education workforce constraints and opportunities. An education system diagnostic tool and better costing models could help guide policymakers through this process. These need to be underpinned by robust data on all roles in the education workforce; their characteristics (e.g. gender, language, disability, and location preference); and current and future workforce supply, demand, and cost. Standard datasets and classifications could be established together with workforce indicators that link workforce data to education outcomes.

- **Policymakers at the national and district levels should work with members of the workforce and their unions to diagnose the current workforce challenges and identify opportunities to overcome them**. This would include generating and analyzing data on the education workforce and its effectiveness, and identifying opportunities to improve deployment, allocation, and better matching of supply and demand. New policies should, where possible, consider evidence of good practices to strengthen the workforce and how learning team or learning system approaches can address context-specific challenges.
- **International agencies and donors** should support governments in diagnosing the challenges, providing good practice evidence, considering learning teams and system approaches, establishing efficient data systems, and building government capacity for data-based decision-making. The Global Partnership for Education (GPE), UNESCO's International Institute for Educational Planning (IIEP), and the World Bank could work together to support countries to develop an education system workforce diagnostic tool as well as improved costing and financing models to understand and tackle workforce reform.

2 Experimenting, researching, and evaluating to explore what works and at what cost

Further research is needed to test, prototype, and evaluate new approaches to workforce reform in low-income contexts and low-capacity environments. This includes collecting detailed evidence on cost-effectiveness, system-wide changes, and understanding *how* effective education workforce reforms are implemented and taken to scale by identifying their enabling and success factors and how challenges and barriers to reform are addressed. Key stakeholders should work together to do the following:

The Education Commission calls on each country to work with their education workforce to test, analyze, scale, and promote workforce reforms

- **Governments should work with members of the education workforce and their unions** to pioneer, test, and evaluate effective reforms, and share lessons and key success factors.
- **International agencies, non-governmental organizations (NGOs), civil society organizations, and donors** should support governments to do the above and provide platforms for these lessons to be shared.
- **Researchers and funders of research** should evaluate existing and new reform approaches; undertake systematic analyses of the outcomes and cost-effectiveness of approaches to strengthening the workforce, developing learning teams, and building learning systems; and contribute to identifying success factors.

3 Leading coalitions for change at all levels

When reforms are ready to be scaled or targeted towards areas with the most need:

- **National policymakers** should build a coalition for change, working with the workforce and their unions, teacher training institutions and universities, development partners, civil society, and other sectors to implement reform. They should monitor the implementation, adapt as necessary, and ensure that coherent structures, policies, and practices are in place to sustain the reform. They should be open to evaluating the reform at scale and sharing lessons from systemwide reforms over time.
- **Members of the education workforce and their unions** should actively engage in the policymaking process, pushing reform from the bottom up. They should lead the changes based on their needs and expertise, generate evidence of what works, and champion reforms by acting as changemakers.
- **International agencies and donors** should support governments to implement at scale and consider establishing or building on an existing international alliance or network to undertake further rigorous research and support policymakers to use this research to inform education workforce reform.

With only 10 years left until 2030, this must be the decade of delivery. We have no time to waste. Now is the time for all actors – and most importantly policymakers and members of the education workforce themselves – to be open to new ways of working and learning together. It takes a team to educate a child. By building learning teams and learning systems, we can harness the human and social capital of the wider workforce and create a learning generation.

Now is the time for all actors – and most importantly policymakers and members of the education workforce themselves – to be open to new ways of working and learning together

Transforming the Education Workforce:

Learning Teams for a Learning Generation

Terms

Designing the education workforce refers to designing education workforce organizational structures, functions, and roles within schools (inside and outside classrooms), across schools, and at different levels in the system to evaluate what workforce needs to be in place to achieve quality education for all.

District is used throughout the report to denote the school-facing workforce at the middle-tier level although we recognize that some countries have other jurisdictions, e.g. provinces.

Education workforce is used to describe *teachers and all people who work directly to support the provision of education to students in education systems.* This includes people working across all functions relevant for providing education: leadership and management, teaching and learning, student welfare, operations and administration. The education workforce includes both compensated and volunteer roles and even communities and families when directly involved in formal education processes with schools.

The **Education Workforce Initiative** is a direct result of the Education Commission's *Learning Generation* report recommendation to "strengthen and diversify the workforce" (Recommendation 4). This recommendation suggested the creation of a taskforce to develop specific proposals for the redesign of professional roles within education, as well as their recruitment, training, deployment, and development needs. In response, the Education Workforce Initiative (EWI) was established. It includes a High-Level Steering Group that has guided the development of this report and overseen work with three countries (Ghana, Sierra Leone, and Vietnam) to address their education workforce needs and test the report's approaches.

High-income countries are economies with a Gross National Income (GNI) per capita of USD $12,375 or more in 2019, calculated using the World Bank Atlas Method.

Instructional leadership focuses on guiding teaching and learning by establishing a clear vision and educational goals, building relationships, planning curriculum, supporting and providing feedback to teachers, and creating an enabling environment by adapting the school to improve teachers' working and students' learning conditions.

Learning teams collaborate inside the classroom, within schools, within districts, and even at national and international levels. These teams of professionals – which can include qualified teachers, trainee teachers, other teaching and learning roles, leadership and management, and welfare professionals at all levels in the system – collectively focus on improving the learning and inclusion of all students and continually learn themselves.

Learning systems harness learning teams, networks of education professionals, cross-sectoral partnerships, data, and evidence to create a system that is coherently organized with a focus on learning and the ability to learn and adapt itself.

Low-income countries are economies with a GNI per capita of USD $1,025 or less in 2019, calculated using the World Bank Atlas Method.

Lower-middle-income countries are economies with a GNI per capita between USD $1,026 and USD $3,995 in 2019, calculated using the World Bank Atlas Method.

Middle-income countries are economies with a GNI per capita of more than USD $1,026 but less than USD $12,375 in 2019, calculated using the World Bank Atlas Method.

Network networks in education are associated with each other in forms of connection that have been deliberately established and worked on in pursuit of common interests and goals. They can be established at the regional, national, and international level and can be horizontal (connecting either individual teachers/ principals or individual schools) or vertical (connecting functionally different but interdependent educational institutions, such as schools, school boards, education researchers and ministries of education). One of the primary aims of networks is to create opportunities for ongoing exchange and collaboration of education practitioners.

Primary education includes learning and educational activities typically designed to provide students with fundamental skills in reading, writing, and mathematics and establish a solid foundation for learning and understanding.

Secondary education is often made up of two stages: lower and upper secondary. Lower-secondary education is generally designed to continue the basic program of the primary level, but teaching is typically more subject-focused, requiring more specialized teachers for each subject area. The end of this level often coincides with the end of compulsory education. In upper-secondary education, instruction is often organized even more along subject lines and teachers typically need a higher or more subject-specific qualification.

State is used to denote the highest level of governance that leads on policy.

Strengthening the education workforce envisions an effective education workforce at all levels in the system with coherent approaches to the professionalization of teachers and other key roles throughout the workforce life cycle – from recruitment and preparation to professional development and career progression to workforce leadership and management.

Well-being/welfare measures the quality of children's lives. While there is no unique, universally accepted way of defining child well-being that emerges from the academic literature, UNICEF uses six helpful dimensions to measure well-being: 1) material well-being, 2) health and safety, 3) educational well-being, 4) family and peer relationships, 5) behaviors and risks, and 6) young people's own subjective sense of well-being.

Chapter 1

Introduction

How can new approaches to the education workforce help us deliver inclusive and quality education to the world's children?

Current education trends are alarming: more than half of all children and young people around the globe are not learning the basic skills needed to thrive in this century. Although education is enshrined as a fundamental human right, there is a serious risk the world will not achieve inclusive, quality education for all by 2030 as set out by Sustainable Development Goal 4 (SDG 4). Despite progress in some areas, more than 260 million children are still out of school, and more than 600 million who are in school are not learning fast enough. The Education Commission estimates that if current trends continue, more than 800 million children will not be on track to achieve basic secondary level skills in 2030.[1]

This education crisis is compounded by the need for education systems to respond to the often fast-changing environments around them. Globalization, technological change, and demographic shifts have led to growing inequality, especially within countries. Education systems need to support increasingly diverse student populations with wide-ranging needs and challenges. Environmental changes and shifting demands from the labor market require new skills and competencies from students. Advances in science and technology are providing innovative ways to facilitate student learning both inside and outside the classroom.

> To have any chance at achieving equitable, quality education for all, we urgently need to harness the broader education workforce. It is an education system's biggest investment and one of its greatest levers for change

Most experts agree that making further and faster progress and responding to change will require deep reforms and transformations of education systems.[2] Education systems face varying obstacles depending on their stage of development and context, but top-performing systems share some common characteristics. Teachers are at the heart of the learning process, so the key strategies used to improve student outcomes center around developing a quality teacher workforce.[3] However, other roles and relationships, such as school leadership and management roles, are also strongly associated with better education outcomes.[4] Support roles can be important to help reach those left behind. District and state roles are important in driving strategic investment and system change. Yet systems rarely pay attention to the workforce beyond teachers.

Given the slow state of progress towards SDG 4 and the increasing range of education outcomes expected – which go well beyond learning outcomes as defined by standardized tests and include student well-being and an expanding list of knowledge and skills – it is clear that teachers will struggle to provide a quality education for all students if working alone. In the future, education systems must draw on a wider community of professionals to support the education outcomes required for young people to thrive in this century.

To have any chance at achieving equitable, quality education for all, we urgently need to harness the broader education workforce. It is an education system's biggest investment and one of its greatest levers for change.

Purpose and scope

This report is a direct result of the Education Commission's *Learning Generation* report recommendation to "strengthen and diversify the workforce" (Recommendation 4). This recommendation suggested the creation of a taskforce to develop specific proposals for the redesign of professional roles within education, as well as their recruitment, training, deployment, and development needs. In response, the Education Workforce Initiative (EWI) was established. It includes a High-Level Steering Group that guided the development of this report and work with three countries (Ghana, Sierra Leone, and Vietnam) to address their education workforce needs and test the report's approaches.

While research exists on teacher interventions, policy, and reform, very little research has focused on the role of the broader education workforce as a whole (see Box 1). Many roles beyond the teacher are under-analyzed, particularly in developing countries. There has also been very little thought leadership on the education workforce needed for the future.

Very little research has focused on the role of the broader education workforce as a whole

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Box 1: Defining the education workforce

This report takes a holistic view of the education workforce and follows the lead of other sectors, such as early childhood development, that define their primary workers more broadly. In this report, the term ***education workforce*** describes *teachers and all people who work directly to support the provision of education to students in education systems.* This includes people working across all functions relevant for providing education: leadership and management, teaching and learning, student welfare, operations, and administration. The education workforce includes both compensated and volunteer roles and even communities and families when directly involved in formal education processes with schools.

This report starts to address these gaps by presenting the latest evidence and experience on broader education workforce reform, exploring new approaches and drawing on lessons from other sectors to catalyze new thinking on education workforce strengthening, design, and implementation (see Box 2). The report is future-focused – imagining an education workforce relevant now but continually evolving and adapting to global trends.

The overarching questions guiding the report are:

1. What kind of workforce is needed to meet the demand for quality, inclusive primary and secondary education at the school, district, and system levels?
2. How can existing roles be strengthened, i.e. recruited, deployed, trained, supported, motivated, professionally developed, and led effectively to help prepare all students to thrive?
3. How do existing roles (such as teacher, support staff, school leader, and district support) need to be redefined, and what, if any, new roles are needed to more effectively deliver quality education to all students?

4. How have countries implemented education workforce reforms? How does the political economy influence the design and implementation of education workforce reforms?
5. What are the costing and financing considerations needed for the design and implementation of new approaches to the education workforce?

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Box 2: Designing and strengthening the education workforce

This report uses *education workforce design* to mean *designing education workforce organizational structures, functions, and roles within schools (inside and outside classrooms), across schools, and at different levels in the system to evaluate what workforce needs to be in place to achieve quality education for all.*

This report uses *education workforce strengthening* to mean implementing the workforce design by *improving the education workforce and ensuring the enabling factors are in place so all roles are recruited, trained, developed, motivated, supported, and professionalized where necessary to deliver a quality education for all children.*

</div>

The report treats inclusion and equity as interdependent and systemwide goals

The report is focused on the education workforce for primary and secondary education in low- and middle-income countries. It also draws on innovations and examples of promising practices from other spheres such as early childhood education and the health sector. Evidence from high-income countries is included where it is lacking in low- or middle-income countries. In support of SDG 4, this report is focused on a workforce that can address the goals of **access, learning, equity, and inclusion** for all students. The report treats inclusion and equity as interdependent and systemwide goals. Rather than solely focusing on "including" disadvantaged groups or issues (whether based on gender, ability, language, or ethnicity) as a separate project, it considers inclusion and equity to be integral principles in workforce design and strengthening at all levels of the workforce.

Approach

This report aims to balance evidence of what works from education, workforce effectiveness and innovation literature and thought leadership, and future trends with the current reality of many education systems. It takes a three-stage approach. First, it examines current challenges effectively ("strengthening the education workforce"). Second, it explores a shift to a team-based education workforce ("developing a learning team"). Third, it explores a more radical paradigm-shifting vision for the future ("transforming to a learning system"). These stages are not meant to be linear or prescriptive, since countries will likely interact with the stages according to their needs (see Figure 4 in Chapter 3). The approach is informed by and informs the EWI work in Ghana, Sierra Leone, and Vietnam.

# Reimagining the education workforce

2

2.1 The broader education challenge

The number of out-of-school children and youth was cut by almost half between 2000 and 2011, and today around 90 percent of primary-aged students are enrolled in school.[5] **Despite these gains, the opportunity for inclusive, quality education as set out by SDG 4 has yet to be realized for many children – especially in access, learning, equity, and inclusion**. The Education Commission estimated that one in four children of primary school age who are not learning the basics are not in school, but the remaining three out of four children are failing to achieve despite being in school.[6] Recent evidence shows that years of schooling adjusted for quality are much lower than the expected years of schooling in most lower- and middle-income countries (see Figure 1).

Figure 1- Median learning-adjusted years of schooling by country income group

Source: Education Commission analysis, 2019, based on World Bank Human Capital Index data

- ● Expected years of school   ● Learning-adjusted years of school
LIC: Low-income country   **LMIC:** Lower-middle-income country   **UMIC:** Upper-middle-income country
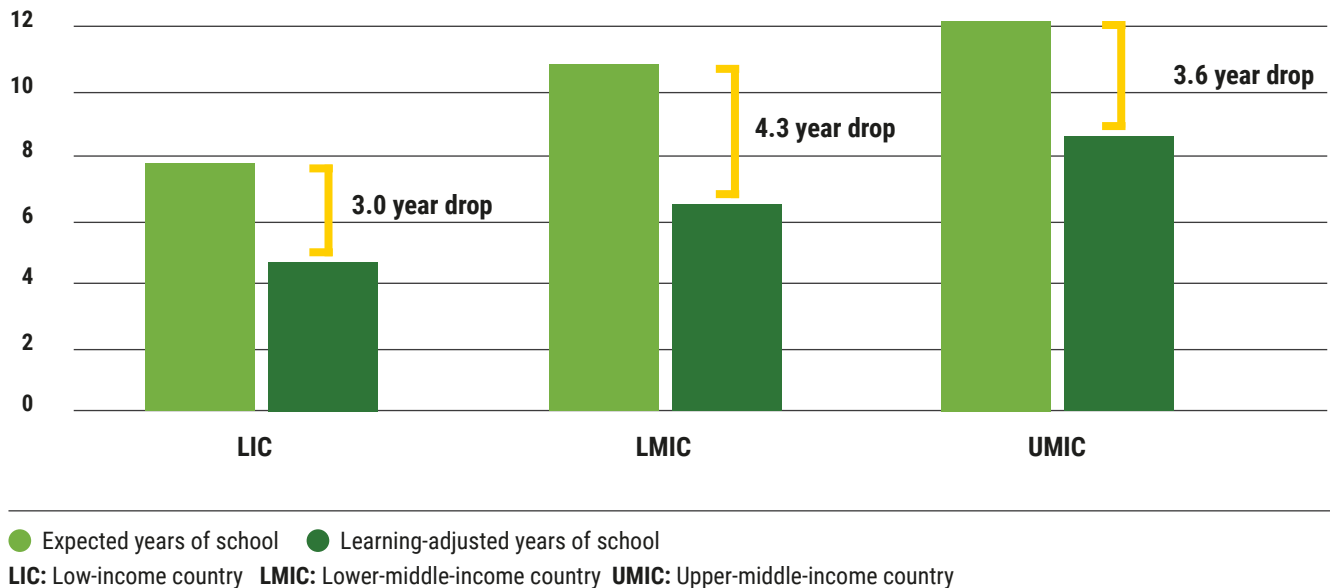
While many students struggle to learn the basics, there is simultaneously a growing demand for education to provide a wider set of skills beyond foundational literacy and numeracy. This puts students who are not learning at an even greater disadvantage. For example, socio-emotional skills are increasingly valued and predict earnings over and above the effects of schooling and cognitive skills.[7] Nearly 45 percent of employers globally struggle to find people with the right skills, citing lack of soft skills as one of the reasons.[8]

The most marginalized children continually fall furthest behind, with circumstantial realities such as poverty, gender, disability, geography, and ethnicity interacting to compound their challenges. For example, in some countries children with disabilities can be more than twice as likely to be out of school as their non-disabled peers.[9] Poverty alone often determines key education outcomes. Across low- and middle-income countries, there is on average a 32 percent gap between the chances of children in the poorest quintile and

richest quintile completing primary education.[10] Gender is still a major barrier to education in low-income countries, with only 25 percent of the poorest girls completing primary school.[11] On current trends, in Sub-Saharan Africa it will take poor girls 70 years longer to reach universal lower-secondary school completion than rich boys.[12] While progress has been made in recognizing that all children are entitled to a quality education, the pace of progress on equity and inclusion in education is difficult to measure as many of the most marginalized are often invisible in statistics.[13]

2.2   The education workforce: the key to achieving SDG 4 and future progress

Understanding how different workforce roles at all levels of the system support access, learning, equity, and inclusion is illustrated throughout this report. This section briefly outlines how teachers and other roles within the education workforce contribute to achieving SDG 4.

Teacher quality is the single most important influence on learning outcomes at the school level. An effective teacher can make a major difference to a student's learning trajectory – going from a low-performing to a high-performing teacher increases student learning significantly.[14] Teachers can also impact long-term student well-being, future academic achievement, and economic outcomes.[15] Several years of outstanding teaching may also improve equity, offsetting learning deficits of disadvantaged students.[16]

Specialist and complementary teaching and education support roles can support the improvement of education outcomes – especially by addressing inclusion. Specialist teachers can support students with a range of needs by offering individualized attention in the classroom and providing practical advice to classroom teachers on educational inclusion strategies.[17] Learning support staff can also have a positive impact on inclusion and student achievement.[18] Examples from diverse contexts illustrate how education professionals and even volunteers from local communities working alongside teachers in certain interventions have improved student outcomes.[19] The local community also has an important role to play in connecting students to their school and supporting well-being.[20]

Leadership and management roles improve teacher quality and learning outcomes.[21] Evidence suggests that school leaders are critical in improving school performance. Research from the United States shows that school leadership accounts for up to 25 percent of variation in students' learning achievement, second only to classroom teaching.[22]

The district workforce can be powerful in supporting teachers and school leaders to improve their practice and sustain change. There is little comparative evidence undertaken on roles at district, region, or state levels to evaluate their impact. However, evidence from effective programs in low-income countries[23] and systemic evidence from high-income countries[24] suggest that districts can play a role in providing instructional leadership and specialist support, facilitating collaboration and promoting better use of data, especially for addressing inequalities and sustaining interventions.

Teacher quality is the single most important influence on learning outcomes at the school level

There is no "one-size-fits-all" model when taking a systems approach – each system starts from a different point, faces different expectations, and operates in different social and political contexts that must be taken into account

The education workforce is critical to achieving SDG 4. However, it is important to note that the design and delivery of education workforce policy will succeed only when it is understood as part of a larger system.[25] This includes paying attention to the interdependencies among different actors who are part of the broader education workforce at all levels (school, district, region, and state) and among the different components of the education workforce life cycle – from bringing people into the workforce, supporting them to develop, to providing leadership and management. It also includes paying attention to relevant factors that influence teaching quality. Teaching quality is partly dependent on teacher quality (the personal characteristics and skills an individual brings to teaching), but is also strongly influenced by the context, including factors external to teachers, such as curriculum reform and assessment, that are part of the wider system.[26] There is no "one-size-fits-all" model when taking a systems approach – each system starts from a different point, faces different expectations, and operates in different social and political contexts that must be taken into account.[27]

2.3 The education workforce challenge

A range of factors affects the slow and stalled progress on education goals, but much of it is driven by education workforce challenges. These can be categorized broadly into three core issues: the supply and distribution of trained and qualified teachers; the effectiveness of teachers and other members of the workforce in ensuring quality and inclusive education; and the ability of the workforce to keep pace with change. Although these challenges affect many types of education systems, they vary significantly in degree and substance depending on the specific context and stage of a system's development. Not every country will face all these issues – each education system will have a unique set of challenges it must diagnose to move forward.

Education systems do not have enough trained and qualified teachers in the right places to meet growing demand and their distribution often exacerbates inequality

1. **Education systems do not have enough trained and qualified teachers in the right places to meet growing demand and their distribution often exacerbates inequality.**

An estimated 69 million teachers – 24.4 million in primary and 44.4million in secondary – must be recruited by 2030 in order to meet SDG 4, with Sub-Saharan Africa and South Asia accounting for over 76 percent of this need.[28] In some of the poorest countries, these increases are equal to half or more of the projected graduates of tertiary education – a proportion that is unprecedented in even the most successful and industrialized nations[29] (see Figure 2).

Figure 2 – In some countries, half of all graduates are needed to meet teacher demand

Source: Education Commission projections, 2016

**Percentage of new teachers needed in relation
to number of tertiary graduates 2020—2030**
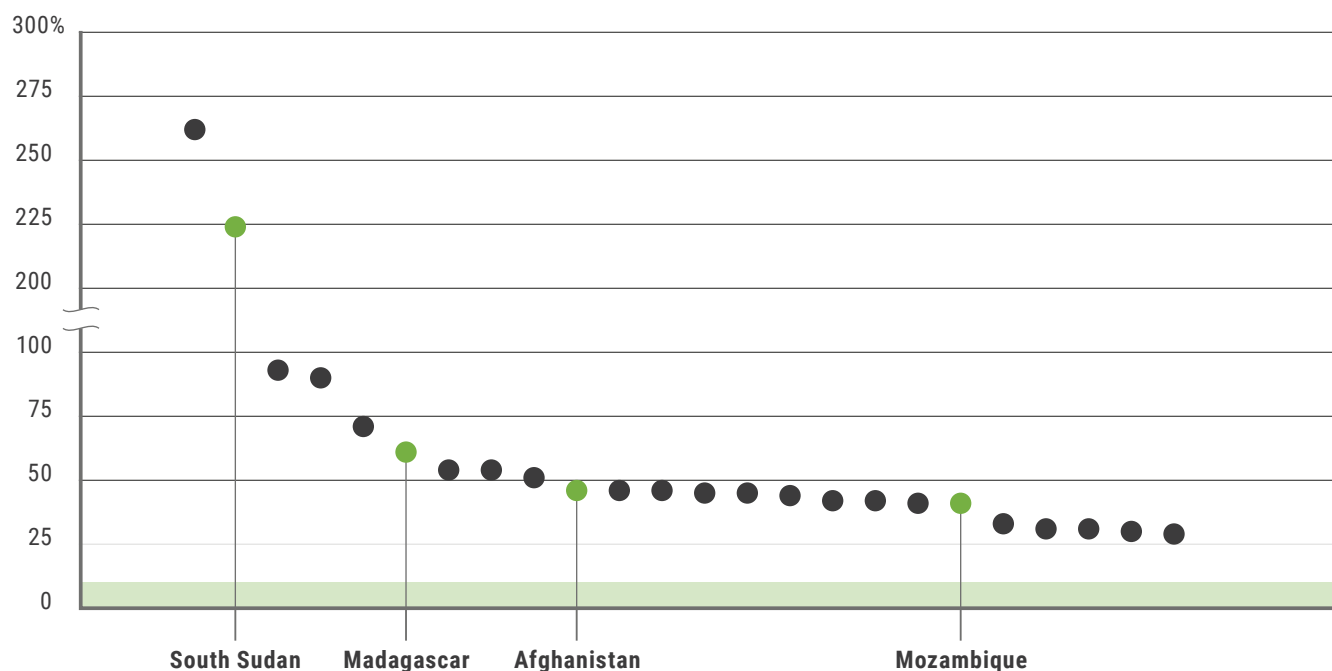
● Average of other low- and middle-income countries

But teacher shortages are not generic — teacher supply is often a localized problem and varies by education level. At the secondary level, for example, there may be an oversupply of teachers for some subjects but shortages in others, with teachers coming into the system not matching the specific needs.[30] Inequitable deployment and distribution can lead to shortages in rural and hard-to-reach locations. There is also evidence that more qualified teachers disproportionately work with more advantaged schools and privileged students, have smaller class sizes, and focus on later grades.[31] This exacerbates inequity in lower grades, adding to challenges in foundational learning.

Many interrelated factors drive shortages. The pool of qualified recruits may be limited[32] and attracting top graduates is often difficult due to the low status of teachers, low pay, poor working and living conditions, and unattractive career structures. Trained teachers sometimes choose not to enter the profession at all, and attrition rates of qualified professionals can be high in the early years due to lack of support.[33] Given the distinct characteristics of the education workforce labor market – where governments are typically the largest employer – the opportunities to generate innovative solutions to overcome the supply challenge are limited within the traditional delivery model.

2. Teachers and other members of the workforce do not receive the support they need to be effective.

Education systems are not providing the initial training teachers and other roles need to be effective, resulting in many teachers being unqualified or poorly trained with limited pedagogical and subject knowledge. This is a particular problem in rapidly expanding education systems with large numbers of relatively new and inexperienced teachers. In Sub-Saharan Africa, on average 62 percent of teachers are trained at the primary level and only 45 percent at the secondary level.[34] A study in seven countries in Sub-Saharan Africa found that less than 10 percent of primary school language teachers were able to demonstrate a minimum level of subject knowledge to teach grade four students.[35]

Issues in pre-service training include misalignment of teacher education with the curriculum, limited practice-based learning opportunities, and omission of newer skills.[36] Weaknesses in teacher educators' knowledge and expertise and in institutional management of teacher training institutions compounds these issues.[37] In the Gambia, for example, 77 percent of primary school teacher preparation instructors surveyed had never taught in a primary school themselves.[38] Developing countries face a vicious circle in which poorly educated students become poorly educated teachers unable to sufficiently improve their students' learning.
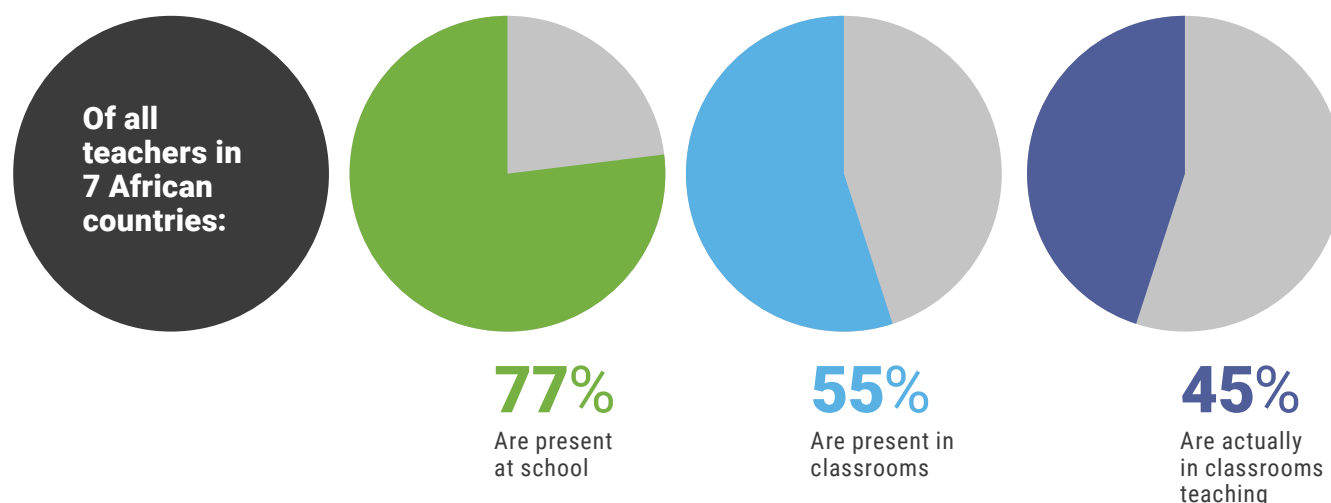
Across much of the developing world, models of professional development remain outdated. While the quality of in-service training varies significantly across countries, many continue to rely on ineffective cascade trainings that are both dislocated from the context of the classroom and the follow-up required to tangibly change behaviors and practice.[39] Cascade training models are often seen as the only option for reaching scale at low cost, but there are now more effective examples of using technology to support distance and open learning and coaching at scale that are not always considered.[40]

Multiple factors affect whether teachers are in classrooms and spending enough time on instruction. Absenteeism is a problem for some developing countries,[41] and even when teachers are present in school, they are often not spending enough time teaching.[42] A survey of primary schools in seven African countries found that of teachers present in school, on average 45 percent are not in classrooms teaching. The study found that primary school students receive less than 2.5 hours of teaching a day, less than half of the intended instructional time (see Figure 3).[43] Previous studies cite work-related out-of-school duties (such as attending in-service training) and personal illness as the primary reasons for absences and find higher absence rates for poorer, remote schools.[44] A recent study in India found a 19 percent overall rate of absenteeism among teachers, yet absences without reason accounted for only 2.5 percent – the rest were due to authorized leave (such as medical leave) and official academic, administrative, and other departmental duties.[45] These studies suggest that multiple, interacting, and systemwide factors affect teacher absenteeism. Reasons for insufficient time on instruction can include: administration and classroom management (which take an estimated 20 percent of time),[46] classroom management,[47] non-instructional duties,[48] and ineffective accountability systems and misaligned incentive structures.[49]

Teachers and other members of the workforce do not receive the support they need to be effective

Figure 3 – Teachers' time at primary school level

Source: Data from Bold, Tessa, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Brian Stacy, Jakob Svensson, and Waly Wane. 2017. "What Do Teachers Know and Do? Does It Matter? Evidence from Primary Schools in Africa." *Background paper to the World Development Report 2018*. Washington, DC: World Bank.

Of all teachers in 7 African countries:

77%
Are present at school

55%
Are present in classrooms

45%
Are actually in classrooms teaching

Teachers often work in relative isolation and are expected to fulfill increasingly diverse roles[50] to address a wider range of student learning needs. Competing demands often mean they cannot focus on what is known to improve learning and on top of this they receive limited support. In the World Teacher Survey across 166 countries, 41 percent of teachers cited managing student behavior as a challenge, making it the top professional concern, along with managing mixed ability classes.[51]

The education workforce is not designed to deliver inclusive education. Classroom teachers are tasked with understanding and meeting the diverse needs of all their students (including first generation, multiple languages, diverse backgrounds, interrupted education, and special needs), often with training that is highly generic.[52] This is especially challenging when they are expected to work alone in classrooms with large class sizes and limited support staff. In many cases, specialist inclusion roles that could support teachers do not exist and inclusive practices are rarely embedded in classroom practice. This can be due to insufficient data and evidence on what roles are required and to low prioritization in both policy and funding support.

Inequities in the workforce itself are rarely recognized or addressed in the design, training, professional development, or career opportunities for the workforce. This can lead to a workforce that is not representative of the population it serves in terms of gender, disabilities, ethnic, and linguistic groups. For example, in Sierra Leone, only 27 percent of teachers at primary level and 14 percent at secondary level are female.[53] This has immediate consequences for girls' enrollment, retention, and achievement as well as the school culture and longer-term impact on girls' aspirations, safety in school, and job prospects.[54]

Teachers often work in relative isolation and are expected to fulfill increasingly diverse roles to address a wider range of student learning needs

Too little attention is paid to leadership and management roles. School and district leaders are increasingly viewed as instructional leaders, but in practice tend to focus on administrative and supervisory activities.[55] They are rarely selected, trained, or professionally developed to focus on leading learning and school improvement.[56] In some systems, appropriate roles and job descriptions do exist, but are not enacted in practice.

The expertise of the education workforce itself is not always used to inform workforce reform. In the latest Status of Teachers survey, 29 percent of unions responded that they were rarely or never consulted on education policy. Thirty-three percent reported that they are not consulted on the development and selection of teaching materials, and 25 percent reported not being consulted on curriculum development.[57] Failure to take advantage of the education workforce's ability to highlight unforeseen risks and opportunities can lead to less effective design and implementation of reforms. Roles beyond teachers are rarely unionized and therefore also rarely consulted.

3. Current design and system failures hinder the workforce from keeping pace with change.

Workforce design is still largely based on a model of education that was created to meet the labor needs of the Industrial Revolution and organized on the principle of mass production.[58] Some of the best systems have started to adapt and innovate beyond this model. Wider global trends, as well as shifts in education itself, are changing the understanding of what teaching and learning can look like. Exploring how the teacher and other education roles need to change in response is critical, yet few education systems have experimented so far.

In many developing contexts, the data and knowledge necessary to manage the education workforce or make strategic changes are often limited or unavailable. Only half of the countries surveyed about monitoring information on SDG 4 had any data available on teacher attrition rates or teacher training from the previous year.[59] The quality and relevance of data that does exist is often poor[60] and data on other roles within the workforce besides teachers is rarely collected. Systems can often be data-rich but not data-driven, missing opportunities to better understand sector and education workforce needs and learn from policy implementation. In an analysis of how countries used their EMIS, only 10 percent of countries used the data to help integrate hard-to-reach areas and only 7 percent used student assessment data to identify support needed for teachers.[61] System conditions like these and others – critically the political economy dynamics – can either drive the pace of progress or perpetuate inertia.

Rather than being valued and empowered to innovate, teachers are too often perceived as obstacles rather than agents of change. Many successful systems have shown that as skill levels in the education workforce increase, so too should their autonomy and freedom to innovate and improve. High-performing systems like those in Singapore and Ontario, Canada, use the strong skill base of their teachers to give them a high degree of freedom to develop their own solutions and approaches, encouraging teachers to learn from and innovate with their peers.[62]

Given the scale and urgency of the learning crisis and the critical role the education workforce can play in tackling it, the potential of education's biggest asset and investment – its workforce – must be harnessed by better strengthening and designing it to achieve SDG 4.

2.4   Global trends and opportunities to reimagine the education workforce

Global trends are driving change in some societies and economies at a faster pace than ever before.[63] While these trends might put additional pressure on already struggling systems and workforces, they also provide opportunities to reimagine the education workforce needed for the future.

Demographic shifts and evolving familial arrangements contribute to diversity. Continued population growth, especially in the least developed countries, along with greater urbanization and migration[64] means planning for education will require robust data to ensure resources are deployed where they are most needed. Targeted approaches to attracting, training, deploying, developing, and retaining the education workforce in both rural and disadvantaged urban areas will be more important than ever to ensure that inequality is not exacerbated. Schools will need to ensure they are engaging with their changing communities in effective ways. Evolving familial arrangements and values, as well as shifts in attitudes around traditional gender roles and stereotypes,[65] mean education systems must consider how the composition of their workforce reflects and supports these new realities.

Environmental change impacts the health and management of our societies. Most predictions suggest that climate change will have unprecedented influence on where people can settle, grow food, build cities, and provide key services in the future.[66] The education workforce has an increasingly important role to play in developing the skills and knowledge, responsible attitudes, and sustainable behaviors needed to meet the mounting pressure of increasing environmental insecurity.[67]

Scientific and technological growth and innovation spark the need for a wider range of skills and are raising fundamental questions about what it means to work and live in this century. This includes growth in increased automation, big data, more sophisticated Information and Communication Technology (ICTs), and artificial intelligence. Education systems and their workforce will have to ensure that students learn both the foundational and wider set of new skills needed, as well as support students to continuously learn and manage complex ways of thinking and working in increasingly complex societies.[68] Systems will also need to consider how these tools can support the workforce to be more effective.

While much is written about the global drivers transforming societies and economies, the future is rarely predictable.

<div>

The potential of education's biggest asset and investment – its workforce – must be harnessed by better strengthening and designing it to achieve SDG 4

</div>

There are also trends specific to education that need to be taken into account when considering how education can transform for the future.

Advances in neuroscience have led to a greater understanding of how the brain works, with implications for cognitive and behavioral development and the ways that adults and children learn best. For example, evidence shows that stunting and other early childhood development deficiencies impact cognitive development and learning performance from the beginning of a child's life.[69] Greater understanding of how the brain works has implications for the delivery of education; the design of learning spaces and experiences; teaching methodologies and language of instruction; and harnessing the motivation of both the education workforce and students.

Greater connectivity and more sophisticated ICTs are already changing how education is delivered and how children are learning. As connectivity and technology continue to spread and become more widely accessible, the digital and tech-related skills required from students and the education workforce are becoming more prominent. More evidence is required to understand the impact of these technologies on learning experiences and outcomes. As countries establish strong foundational skills and labor markets begin to shift toward the technological frontier, they clearly will need to invest more to support the expansion of secondary and higher education.[70]

Education curriculum policy is moving towards a broader set of skills and greater pedagogical innovation.[71] The policy shifts reflect a recognition that greater learner agency is required to support lifelong learning in and beyond school.[72] Personalized approaches are one of the responses put forward to enable students to have greater agency in their own learning trajectories. If adopted, these will impact teachers' roles and instructional strategies in the future.

Learning environments are becoming more diversified, from students' independent use of technology to multi-age learning groups. This includes any combination of changes in location, types of spaces, configurations, resources, and tools utilized, creating a more multidimensional ecosystem of learning.[73] Research on innovative learning environments shows trends towards opening up classroom doors so that teaching can be shared, and breaking down the close association between a particular learning space and a single teacher.[74] Examples include mixed-aged learning groups and opening up the classroom to the wider community. Schools are starting to integrate "digital spaces" into formal learning. These diversified environments are facilitating more personalized approaches to learning.

Networking is becoming more complex and widespread in contemporary learning systems. Innovations in technology and management are facilitating organic networks of practitioners that are able to share proven practices and collaborate in ways that were unthinkable in previous generations. Wider opportunities for partnerships both within learning environments and external to them – including families and communities, higher education, cultural institutions, and businesses – could support broader education goals.[75]

These key trends in education, as well as wider economic and societal shifts, are changing our understanding of education goals, how it is provided, where it takes place, and who is responsible for it. However, the definition and role of the teacher has remained largely static over the past decades. These trends provide an opportunity to reimagine teachers' professional roles and provide additional reasons to better design and strengthen the education workforce to meet the needs of this century.

Visions for the education workforce

The report's vision for an education workforce able to deliver on SDG 4 includes three interacting stages: 1) immediate incremental change to address the most pressing challenges through strengthening the existing workforce, 2) a shift to a team-based education workforce through nurturing learning teams, and 3) a more paradigm-shifting change through transforming an education system into a learning system.

The process of change will not be linear, however. In line with recent literature on innovation and political change processes,[76] reform will be an interactive and iterative process in which the workforce is continuously strengthening, forming the basis for the creation of learning teams and learning systems. Given that challenges vary between and within countries, these visions will need to adapt to the needs of the specific context and are likely to involve hybrid approaches. Advancing these visions will depend on the political economy and financial support. Lessons from previous education workforce reforms, political economy, and costing and financing implications of future reforms will be considered in Chapter 7.

Figure 4 – Three interacting visions for the education workforce to reach system goals

Education Workforce

Vision 1

Strengthening
the education workforce

More effective:

Recruitment

Preparation

Development

Management

Vision 2

Developing
learning teams

Skill optimization

Instructional leadership
and inclusion

Data-driven improvement

Collaborative
policymaking

Teamwork

Vision 3

Transforming
into a learning system

Learners as individuals

School networks

Cross-sector partnerships

Research
and development

Education system goals

Access　**Learning**　**Equity**　**Inclusion**
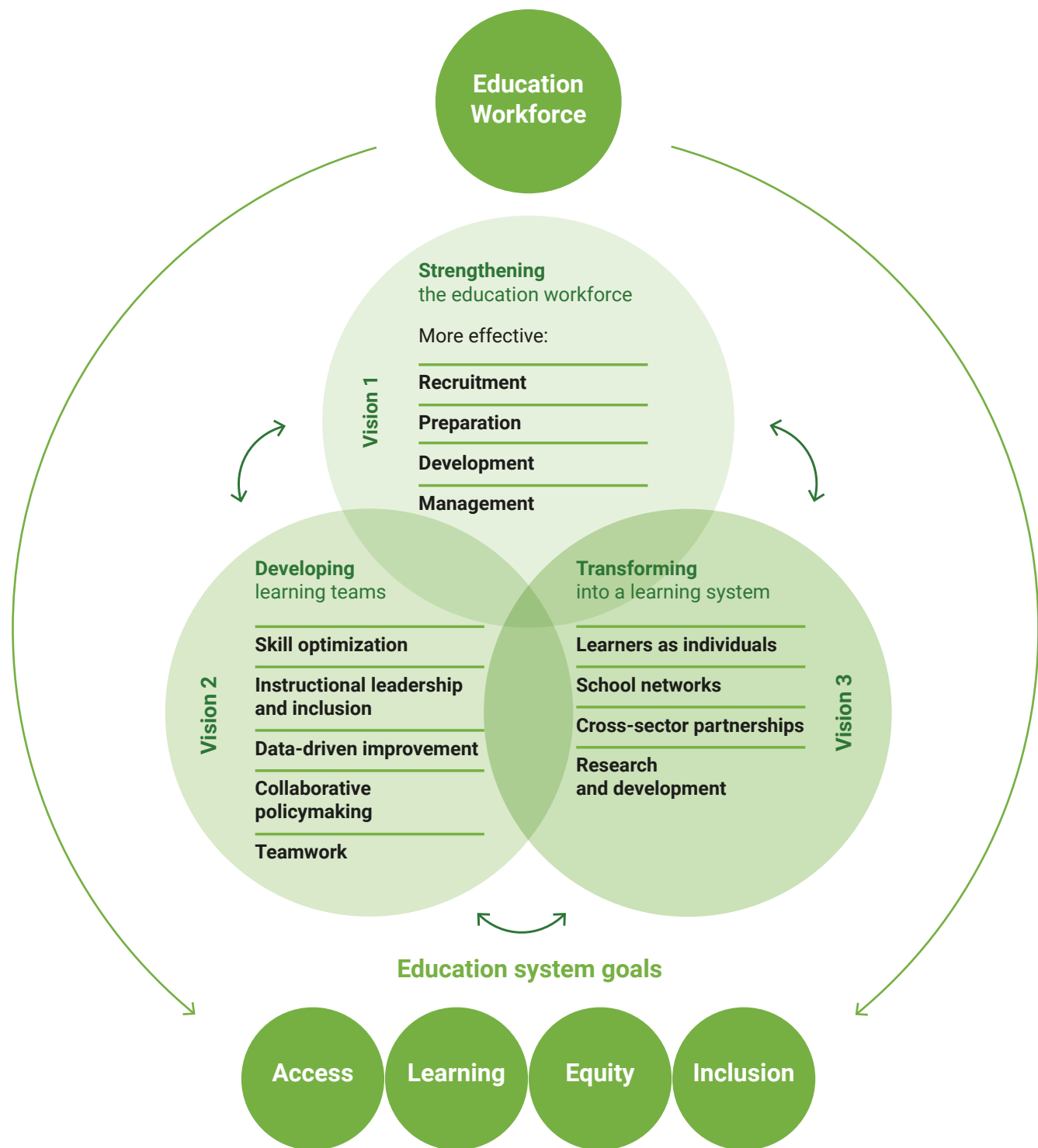
Vision 1: Strengthening the education workforce

Strengthening the education workforce envisions an effective education workforce at all levels in the system with consistent and coherent approaches to the professionalization of teachers and other key roles throughout the workforce life cycle, ranging from recruitment and preparation to professional development and career progression to leadership and management.

Rationale

Some countries face significant shortages of teachers. Many countries have large numbers of teachers, but many are unable to meet a minimum teaching standard. Some countries also have ineffective leadership and management structures. In these countries, the priority is to establish the foundations for an effective workforce that address these key challenges and treat teachers *and other key roles* (such as school leaders and district officials) as professionals so education systems can attract higher-quality entrants and strengthen the workforce already in place. In some cases, this will involve acting on policies or job descriptions that may already be in place by addressing implementation challenges such as those posed by the political economy (see Chapter 7). In other situations, new policies or approaches will need to be considered. **This vision is about strengthening the existing human capital of the education system.**

Box 3: Benefits of the learning team approach

- **More effective teaching:** Planning and teaching in teams; peer collaboration; coaching and mentoring; learning assistants and trainee teachers supporting proven teaching and learning strategies
- **More instructional time:** Learning assistants and trainee teachers supporting classroom management and routine/administrative activities task shifted to these roles; administrative support and technology
- **Greater access to specialist expertise:** Identifying gaps in subject and pedagogy expertise and devising solutions to provide needed expertise potentially across schools, harnessing technology where appropriate
- **Better support for inclusion:** Access to specialist inclusion expertise, classroom support for children with greatest needs, and better links to the community
- **On-the-job learning and support:** Planning and teaching in teams; peer collaboration; coaching and mentoring
- **Improved workforce motivation:** More team working, support, development, and variety of career opportunities

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Evidence

This vision draws on evidence from education system reform and promising practices, primarily in low- and middle-income countries. Evidence on system-wide workforce reform is more limited.

Interaction with the other visions

When strengthening the existing workforce, it is essential to lay the groundwork for more transformational change through the proposed learning teams

and learning systems. As a first step, the professionalization of roles beyond teachers is critical. Strengthening the workforce is an important process at any stage of development and should be ongoing as countries build learning teams and learning systems.

Vision 2: Developing learning teams

The current education workforce model in most education systems is built around a "one teacher to one classroom" model in which teachers work in relative isolation with limited support and often with challenging conditions such as large class sizes. To address this and other challenges, this report proposes the development of learning teams aligned with what works to improve education outcomes.

Learning teams collaborate inside the classroom, within schools, within districts, and even at the national and international levels. These teams of professionals collectively focus on improving the learning and inclusion of all students and continually learn themselves.

Rationale

The learning team approach is informed by workforce effectiveness theory[77] and based on a concept of professionalism that leverages the collective capacity of a group of people as opposed to focusing solely on developing the skills of individuals. It enables a group of people to use their diverse skill sets and other characteristics to work towards a shared vision[78] and is at the heart of the OECD's study on schools as learning organizations[79] where all staff learn to work together and learn collectively.[80] A meta-analysis of factors influencing student achievement identified collective teacher efficacy as the single most powerful characteristic of highly effective schools and the top factor influencing student achievement.[81] **Developing learning teams is about investing in the "social capital" in addition to the "human capital" of the workforce.**

Learning teams would be formed in different ways depending on contextual needs. They can include a variety of professionals – qualified teachers, other teaching and learning roles, leadership and management, and welfare professionals – inside the classroom, within and across schools, and at all levels in the system. At the school level, by organizing teams with differentiated roles (such as classroom teachers, learning assistants, trainee teachers, and inclusion specialists) that optimize specific skillsets and reorienting school leader roles towards instructional leadership and inclusion, learning teams would provide more effective teaching and better support for inclusion and improve on the job learning, support, and motivation.

A learning team approach at the class level ensures that all the critical education functions are shared across a team and not concentrated on a single teacher. Figure 5 illustrates the shift from a typical current class design to a learning team design, which reorganizes key functions, including teaching and learning, student welfare, instructional leadership, and operations and administration.

Figure 5 - Comparison between current class design and learning team design

Source: Education Commission, 2019

Current class design

Learning team design

● **Learners**

⋰ **Teacher**

Key to functions:

● Teaching and learning
● Operations and administration
● Student welfare
● Instructional leadership
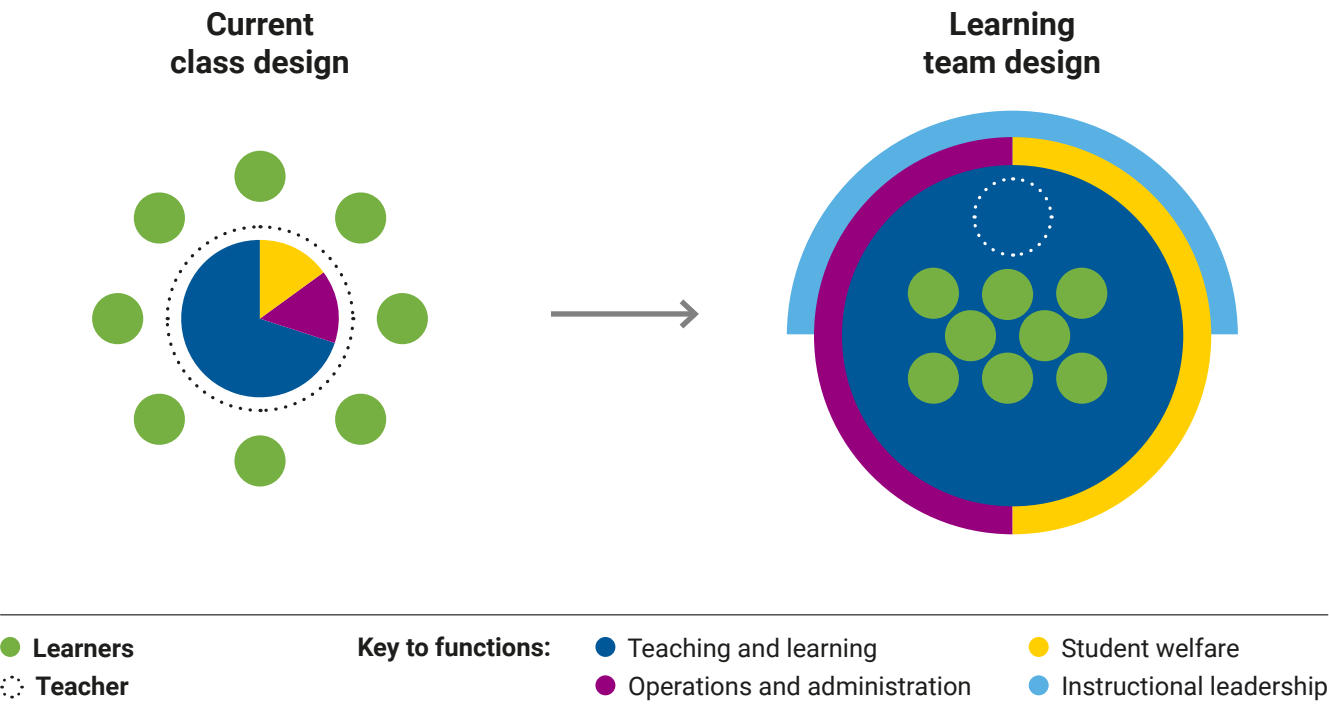
Note: In the learning team design, the functions are shared between a team and would be undertaken by different roles depending on the context.

Developing learning teams does not necessarily involve hiring many new roles. It entails diagnosing the challenges, understanding what roles and skills exist, considering how best to utilize them in a team, realigning roles, prioritizing any new roles to the areas of greatest need, and enabling more teamwork. This includes the following approaches which are outlined in more detail in Chapter 5: optimizing the right skills and expertise of the workforce; reorienting school leader roles to instructional leadership and inclusion; reorienting the district to provide instructional leadership and data-driven improvement, targeting those most in need; shifting state focus to evidence-based strategic change in collaboration with the workforce; and creating structures and practices to enable education professionals to work in learning teams at all levels in the system.

Evidence

While the importance of a wider set of actors to achieve education objectives is increasingly recognized in the education sector,[82] team-based approaches that focus on the optimal allocation of skills have not been systematically explored.

Team-based approaches are more common in other sectors. For example, in early childhood development (ECD), increased understanding of the diverse and complex learning and development needs of young children has resulted in a diversified professional workforce with the expertise to meet those needs.

Professionals with diverse skillsets from different sectors and with varying levels of training work collaboratively in various configurations.[83] In the health sector, team-based approaches have improved the quality of service delivery and health outcomes[84] and are more cost-effective. The health sector uses a method called "skill mix analysis" to find the optimal configuration of a health workforce team. This can lead to task shifting for a more efficient use of the available human resources, and where new cadres of roles are required, specific training is provided.[85] While there are critical differences in ECD, health, and education systems, taking a team-based approach provides a new lens for reimagining the education workforce needed for inclusive quality education for all.

As the idea of learning teams is relatively new in education, especially in low-income contexts, testing the approach at a larger scale and evaluating its long-term benefits will be critical for successful implementation.

Interaction with the other visions
In some low-capacity and low-income contexts, governments may not yet feel ready to consider the learning team approach. However, even in these contexts, learning teams provide new ways to address immediate challenges and harness existing expertise and human capacity to develop a more effective workforce. Any strengthening of the workforce should take into account the opportunity to incorporate the relevant learning team approaches.

Vision 3: Transforming an education system into a learning system

Learning systems harness learning teams, networks of education professionals, cross-sectoral partnerships data, and evidence to create a system that is coherently organized with a focus on learning and able to learn and adapt itself.

Rationale
One of the key challenges outlined in Chapter 2 is the inability of education systems to keep pace with change. A learning system approach seeks to address this by building on the learning team approach and maximizing the collective capacity of professionals, creating a self-improving system able to learn and adapt to change.

As the capacity of education professionals grows, school networks become the engine of professional development: skilled school-based practitioners begin to share their expertise and knowledge across school networks and beyond[86] (see Box 4). Such networks have been able to organize the diverse expertise needed to solve complex educational issues and to quickly spread lessons learned in one part of the network to another.[87] Effective networks in education "promote the dissemination of good practice, enhance the professional development of teachers, support capacity building in schools, mediate between centralized and decentralized structures, re-culture educational organizations and systems, and support innovation in times of change."[88] Through networks, the education system can engage and connect to other important actors – such as employers, new innovators, and other sectors – who can

Taking a team-based approach provides a new lens for reimagining the education workforce

work in partnership with schools to improve student outcomes and close achievement gaps for marginalized students more rapidly.[89]

To work in this way, new types of education workforce roles will be required. For example, the best practitioners would move into system leadership roles to provide subject, pedagogical, or leadership support to other schools. The district could become smaller and more strategic, focusing on quality assurance of practitioner-based professional development, identifying and scaling high-impact practices, and providing strategic management to ensure equitable resourcing. New and existing roles at the school and district levels would become more external facing, forging partnerships with actors outside the education sector.

Figure 6 depicts how a learning system would build on learning teams, forming networks and harnessing cross-sectoral partnerships. The way this report conceptualizes a learning system involves four approaches outlined in Chapter 6: exploring innovative learning configurations to address individual needs; developing school networks and harnessing system leaders; leveraging cross-sectoral partnerships to support broader education goals; and encouraging a research and development culture at all levels in the system where high-impact innovations are identified and scaled.

Learning systems harness learning teams, networks of education professionals, cross-sectoral partnerships, and data and evidence to create a system that is coherently organized with a focus on learning and able to learn and adapt itself

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Box 4: Defining networks for a learning system

The OECD's *Networks of Innovation: Towards New Models for Managing Schools and Systems* distinguishes a network in education as "distinct from traditional forms of grouping schools and systems – the concept of a network stresses the idea of a community as the common element and the principal connection between institutions. Schools are not just 'clusters,' which connotes geographical proximity, nor 'groups,' which suggests an almost accidental agglomeration of disparate institutions. Rather, networks are associated with each other in forms of connection that have been deliberately established and worked on in pursuit of common interests and goals."

"Educational networks can be created at regional, national, and international levels and can be horizontal (connecting individual teachers/principals or individual schools) or vertical (connecting functionally different but interdependent educational institutions, such as schools, school boards, education researchers, and ministries of education). One of the primary aims of networks is to create opportunities for ongoing exchange and collaboration of education practitioners."

Reference: Hopkins, David. 2003. "Understanding Networks for Innovation in Policy and Practice" in *Networks of Innovation: Towards New Models for Managing Schools and Systems.* Paris: OECD Publishing.

Figure 6 - Transforming learning teams into a learning system

Source: Education Commission, 2019

A learning system
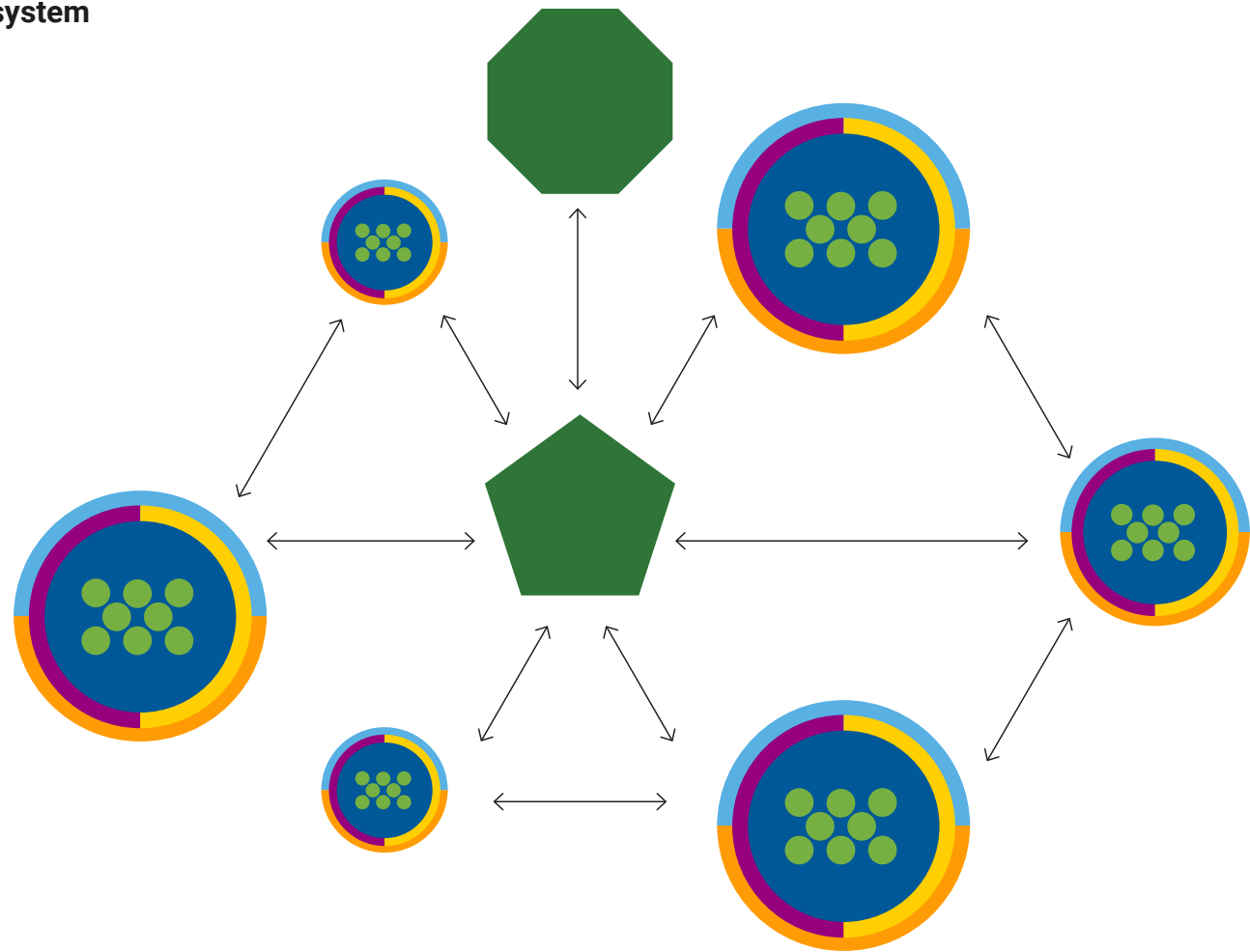
Key to shapes

⬢ School

⬠ District

⬡ State

Key to functions at school level

● Teaching and learning
● Operations and administration
● Student welfare
● Instructional leadership
● Cross-sectoral partnerships

Evidence

For this more aspirational future vision, the report considers evidence from a range of sectors, including public-service reform, systemic innovation literature, innovative education models from developing and developed countries, emerging thought leadership, and global and education trends. This vision is informed by research on the power of networks and improvement science[90] – a disciplined approach to accelerate how a field learns to improve and facilitate innovation.[91] This has enabled "thinking forward" to consider how a future education workforce can incorporate a learning systems approach.

While some of the best performing systems already incorporate elements of a learning system, this future vision, by its very nature, draws upon less evidence, especially from education systems in developing countries. A new report on education innovations notes that "such is the urgency of the learning crisis that [the lack of evidence on system transformation] should not stop the endeavour and bold experimentation."[92] More research is needed to prototype and evaluate these approaches for education, especially in low-income contexts.

Interaction with the other visions

Aspects of a learning system may seem aspirational for some countries, but the aim is to provide a vision for countries to work towards or test elements of as part of the development of their education system. This is based on the assumption that countries do not develop in a linear way. They may progress through interacting stages and should have the opportunity to leapfrog[93] where possible. Transforming into a learning system will also impact the way education systems strengthen their workforce and build learning teams.

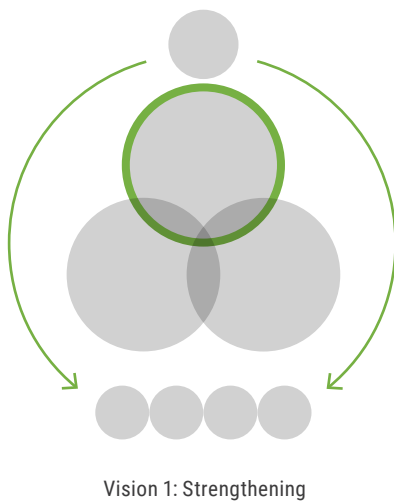# Strengthening the education workforce

Key messages for policymakers

- To attract high-quality candidates and raise the status of the education profession, reforms need to **professionalize** teachers and other key workforce roles **throughout the workforce life cycle**: from recruitment to initial training to professional development and career progression. These policies should be coherent, support each other, and align with other education policies such as curriculum policy.

- **Recruitment** should be merit-based and where possible based on clearly defined dispositions and capabilities. The workforce should be representative of the population it serves. For underserved areas, systems should consider hiring directly from these areas, and where necessary provide alternative training routes that address the needs of the local population.

- Evidence from high-performing education systems shows that improving the standard of **initial teacher training** is critical for improving learning outcomes. Teacher training institutions and their workforce will need support to reform. Investments in initial teacher training should be based on evidence of what works such as a stronger emphasis on addressing trainees' foundational knowledge before building and applying robust subject and pedagogical knowledge; more school-based practicum; and teacher training aligned to the curriculum and context. Training courses should be inclusive in terms of trainee accessibility, course content, and trainers. Induction programs for those entering new roles and mentoring during the initial years should be encouraged.

- **Professional development** opportunities should be more widely available to all teachers and other key staff and evaluated for their effectiveness. These should be practice-based cycles focused on improving learning outcomes. Evidence suggests professional development is most effective when it is focused on a specific subject, tailored to topics relevant to the local context, and provides supporting materials, coaching, and collaboration opportunities to complement training. Low-tech approaches can facilitate professional development when combined with face to face approaches. For teachers who lack core competencies, a range of pedagogical support strategies, including structured pedagogy and frequent formative assessment could be considered until their competencies are further developed. **Career progression** should be based on achievement of professional skills and competencies and result in salary increases.

- **Workforce management** policies must address the root causes of workforce absenteeism. For example, salaries must be set at the same level as similarly qualified professionals, paid on time, and easily accessible. Requests for teachers to undertake activities that impact scheduled instructional time should be minimized, and fair accountability mechanisms should be established.

- **Deployment** systems should use robust data to better match supply and demand, take into account workforce preferences, and ensure equitable resource distribution. Data should also be used to target specialized support to schools, prioritizing the most marginalized.

Vision 1: Strengthening

More effective:

Recruitment

Preparation

Development

Management

Vision 1: Strengthening

In many education systems, strengthening the existing workforce should be an urgent priority as it will lay the foundation for further reforms. Recruiting and deploying teachers to address teacher shortages and ensuring that existing teachers meet minimum teaching standards and are motivated to teach are critical challenges, particularly in low-income countries. But strengthening the workforce is an ongoing process that should be sustained throughout the move towards learning teams (Vision 2) and learning systems (Vision 3) and during each stage of reform.

The policies and practices below are based on the best evidence and examples available and are drawn from low- and middle-income countries where possible. They represent options, recognizing that each country will need to focus on the most relevant policies and practices for their own needs. Each country will also need to ensure that policies across the workforce life cycle – from recruitment and preparation to professional development and career progression to workforce management – are coherent and align with other education system reforms such as curriculum reform or inspection processes.

This section is structured using the following workforce life cycle and the four key elements that need to be strengthened:
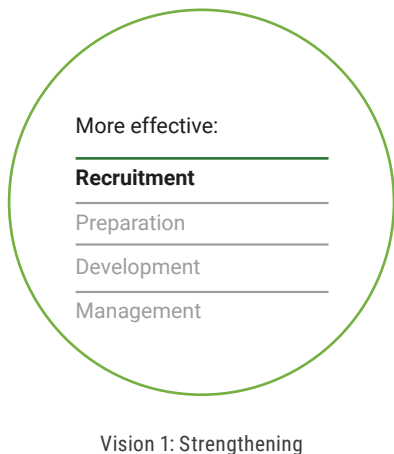
4.1 Recruit the right people to the right places

Many countries struggle to recruit highly qualified people to the education sector. To recruit the right people to the right places, education systems can focus on three key strategies:

1. Strengthen professionalization throughout the workforce life cycle
2. Select based on capabilities
3. Develop alternative routes into teaching

Approaches to more effective deployment are discussed under leadership and management of the workforce (see Section 4.4).

1. Strengthen professionalization throughout the workforce life cycle

In many contexts, the teaching profession is characterized by low pay, low prestige, and low status and is seen as a "profession of last resort." This can make attracting high-quality candidates difficult, especially in low-resource contexts where demands from competing sectors can be high.[94]

Successful education systems demonstrate that higher-skilled individuals can be attracted to the workforce if roles are continuously professionalized throughout the life cycle. Countries have sought to raise the status of teachers by establishing professional teaching standards, making routes into teaching attractive, accessible, and fair, and ensuring minimum standards for pay and working conditions. This process should include salary structures that recognize and reward teachers with experience and highly accomplished skills, as well as differentiated career structures, training, and development programs that enable the workforce to build its own capacity and professional knowledge base. An important consideration is how attractive the profession

is vis a vis other professions, and how reforms may affect this equilibrium over time. This all requires investment, but the reward is more effective teachers and students who learn more, stay in school longer, and form the potential pipeline for higher-quality teachers. Chile provides an example of such an approach (see Box 5).

Box 5: Chile's approach to teacher professionalization

Chile has used a life cycle approach to professionalization and introduced reforms throughout the education workforce life cycle to make careers in education more attractive and rewarding. While several measures are currently under evaluation, anecdotal evidence suggests that they have contributed towards improving the status of teachers.

First, incentives such as prestigious scholarship programs have made routes into teaching more attractive to the brightest candidates. These schemes also address equity issues by specifically targeting students from disadvantaged backgrounds and requiring that scholars teach for three years in designated "vulnerable schools." Stricter entry requirements for education/pedagogy courses have also been introduced.

Second, a new pay scale benchmarked to performance has been introduced. Teachers benefit from professional mentors and free training, and from induction throughout their teaching career, to support their progression up the pay scale. The number of designated hours for non-teaching tasks such as lesson planning, reviews of assessments, and peer collaboration has been increased and is protected by law. Teachers are actively encouraged to collaborate with other teachers at their schools as well as engage with professional teacher networks.

Early results show that despite the increased entry requirements for teaching qualifications, reforms have not adversely affected the number of teaching candidates.

Reference: Naylor, Ruth, Charlotte Jones and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

Simply raising requirements for entry into the teaching profession based on qualifications, without other reforms to make teaching more attractive, can be counterproductive. When teacher qualifications become too selective, the supply of qualified teachers may become limited, forcing systems to recruit unqualified and untrained teachers. Thus, raising entry requirements alone can actually lead to a reduction in the number of appropriately trained teachers.[95]

2. Select based on clearly defined capabilities

In many contexts, recruitment of teachers and other roles is subject to political patronage. Teacher recruitment processes tend to emphasize academic qualifications rather than observations of the candidate's teaching ability.[96] Leaders and managers are often recruited from the teacher workforce based on years of service and qualifications, and in some cases personal connections, rather than the leadership competencies required. Selection processes in some contexts disadvantage women, leading to underrepresentation of women in leadership roles.[97] These recruitment challenges can result in teachers without the skills to teach effectively and school and district staff without the capacity to lead and manage.

New and more effective approaches to teacher selection are urgently needed. These should be based on the functions and capabilities required, rather than solely on academic qualifications, and targeted at high achieving candidates. This is important because evidence indicates that, beyond a given threshold, there is no relationship between a teacher's academic qualifications and pupil performance.[98] Compared to other sectors, there is limited systematic research on effective education workforce recruitment practices.[99] Evidence from other sectors suggests that selection processes should take into account a breadth of skills and dispositions beyond cognitive traits associated with good teaching. Several universities have been developing teacher selection tools, such as the University of Melbourne's Teacher Capability Assessment Tool[100] and the Teacher Selection Project, which is researching ways to develop contextualized, evidence-based teacher selection frameworks in the United Kingdom, Australia, Finland, Lithuania, and Malawi. These projects aim to identify and select for the soft skills, attributes, and dispositions related to effective teaching. Atlanta public schools in the United States are exploring the use of video interviews to assess these competencies and reduce recruitment costs.[101] Prestigious scholarship programs can make routes into teaching attractive, supporting selection of the brightest candidates (see Chile example in Box 5)**.**

In all cases, workforce selection should be a merit-based process that avoids political patronage. Several countries (such as India and Pakistan) have introduced tests for teacher candidates, but their effectiveness still needs to be evaluated. In Mexico, moving from a political process to a test-based teacher selection process was associated with a boost in student learning. The test itself was not good at predicting teacher effectiveness, but just having a test deterred many low-skilled candidates from applying.[102]

School and district leadership and management should be selected based on demonstrated leadership dispositions and management competencies rather than just length of service. Competencies such as leading change, collaborative leadership, knowledge management, and data analysis should be considered.[103] Education reforms in Punjab, Pakistan, explicitly put in place recruitment systems[104] for the district-level workforce to ensure competency-based selection of teacher mentors. Selection was based on tests for pedagogical knowledge as well as coaching and leadership skills.[105]

*In **Kenya** and **Rwanda**, the Education Development Trust's system leadership programs select participants based on wider leadership competencies (including coaching skills), their drive and capacity to improve performance in schools, and their approach to inclusive education. A district stakeholder panel collects evidence through interviews, evidence statements, and school visits to observe leadership practices.[106]*

3. Develop alternative routes into teaching and ensure an inclusive workforce

Many countries face teacher shortages. In some countries, the shortage is in terms of absolute numbers of teachers, and in others it is specific to certain locations, subjects, or underrepresented groups who may not be able to access traditional routes into teaching. One cause is the low completion rates for secondary education (e.g. less than 25 percent in Sub-Saharan Africa[107]) and an even smaller percentage of tertiary graduates (e.g. 10 percent tertiary gross enrollment rate for Sub-Saharan Africa[108]). With such a small pipeline of potential teachers, some education systems are forced to recruit teachers without the necessary skills and expertise. This fuels the vicious circle of poorly educated students becoming teachers who then provide inadequate teaching to the next generation.

Many countries are addressing absolute teacher shortages by increasing their investment in education to keep up with rising student populations and/or reduce class sizes. For example, Senegal has invested heavily in education, consistently spending over 20 percent of all government expenditure on education since 2009.[109] Between 2008 and 2014, it decreased the number of primary students per trained teacher from 79 to 45.[110] Of course, not all countries will be able replicate this success given the investment required and availability of a ready pipeline of potential teachers.

Some countries have used short-term solutions to address teacher shortages, but these can have long-term consequences for professionalism. These include "fast track" routes into teaching or a reduction in the length of teacher training courses to meet the urgent demand for additional teachers. If these training routes are combined with lower entry criteria to expand the pool of potential candidates, this can have long-term negative consequences for the quality and professional status of teachers.[111] Employment of unqualified teachers on short-term contracts also has negative long-term impacts. These have mixed evidence of effectiveness,[112] do not provide a long-term sustainable solution, and challenge professionalism.[113]

To expand the pool of potential recruits and address the need for more qualified and trained teachers – including more women – countries have recruited teachers directly from underserved areas or provided pathways to qualification for unqualified teachers and trained them in schools supported by distance learning. Both Malawi and Tanzania have recruited teachers from underserved areas and provided paper-based distance teacher training.[114] In the Gambia, unqualified teachers are recruited locally and given in-service training that brings them to qualified status in three years.[115] Evidence on the success rates of these programs has not been found (more approaches to

develop unqualified teachers can be found in Section 4.3). Alternatively, it might be more appropriate to train some unqualified teachers to undertake learning assistant or community education worker roles, working in teams with qualified teachers (see Chapter 5 on learning teams).

*In **Sierra Leone**, GATE provides a bridging program for women by combining working as learning assistants in a local primary school with a distance learning program. The women then earn their teaching qualification after 12-18 months. The program has been shown to promote learning and aspiration, particularly with female students.[116]*

Interim strategies may be needed to meet a temporary shortage of qualified teachers while training systems expand. Developing a long-term teacher pipeline can take time, especially in contexts where the supply of secondary school graduates with good subject knowledge is limited. Interim strategies include using video or radio technology to broadcast lessons requiring subject expertise to children without appropriately qualified teachers (see the MGCubed example in Chapter 5). In the Gambia and Malawi, retired teachers were allowed to remain employed on temporary contracts as "month-to-month" employees and received a fixed salary or gratuity payment along with their pensions.[117] The learning team approach described in Chapter 5 outlines an interim strategy to create a teaching and learning team that could include a qualified teacher, learning assistant (or community volunteer in low-income countries), and/or trainee teacher to help manage large classes with multiple learner and language needs.

To address teacher shortages in specific locations or subjects, incentives can be effective but often only in the short term and at a cost. Some countries (e.g. Ghana) require newly trained teachers to do a minimum service in rural schools. While this fills a short-term need, retention in these posts is low.[118] In Ghana, when pairs of students who had trained together were posted to remote schools together, this helped to increase uptake of rural postings.[119] Targeted incentives, such as remote service allowances, provision of housing, or accelerated promotion routes can be effective,[120] but have cost implications. While there is little empirical evidence on gender aspects of teacher deployment, promising strategies to encourage female teachers to accept positions in rural areas include career guarantees for accompanying spouses, housing and other incentives, and provision of in-situ training.[121]

Subject-specific incentives for candidates to study education courses in subjects with a limited teacher supply can work,[122] but they need to take place in conjunction with other efforts to increase overall motivation, morale, and retention. Examples include the South African Funza Lushaka Bursary Programme and the Mathematics and Teacher Intern Programme, which have improved enrollment in Bachelor of Education and Postgraduate Certificate in Education courses in STEM and ICT subjects.[123]

New approaches are needed to ensure routes into teaching are accessible for underrepresented groups. Traditional routes are often inaccessible to people with disabilities and people from minority groups. This can contribute to their underrepresentation in the workforce and reinforce a negative feedback loop

New approaches are needed to ensure routes into teaching are accessible for underrepresented groups

of inequality. Alternative routes could facilitate greater representation. Some examples exist, but more research is required.

*In **Mozambique**, Escolas de Professores do Futuro community-based teacher training colleges (TTC) have offered teacher education programs for visually impaired primary school teachers in rural areas for over 10 years. Each year, visually impaired graduates from mainstream schools are identified with assistance from the local school for the blind and encouraged to apply for a scholarship at a specialist TTC. During their training, visually impaired student teachers teach in practice schools nearby. As a result, communities have become accustomed to visually impaired teachers, resulting in a positive change of attitude and helping create a more welcoming environment for teachers and students with disabilities.[124]*

More effective:

Recruitment

Preparation

Development

Management
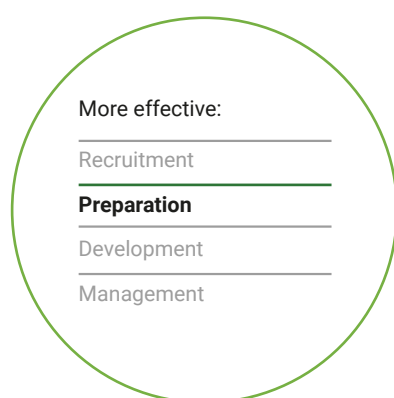
Vision 1: Strengthening

4.2   Prepare, train, and induct the workforce

In many countries, initial teacher training (ITT) systems do not equip trainees with the skills needed to provide quality instruction. Teacher educators themselves often have limited classroom experience and poor training on the most effective pedagogical approaches for the level they are training teachers for.[125] In one study, most of the teacher educators in primary teacher training institutions in Eritrea and Zambia were actually drawn from secondary schools.[126] The logistical challenges of supervising trainees in schools and hierarchical relationships between teacher educators and teachers can make increasing the amount of supervised practicum difficult.[127] Furthermore, attrition rates tend to be highest for teachers in the first few years after they enter the profession, as they often have to manage the challenges of a move to a new location and a new job.[128] Overall, there is a lack of coherence between initial teacher training and professional development across an education system, and teacher education is a fragmented experience for most.[129] Initial training, induction, and mentoring programs for school principals and district roles are limited.[130]

The evidence from high-performing education systems such as South Korea and Vietnam shows that investment to improve the standard of initial teacher training is critical for improving learning outcomes.[131] Reform in this area can be challenging due to the institutional changes required. However, investing in initial teacher training to ensure that high-quality teachers enter the workforce is likely to be more cost effective than relying on a remedial approach through in-service training.[132]

To strengthen workforce preparation, education systems should:
1.   Raise the standard of initial teacher training to focus on what works to train teachers and align to contextual needs
2.   Provide all new role holders with structured induction and support

1. Raise the standard of initial teacher training to focus on what works and align to need

A recent OECD report on initial teacher preparation highlights the importance of viewing teacher training as a continuum, with initial teacher training as just the beginning of a career of professional development. The report also stresses the need for strong partnerships among stakeholders (universities, schools, policymakers, and unions) and mechanisms for making collaboration among the different partners and institutions at different levels in the system more effective.[133]

Investments in ITT should be based on evidence of what works, and teacher training institutions and their workforce should be supported to reform. Based on existing evidence, key elements for more effective ITT include:

- **Addressing trainees' foundational knowledge, then building robust pedagogical and content knowledge**. Teacher training courses are sometimes based on aspirational assumptions of recruitment of high-quality secondary school or university graduates, even though in many contexts teacher training is actually working with individuals with relatively low academic performance.[134] Foundational knowledge must be addressed before teacher training begins.[135] In addition, there is increasing evidence from the cognitive science research on how students learn. Teachers should also be knowledgeable on this to be effective.
- **Increasing the amount of school-based practicum throughout the course.** Field experiences should occur early and throughout pre-service training in an integrated way. Trainees who get field experiences only at the end of pre-service training have minimal opportunities for guidance and feedback.[136] The learning team approach in the Chapter 5 explains how trainees could contribute to the school workforce while also learning from it.
- **Aligning teacher training to the curriculum and context**. Training should be in subject- or grade-specific pedagogy using concrete methods relevant to the context and tailored to trainees' knowledge and experience.[137] In low-capacity contexts, training that provides detailed guidance on what and how teachers should teach has proved essential for improving the skills of low-performing students.[138] Research conducted in Latin America suggests four broad strategies: scripted approaches, content mastery, classroom management, and peer collaboration.[139]
- **Ensuring training courses are inclusive in terms of trainee accessibility, course content, and trainers**. ITT courses should be accessible to people with disabilities and other marginalized groups. The training and course materials need to equip trainees with awareness of the importance of inclusion and the skills to meet special learning needs.[140] One study recommends that information about special educational needs and disability should be spread throughout units in an initial teacher education program rather than "added on" as it is currently.[141] It is also important to train teachers in gender-sensitive approaches during ITT as the Transforming Teacher Education and Learning program (T-TEL) has done in Ghana (see Box 6).

Teacher training should be viewed as a continuum, with initial teacher training as just the beginning of a career of professional development

> **Box 6: Transforming Teacher Education and Learning (T-TEL) in Ghana**
>
> The T-TEL program in Ghana has been working with the National Council for Tertiary Education, colleges of education, and universities to implement fit-for-purpose curricula and assessments, develop strong partnerships between colleges and partner schools, develop national teacher standards, undertake regular school-based mentoring and support to teacher trainees, and move towards a more practically focused training system with strong oversight.
>
> A key element of these reforms is the introduction of a new four-year Bachelor of Education degree program for initial teacher education that includes subject and level specializations (early grade, upper primary, and junior high school), and introduces classroom experience through supported teaching in schools from the first year. Evaluations show strong improvements in gender-sensitive instructional methods, more beginning teachers demonstrating interactive student-focused instructional methods, and improved knowledge and application of basic school curricula and assessments.
>
> Key factors of the program's success are strong relationships with government, teacher education institutions, teacher unions, and other key education actors in Ghana; an enabling policy environment that provides a much needed institutional anchor for systemic change; and an ability to leverage existing structures and in-country expertise to increase the program's relevance to the context and sustainability.
>
> Lessons learned include the importance of genuine co-creation with and ownership by local partners, challenges around embedding an inclusive attitude, and the need to collect a variety of data to demonstrate the program's impact. Discussion on how T-TEL has worked within the political economy is in Chapter 7.
>
> Reference: Naylor, Ruth, Charlotte Jones and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

Increasing school-based initial teacher training that is aligned to the curriculum and trainees' competencies can produce more effective teachers. Initial teacher education programs in developing countries often involve only short periods of school-based training. In Kenya and Senegal, for example, school-based training is 45 days[142] and trainees often receive very little mentoring during practicum periods and lack support from tutors while in schools.[143] In OECD countries, initial teacher training courses at the lower secondary level tend to have between 70 to 120 days practicum during the course with mentor teachers from the school responsible for supporting trainees.[144] School-based training has been shown to be possible in low-income countries given sufficient support.[145]

*In **South Africa**, school-based mentors were used to support unqualified practicing teachers who were enrolled in a distance learning teaching qualification. The experience demonstrated that adequately trained mentors who understand how to mentor trainee teachers and pass on pedagogical skills are critical. In addition, increased coordination and collaboration between the university and school is essential to ensure that lecturers and mentors focus on the same pedagogic techniques.[146] In **Zimbabwe** trainee teachers have a school-based mentor throughout their practicum component.[147]*

Harnessing technology as part of a blended approach for initial teacher training should be considered when appropriate, especially for those without access initial teacher training otherwise. Smartphones and similar devices are expanding opportunities to provide initial teacher training content online or, where Internet access is limited, through micro-SD cards. Trainee teachers are increasingly able to access Open Educational Resources (OER) that they can adapt and use in the classroom. They can also upgrade their skills and knowledge through massive open online courses (MOOCs)[148] such as those provided through TESSA India, which have been effective when combined with face-to-face training.[149] However, these OERs need regulation and accreditation to ensure they meet required standards, and teachers must have self-study skills[150] and training in the use of technologies for distance learning.[151] These technologies should not be seen as a cheap delivery substitute for teacher training.[152]

Chile introduced new standards for its teacher training curriculum backed by an exit exam for students one year before graduation and tough new accreditation standards that forced the closure of many low-quality training institutions.[153] This created a massive shift in the teacher training market from 77 percent of enrollments in non-accredited programs to 70 percent of enrollments in accredited programs. Proposed legislation requires that all teachers hired into public (or publicly funded) schools be qualified with an accredited institution.[154]

Strong partnerships among training institutions, schools, and districts are important to align supply and demand of teachers. Data sharing with teacher training institutions on teacher demand in terms of level, subjects, and location could improve alignment of the production pipeline to need. This requires coordination and collaboration among the various stakeholders involved at the school and district levels and with teacher training institutions. In Nigeria, the Teacher Development Programme is institutionalizing relationships in each state between the colleges of education and the State University Basic Education Board (SUBEB) to ensure that colleges are training teachers to meet the subject, level, and skills needs of the SUBEB and help match supply and demand.[155]

As systems move towards a more professionalized and diversified workforce (see Chapter 5 on learning teams)**, new training courses and qualifications will be needed for other roles** such as school leaders, district education directors, learning assistants, and specialist teachers. School leader programs are emerging. The Varkey Foundation's six-week leadership and innovation program for current and aspiring school leaders in Argentina has trained over 2,000 leaders and the Ark-Relay Instructional Leadership Institute in South Africa provides a two-year leadership program. These programs have not yet had an external evaluation.

Strong partnerships among training institutions, schools, and districts are important to align supply and demand of teachers

*The Global School Leaders program (**Malaysia**, **Kenya**, and **Indonesia**), based on the model of the **Indian** School Leadership Institute (ISLI), combines workshops with in-school support, peer school visits, development of a school improvement plan, and peer networking. For schools participating in ISLI, the proportion of students performing above average in English increased from 24 percent to 35 percent and in math from 24 percent to 41 percent. More rigorous impact evaluations are planned to assess what gains can be wholly attributed to ISLI.* [156]

2. Provide new role holders with structured induction and support

Mentoring by teachers from the same subject area and participating in induction activities with other teachers can contribute to reducing attrition rates in the first years of teaching.[157] High- performing education systems ensure that newly qualified teachers receive mentoring and that time is allocated in the school day for this coaching and other induction activities.[158] Mentors need training and time to undertake the role. In Chile, recent education reforms provided early career teachers with mentoring from more experienced local teachers. In Ghana's T-TEL initial teacher training reform (see Box 6), school-based mentors provide regular support to trainee teachers and team teaching at times, and mentors are supported by coaching visits from college of education tutors who gain weekly professional development through support from the National Council on Tertiary Education and T-TEL.[159] In STIR's work with the Delhi government, induction programs for district staff and teacher mentors focus primarily on building a shared understanding of the new teacher mentor role and how it can support schools and teachers. The induction includes cross-district learning and opportunities to build networks for future support and resilience.[160]

Induction programs can be effectively combined with early assessments and probationary periods during which staff are initially employed on probationary contracts and only transition to permanent contracts once they demonstrate they meet the required standards for the role.[161]

More effective:

Recruitment

Preparation

Development

Management

Vision 1: Strengthening
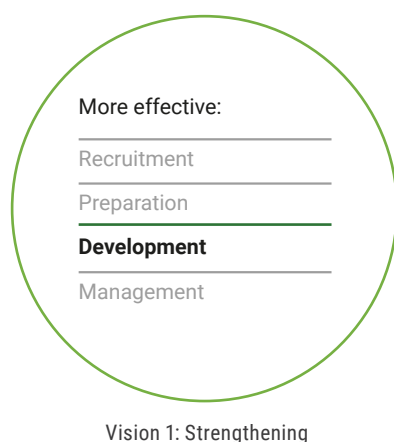
4.3   Motivate, professionally develop, and progress the workforce

The limited data available suggests that globally only 86 percent of teachers are trained at the primary level, but the proportion is far lower in Southern Asia (77 percent) and Sub-Saharan Africa (62 percent). Moreover, in Sub-Saharan Africa even fewer teachers are trained at the secondary level (45 percent).[162] In some countries, a large number of teachers need support to become effective. Teacher development has too often focused on training events that are off-site and sometimes one-off, delivered in a cascaded way and dislocated from the classroom context and follow-up required to tangibly change behaviors and practice.[163]

To strengthen motivation, professional development, and progression in the workforce, countries should:

1. Focus professional development on practice-based cycles of quality improvement oriented towards improving education outcomes
2. Provide a range of pedagogical support strategies for existing teachers (whether qualified or unqualified) who lack core competencies
3. Base career progression on achievement of professional skills and competencies and link this to salary increases

1. Focus professional development on practice-based cycles of quality improvement oriented towards improving education outcomes

High-impact professional development not only fosters new skills and knowledge, but also builds capacity to improve education practice and outcomes. Professional development should be a driver for improving quality and motivating the education workforce to be change makers, rather than passive inputs in an education system. Policymakers should pay attention to the processes and mechanisms that underpin professional learning and practice change, as well as the content. They should ensure that professional development programs are evaluated for their effectiveness at regular intervals and reviewed and updated based on the latest evidence.[164]

Experience from high-income countries shows that practicality (using concrete methods and training in the classroom), specificity (pedagogical instruction for a specific subject area), and continuity (receiving continual support) are key to effective teacher professional development.[165] A rigorous review of large-scale teacher professional learning programs in low- and middle-income countries identified a number of similar features that led to improved student learning: provision of textbooks and other reading materials to complement the training; focusing on a specific subject; linking participation to incentives such as promotion or salary; designing programs in response to the local context; and follow-up visits to support teachers in their classrooms.[166]

*Education Development Trust's Let Girls Succeed program incorporated some of these professional development elements including: teacher training on literacy and numeracy assessment tools, as well as on gender; cluster peer support for teachers facilitated by coaches; use of tablets to identify teacher skills gaps and enable teachers to access reference material; and school-to-school mentoring for lead teachers and lead head teachers. The program scaled to 500 schools in **Kenya** as part of DFID's Girls' Education Challenge Program and showed gains of 0.53 standard deviations in the literacy skills of marginalized girls in slum settings and rural areas compared to a control group.[167]*

*In the Tusome program in **Kenya**, the professional development interventions that most closely correlated to improved reading outcomes at scale were access to a teacher's guide; increased review of lesson plans; and frequent curriculum support officer observations with feedback. These included the use of tablets to assess pupils' reading levels and input live data.[168]*

Professional development should be a driver for improving quality and motivating the education workforce to be change makers

Coaching is emerging as a promising practice for professional development. A meta-study in the United States found that a combination of coaching and other forms of professional development resulted in large improvements in teacher instruction (0.58 standard deviations) and more modest improvements in student learning (0.15 standard deviations).[169] In low- and middle-income countries, there is some evidence to support this as well. Coaching and supervision should be data-driven and structured to include reflections on practice, strategies for improvement, clarity around the why as well as the what is being done, new practice trials, and progress reviews.[170] Technology could play a support role.

The state of Ceará in **Brazil** *delivered a one-year program that provided feedback to secondary school teachers on their classroom practices and gave them access to expert educational coaching through one-on-one sessions delivered via Skype. The pedagogical coordinator in each school was trained to observe teachers' classroom practice, provide useful feedback, and promote collaboration and exchange of practice among teachers. A randomized controlled trial evaluation found that teachers' classroom practices improved, teaching time increased, and students were more engaged. Student results in state-based assessments in math and Portuguese also improved.[171]*

A study in **Kenya** *as part of the Primary Math and Reading (PRIMR) Initiative found that teacher coaching improved literacy in Kenyan public and non-formal settings, but that it was more effective when the coach worked with 10 rather than 15 schools.[172]*

A study in **South Africa** *showed that pupils exposed to two years of a structured pedagogy program, of which on-site instructional and virtual coaching was a key component, improved their reading proficiency by 0.12 standard deviations if their teachers received centralized training, compared to 0.24 if their teachers received in-class coaching. Despite being more expensive, coaching was more cost effective.[173] After one year of the intervention, virtual coaching was no less effective than on-site coaching.[174]*

Technology can play a role in teacher professional development. A review of the use of technology-supported professional development for teachers in developing countries[175] reached several conclusions:

- Effective models of professional learning via technology tend to take a blended learning approach, combining technology with face-to-face interactions.
- Teachers need training in the technology itself, even in technologies they know well. It is important to ensure that barriers to acquiring technological skills are minimized and that specific groups of teachers are not marginalized in the process.
- Technology can facilitate peer support, collaboration, and the creation of communities of practice.
- Technology can strengthen coaching relationships.
- Mobile technologies have high potential to improve the reach, scalability, and flexibility of teacher professional development, but phones alone are not sufficient.

Even in contexts with limited technological infrastructure, low-tech approaches can be effective. The use of mobile phone apps in combination with additional support is one option (see the English in Action and Ethiopia examples in 4.3.2). EWI qualitative research in Sierra Leone suggests that interactive radio could be a valuable tool for teacher professional development given its effectiveness in delivering education during the Ebola outbreak.

In the Reading and Numeracy Activity project in **northern Nigeria,** *head teachers and lead teachers observe teachers weekly using a simple schedule and tablets. They then discuss the success and challenges from lesson implementation and rehearse future lessons with the teachers. Initial evaluation indicates improvements in student learning in these schools.*[176]

FHI360 developed an e-course for early grade literacy coordinators in **Rwanda** *in partnership with the Rwanda Education Board and University of Rwanda. The seven-month course required participants to undertake weekly tasks such as viewing a 20-minute video clip, trying activities in their classrooms, and participating in forum discussions as well as live "meet the expert" sessions. Participants accessed the course through computers, tablets, and phones, and after successful completion of all four modules earned 40 credits from the University of Rwanda. Evaluation of the pilot course (150 participants) indicated that participants' confidence and skills in working within a learning community had improved along with their digital skills.*[177]

Professional development for school principals and district professionals should mirror that of teaching professionals, so they can lead the practice of continuous improvement. If education leaders can model the professional development they expect from teachers, they will begin to cultivate a system-wide culture of continuous improvement. In STIR's partnership with the Delhi government, teacher mentors at the middle tier have continuous monthly coaching, mirroring the coaching they provide to schools and teachers.[178]

2. **Provide a range of pedagogical support strategies for teachers (qualified or unqualified) who lack core competencies**

In situations where teachers lack the core competencies of effective teachers, there is strong evidence of the effectiveness of structured pedagogy on learning outcomes.[179] These strategies use evidence-based instructional approaches and provide teachers with lesson plans and training. Instructional guidelines are often in the form of videos or simplified, structured lessons. Technology can be a key enabler by showing teachers what can be done and providing the scaffolding needed until their skills are further developed.

Teachers in the English In Action program in **Bangladesh** *are guided by short videos of simple teaching techniques available on their mobile phones. This is supported by reflecting and sharing with peers and ongoing support. After a year, students' ability to communicate using a basic level of English rose from 36 to 70 percent.*[180]

If education leaders can model the professional development they expect from teachers, they will begin to cultivate a systemwide culture of continuous improvement

*In **Ethiopia**, inclusive multimedia lesson plans with explicit scripted instructions delivered via smartphone apps successfully changed teachers' foundational classroom practices aimed at including students with visual and hearing impairment.[181]*

Training teachers to conduct formative and ongoing assessment in support of differentiated teaching[182] can also be very impactful.[183] Helping teachers better understand their students' abilities and knowledge level can help them target teaching to student level. In Liberia and Malawi, interventions that supported teachers to better evaluate their students were effective, especially when combined with training and additional materials.[184]

3. Base career progression on achievement of professional skills and competencies and link this to salary increases

In many education systems, career progression is largely determined by qualifications and years of experience. Although the latter can indicate greater effectiveness,[185] it does not always and promotions in some contexts may not necessarily take effectiveness into account – this can be highly demotivating and inequitable.[186] This system disproportionately disadvantages women, as they are more likely to take career breaks for childcare and tend to have less access to residential training courses.

Promotions should be based on the achievement of professional skills and competencies and result in real salary increases – "professional-based pay" – to improve staff motivation and performance. Teacher promotion based on successful appraisal is becoming increasingly common and is recommended by education researchers and economists.[187]

*In **Kenya**, the Teacher Service Commission (TSC) has developed a Teacher Performance Appraisal Development tool that monitors teachers' classroom performance, professional knowledge, innovation and creativity, engagement with parents, attendance, and syllabus coverage. Results from regular classroom observations by county education supervisors and an online teacher self-assessment are used to inform the TSC's decisions regarding promotion.[188]*

Evidence on the effectiveness of linking pay to performance for improving student outcomes is mixed and there is clear evidence that it can increase inequity.[189] It has been shown to promote an unhealthy competitive environment, reduce teacher motivation and collaboration, encourage "teaching to the test," and increase the neglect of lower-performing students.[190] This is especially true with pay for performance based solely on test scores.[191]

***Chile** introduced a new pay scale benchmarked to performance, but has ensured that teachers benefit from professional mentors and free training provided by the government from induction throughout their teaching career to support their progression on this new scale. The reform was implemented incrementally: the government first gathered data on student performance, then introduced teacher evaluations on a voluntary basis with incentives for teachers demonstrating excellence, then the evaluations became a requirement as part of the new law.[192]*

When career structures are single track, promotion based on instructional performance can lead to the promotion of the best teachers to administration and managerial posts, where they have few opportunities to apply their teaching expertise. Technical specialist roles, as described in Chapters 5 and 6 on learning teams and learning systems, can provide a track for career progression beyond the school.

4.4   Lead and manage the workforce

This report focuses on three challenges specific to leadership and management of the workforce. First, although school and district leaders are increasingly viewed as instructional leaders, in practice they tend to focus on administrative and supervisory activities[193] and are rarely selected or supported to lead learning and school improvement or given the professional development needed to succeed.[194] See Section 5.2 for a discussion on how to orient school leaders towards instructional leadership and why.

Second, deployment and management of the workforce needs to be improved. Inequitable deployment of teachers is common with the most marginalized communities and lowest grades often served by the least qualified teachers.[195] District-level human resources are also unevenly utilized. In Zimbabwe, teachers are on average visited every two and a half years by a supervisor, but those in rural areas have to wait four years.[196] Addressing workforce management issues could improve both the efficiency and effectiveness of the workforce.

Third, high levels of absenteeism across the education workforce pose a barrier to learning and reinforce disparities.[197] There is evidence that teacher absenteeism is higher when the head teacher is absent[198] and in schools that are rarely visited by district officials.[199] School and district leaders have an important part to play in reducing teacher absenteeism, but in some contexts absenteeism is higher among school and district leaders than among the teachers.[200]

To lead and manage the workforce, countries should:
1. Enable data-driven workforce management systems to deploy teachers and other staff equitably
2. Ensure teachers are present in the classroom and focusing sufficiently on instruction

1. Establish data-driven workforce management systems to deploy teachers and other staff equitably

Data on workforce management and distribution should drive the deployment of human resources to enable equitable service delivery. The best mechanisms for this depend on whether teachers are employed by schools, districts, provinces, or national government bodies. Regardless of the level of decentralization, national and regional governments should analyze data and manage the distribution of human resources in an equitable manner both within and among schools.

More effective:

Recruitment

Preparation

Development

Management

Vision 1: Strengthening

Some countries are now using data to drive more equitable deployment and ensure marginalized communities are served by higher-quality teachers. In Malawi, use of Global Positioning Satellite data has more accurately mapped schools to help target incentives to remote unpopular areas rather than applied on a blanket basis to rural districts.[201] In Ghana, a smartphone school mapping platform allows users to collect and display information on resources, teachers, infrastructure, and school performance. As the first integrated database of assets, people, and resources, it aims to enable better decision-making for the allocation of resources and teachers. It also enables both policymakers and citizens to monitor investments or outcomes using relatively low-cost smartphones and cloud-based hosting.[202] Zimbabwe, with the support of the Global Partnership for Education (GPE), has established a Teacher Training and Development Information System. Linked to school and pupil data, it is designed to facilitate better needs-based deployment of qualified teachers and better targeting of teacher professional development.[203]

Education Management Information Systems (EMIS) should be strengthened so data can be used to target specialized support services to schools. As technology automates more administrative tasks, such as the capture and reporting of school management data, districts could analyze and use the data to identify school-specific support needs. The district would feed data and information back to the state level based on local needs, creating a sense of efficacy and purpose and ensuring alignment of standards and initiatives. This report recognizes that data alone is not sufficient. Districts need greater capacity to handle and use the data to inform teacher deployment decisions (this is discussed further in Chapter 5 on learning teams).

2. Ensure teachers are present in the classroom and focusing sufficiently on instruction

Teachers' time on instruction is critical – a randomized evaluation of the Ceará program in Brazil found improved student learning in math and Portuguese by 0.12-0.17 standard deviations on the state assessment and 0.14-0.15 standard deviations on the national secondary school exit exam by increasing instructional time along with changes in teacher classroom practices[204]

Systems experiencing high levels of teacher absenteeism need to address system-wide issues that contribute to the problem:
- Base salaries should be set at levels to enable teachers to provide for their families without taking on second jobs.
- Salary payments should be reliable, regular, and not require staff to take time away from their work to collect them.
- Teachers should not be expected to use scheduled class time for administrative duties or training (unless it is practice-based), meetings, or non-school work such as elections (in some countries, in-service teacher training days are provided when children do not attend school).

To address other reasons for teacher absenteeism, monitoring and accountability systems are needed at school, district, and higher levels to ensure that high levels of absenteeism are investigated and action plans put in place.[205] In the short term, close monitoring may reduce teacher absenteeism but not

necessarily increase student achievement. Although evidence is mixed, examples involving parents and communities – including the use of participatory report cards in Uganda, school-based management training for parents, head teachers, and teachers in the Gambia, and a combination of report cards and participatory expenditure tracking of administrative salaries in Malawi – have reduced teacher absenteeism due to both systemic and unexcused reasons.[206] However, short-term approaches undermine teacher professionalism by signaling a lack of trust in teachers and are not a common feature of high-performing systems.

The longer-term goal of education systems should be to build a professional, mutually accountable, and intrinsically motivated workforce. Professional accountability can have long-lasting effects and is generally designed with teachers, drawing on their expertise.[207] The learning team approach outlined in Chapter 5 can facilitate this with its collegiate and supportive culture.

Box 7: EWI in Sierra Leone: Teacher deployment for equity

Sierra Leone has set an ambitious goal to have a fully qualified and competent teaching workforce by 2023. Based on EWI's analysis using a pupil/teacher ratio (PTR) of 40 at primary level, the country has a current shortage of just over 16,000 teachers or 33,000 qualified teachers (only 60 percent of Sierra Leone's teachers are qualified). If workforce numbers remain steady until 2023, they would need to almost double to achieve the target PTR of 40.

EWI has explored several options to address this supply challenge, including analyzing improvement to teacher deployment and distribution. The most promising opportunities include:
- Reassigning teachers strategically within the same school to optimize PTRs across grades, so that no teacher is overloaded and a PTR under 40 is maintained. This reduces the shortage of teachers by 3,500, and the need for qualified teachers by over 2,000.
- Redistributing teachers within chiefdoms so the PTR increases from 20 to 30. This could reduce staff costs by 33 percent and also reduce the number of teachers needed by 3,500 and qualified teachers by 2,220.
- Redistributing teachers that work in schools with a PTR of below 20 could reduce the shortage of teachers by 1,105.
- Including teachers' subject specialization in the deployment criteria and prioritizing English specialists to rural primary schools could improve learning in the most disadvantaged schools as the presence of an English specialist positively correlates with exam performance.
- Incorporating gender into the deployment criteria could help address gender imbalances and allocation of female teachers in pairs to improve retention.

These opportunities will likely be taken forward by the Teaching Service Commission and World Bank in the new deployment framework.

Developing learning teams

Key messages for policymakers

- **Optimize the right skills and expertise of the workforce** at the school level by:
  - Taking into account how existing roles can be re-purposed to align with learning, equity, and inclusion
  - Considering how team composition could leverage the expertise of higher-performing teachers and those with specialist skills by teaming them with less experienced teachers, trainees, and learning support staff.
  - Considering engaging support staff (salaried or voluntary) to support the most marginalized learners and to address student inclusion, well-being, and welfare.

- **Develop instructional leadership** by establishing structures, policies, and processes to enable school leaders to focus on instructional leadership rather than administration. These can include training school leaders to undertake instructional leadership and providing the necessary tools; task-shifting administrative activities to technology or support staff where possible; and strengthening district capacity to provide coaching and support.

- **Drive data-driven improvement** by building the capacity at the district level to provide data analysis to help leaders identify performance and inclusion gaps to prioritize district-wide resources, and by orientating supervision towards data-driven school improvement.

- Enable state-level policymakers to draw on **research, evidence, and data**, and **engage** with the school- and district-level workforce, developing strong feedback loops to inform and drive strategic change.

- **Create team-based structures and practices** to enable staff to work in learning teams at all levels in the system. These should be embedded in initial training and professional development and can include professional learning communities; peer collaboration; training or qualifications for key roles beyond a teacher, including managerial and technical career paths; and team-based goals and incentives.
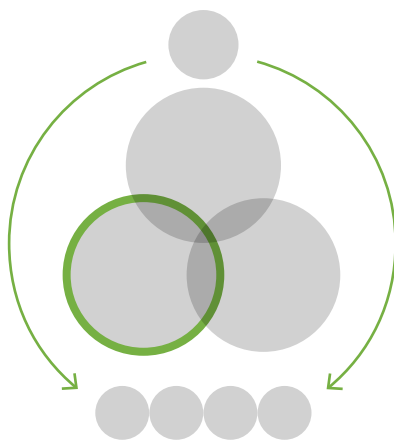
Vision 2: Learning teams

Building on the strengthening of existing systems, a learning team approach can provide a new lens on existing challenges and considerations for the education workforce needed to deliver inclusive, quality education for all. The learning team approach is based on the concept of professionalism that leverages the collective capacity of a group as opposed to solely focusing on developing the skills of individuals to improve effectiveness. It enables teachers and other members of the workforce to be lifelong learners and focuses on building the "social capital" of the workforce in addition to the "human capital."
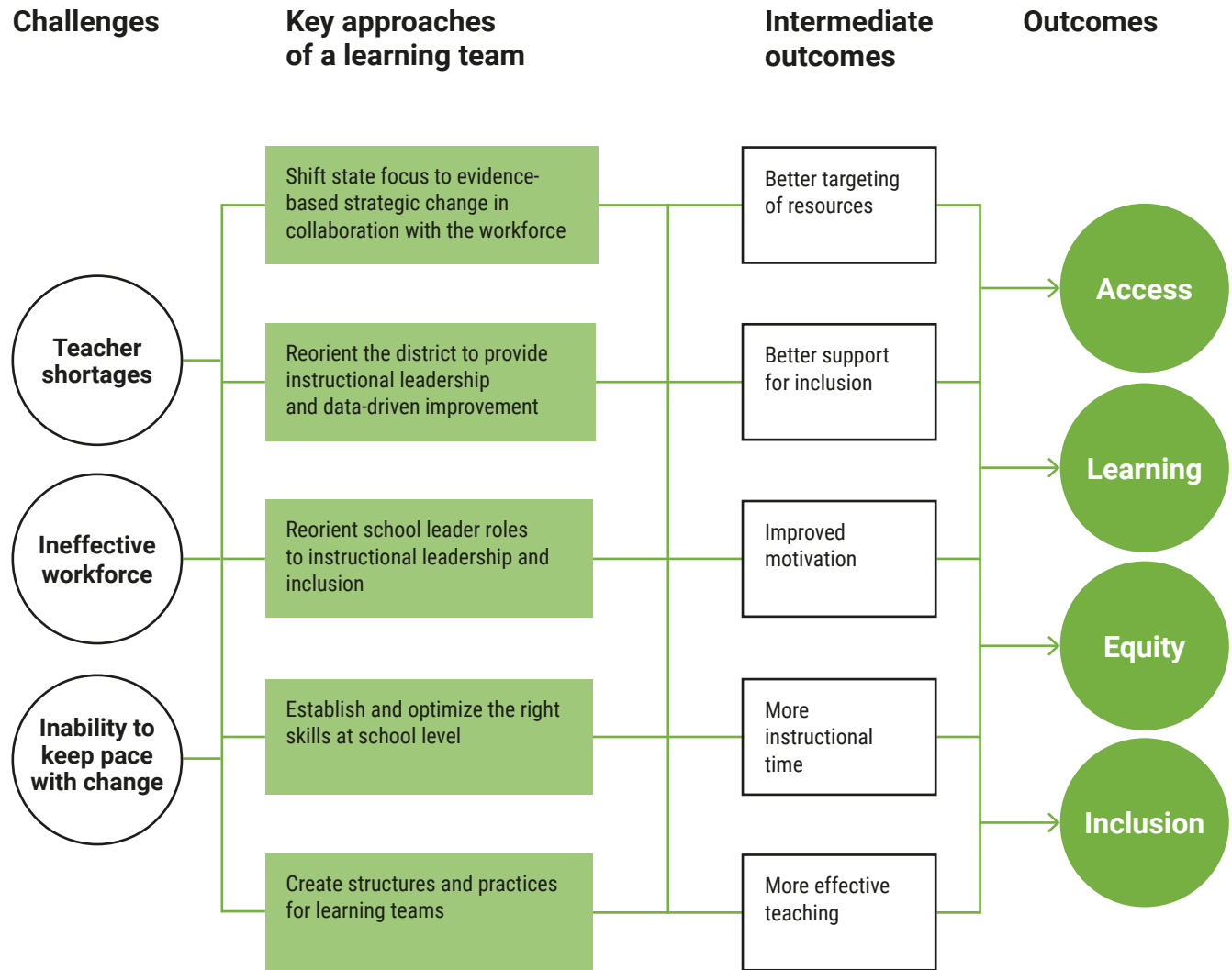
Since each education system is different, it is not possible to prescribe the exact form or composition of a learning team. This report discusses some approaches that support an overall learning team approach at the school, district, and state levels and the enabling structures and practices that countries can tailor to their needs:

• Establish and optimize the right skills and expertise of the workforce at the school level
• Reorient school leadership to instructional leadership and inclusion
• Reorient the district to provide instructional leadership and data-driven improvement
• Shift state-level focus to evidence-based strategic change in collaboration with the workforce
• Create structures and practices to support working in learning teams

Figure 8 shows the theory of change for learning teams, which draws on both education and workforce effectiveness theory.[208] It shows how the learning team approaches address the three key workforce challenges and lead to the intermediate outcomes of more effective teaching, more time on instruction, improved teacher motivation, better targeting of resources, and better support for inclusion. Each learning team approach is evidenced and outlined in more detail in the next section, recognizing that testing the approach at larger scale and evaluating its long-term benefits will be critical for successful implementation.

Figure 7 - Theory of change for learning teams

Source: Education Commission, 2019

Challenges	Key approaches of a learning team	Intermediate outcomes	Outcomes
Teacher shortages	Shift state focus to evidence-based strategic change in collaboration with the workforce	Better targeting of resources	Access
	Reorient the district to provide instructional leadership and data-driven improvement	Better support for inclusion	Learning
Ineffective workforce	Reorient school leader roles to instructional leadership and inclusion	Improved motivation	Equity
Inability to keep pace with change	Establish and optimize the right skills at school level	More instructional time	Inclusion
	Create structures and practices for learning teams	More effective teaching	

Illustrative implications for workforce roles are included at the end of each section and a diagram summarizing key shifts in the functions at all levels in the system appears at the end of the chapter. The aim is to optimize existing roles by realigning them towards activities that are known to impact education outcomes, and to prioritize new roles to support those furthest behind. This shift to a learning team approach will require careful consideration based on the current needs of the education workforce, the political economy, and cost and financing implications. These are discussed in more detail in Chapter 7.

Skill optimization

Instructional leadership and inclusion

Data-driven improvement

Collaborative policy making

Teamwork

Vision 2: Learning teams

5.1 Optimize the right skills and expertise of the workforce at school level

Given the impact of teachers on improving learning outcomes, the design of an effective education workforce at the school level relies on having a sufficient number of qualified teachers.[209] But in many countries, teacher shortages are a serious challenge. Strengthening the system to attract, recruit, train, develop, and professionalize teachers is an essential first step to improve learning outcomes as outlined in the previous chapter. Emerging evidence suggests that supporting teachers and learners with a team of professionals could be an effective way to improve student learning, especially as an additional or interim strategy where large class sizes are still being brought down and where there are multiple languages and a wide range of learner needs. This section outlines the evidence for greater differentiation in the role of the teacher and use of learning support staff, inclusion specialists, and roles that bridge the community and school.

A learning team approach could enable roles with different levels and areas of expertise to better leverage their skills. A team-based approach with the most effective or specialist teachers working together with the least experienced teachers and other roles that support learning means that students benefit from the expertise of the most capable teachers and the support of other adults, while newly qualified or trainee teachers can learn from their more experienced colleagues.

There is little robust evidence on how the role of the teacher is changing, but there are examples that highlight a move towards greater involvement of students in their learning with the teacher taking on a greater role as facilitator. One small-scale example is the Lumiar schools in Brazil, where there are no "traditional" teachers – instead, half of the pedagogical staff work as advisors, mentors, and coaches, monitoring students' progress. The other half of the staff are "masters" of a particular set of skills (such as engineering) and work part-time designing and facilitating projects that equip students with these skills. The Lumiar Public School in Santo Antonio do Pinhal is the highest-performing state school in the municipality.[210]

*An example at scale is the Escuela Nueva model in **Latin America** that uses multi-grade classrooms and has shifted the role of teachers to support instruction at the right level. Students of different ages learn together through group discussions and projects with the teacher as facilitator. Students in grades three and five in Escuela Nueva schools in **Colombia** have achieved higher language and mathematics scores with significantly lower dropout and repetition rates than those in traditional schools without the program.[211]*

Remarkably, to date, there has been limited consideration of the way technology could fundamentally change the role of the teacher. This is explored in Chapter 6.

Greater differentiation in the role of the teacher may help leverage subject or pedagogical specialist skills across schools to reach the most marginalized. In many contexts, there is a shortage of subject specialist teachers and low levels of teacher subject and pedagogical knowledge. There are examples

Greater differentiation in the role of the teacher may help leverage subject or pedagogical specialist skills across schools to reach the most marginalized

where technology has helped leverage available teachers in specific subject areas across schools. Subject specialists have been used successfully to deliver quality distance-learning video lessons to children who would otherwise not have an appropriately qualified teacher and to provide pedagogical coaching to improve classroom practice. The use of technology is not without challenges, given the difficulties with connectivity and devices in many contexts. Other issues can also arise. For example in Ethiopia, television broadcast science lessons had limited success[212] because teachers were unable to tailor them to the class needs, leaving both teachers and students disempowered.[213]

*In the MGCubed project in **Ghana,** lessons delivered by expert teachers via video to rural populations led to improved English and mathematics scores and reduced out-of-school rates.[214]*

*The Media Center initiative in Amazonas state in **Brazil** uses video conferencing to broadcast lessons delivered by subject experts to over 1,000 rural schools.[215] Lower to upper secondary school progression rates increased, dropout rates nearly halved between 2008 and 2011, and children's learning steadily improved.[216]*

*In **Rwanda,** specialist teachers were used in a school-based mentor role to act as pedagogic advisers working within or across schools to mentor teachers with the aim of improving teachers' knowledge of English and pedagogical classroom practices. In addition to improving the English proficiency of teachers, the learner-based approaches these mentors introduced also contributed to the improvement of students' literacy and proficiency levels, with parents noting changes in the literacy skills of their children.[217]*

Specialist inclusion teachers have a critical role in enabling inclusion in mainstream classrooms. They can support students with special needs by offering individualized attention in the classroom and practical advice to classroom teachers on educational inclusion strategies.[218] Specialist teachers can be school or cluster-based, such as Sightsavers' itinerant specialist teachers for children with disabilities in Uganda and the Inclusive Education Resource Teachers in India. Evidence on the effectiveness of such models is mixed[219] due to frequent shortages of these roles,[220] their heavy workloads, the breadth of expertise covered, distance they have to travel, and relationships with teachers.[221] Many experts have highlighted the need for specialist support for classroom teachers as well as more effective models and arrangements to address inclusion.[222]

Learning support staff can help increase teachers' time on instruction by effective division of labor. Teachers in low-income countries sometimes struggle to spend enough time on instruction and address individual learner needs in large classes. Studies of the best school systems show the use of other teaching and learning roles, such as teaching assistants to support teachers, can improve learning if adequate support for their training, induction, and deployment is in place[223] and if they are given specific objectives and enact targeted interventions.[224] Learning support staff can undertake tasks that do not necessarily require a qualified teacher but still have a positive impact on learning outcomes (e.g. helping manage classroom behavior in

large classes, facilitating small group or computer-based learning, or managing learning resources) thus freeing time for teachers to focus on tasks requiring higher-level skills and competencies. [225]

Learning support staff can also play an important role in ensuring that all students – especially those furthest behind – are able to participate in school with equal opportunities.[226] Care must be taken, however, to ensure that students do not feel separated from their peers and that teachers maintain overall responsibility for teaching students with additional needs.[227]

*A study undertaken on an inclusive education program for children with disabilities in **Zimbabwe** showed that one of the key factors in the project's progress was the engagement and retention of classroom assistants in schools. Classroom assistants were seen as an additional resource for schools in supporting children with disabilities and for helping teachers with the extra needs of the class. Results showed a positive trend of teachers and head teachers gaining confidence in their knowledge, attitudes, and practices around inclusion of students with disabilities.[228]*

In low-income contexts, learning support volunteers from the local community or national service programs may be an untapped resource for effectively supporting foundational learning needs and mother-tongue instruction. Particularly in instances where learning is low, several studies find that remedial instruction programs have strong impacts on learning outcomes when implemented by volunteers or informal teachers with little training.[229]

*In **Ghana**, the Teacher Community Assistant Initiative utilized local high school graduates as community assistants (through the existing National Youth Employment Program) to lead in- and after-school remedial classes for small groups of students in primary school. On average, the initiative significantly improved skills in literacy and numeracy.[230]*

*Pratham's Balsakhis Program in **India** hired tutors from the community to take children in third and fourth grade who had not achieved basic competencies in reading and arithmetic out of the regular classroom and provide instruction that followed a special curriculum tailored to the students' current level of learning. The program showed gains in learning for the most marginalized children.[231]*

These roles also help provide local language skills and can cement the closer ties among schools, families, and communities that are critical for student achievement.[232] They can often attract women and help them develop additional skills. Preparation and training for these roles needs to be planned for as well as supported and supervised by a qualified teacher.

Including trainee teachers in the workforce as part of a learning team provides better initial training [233] **and enables them to play a key role in supporting learning**. As outlined in Chapter 4, school-based training is possible in low-income contexts given sufficient support.[234] Arizona State University in the United States is going a step further and replacing the standard model (a single pre-service teacher paired with one in-service mentor) with a model where two pre-service teachers work alongside a lead teacher to form a team. The team of teachers co-teach, co-assess, and co-reflect, providing more

Sidebar

Learning support staff can also play an important role in ensuring that all students – especially those furthest behind – are able to participate in school with equal opportunities

Including trainee teachers in the workforce as part of a learning team provides better initial training and enables them to play a key role in supporting learning

opportunities to learn from each other. The model aims to provide children with a range of adults to learn from and reduce the burden on a single teacher to be the sole provider of knowledge. No evaluation is yet available as this program is still in the pilot stage.[235] This approach highlights the potential of trainee teachers to become key members of the school workforce like trainee doctors and nurses are to the health workforce.

Roles beyond classroom teachers can help connect students to their school and support the well-being and welfare of students.[236] Millions of children do not attend school due to issues with health and at home, and many of those who do attend face barriers to learning at home that limit their ability to succeed and continue in education. Students' relationships with their teachers in the school environment are consistently predictive of a broad range of health and well-being outcomes.[237] But teachers often have limited time to follow up on cases of absenteeism, drop-offs in learning, or dropouts, and are not equipped with the skills needed to address the social and mental welfare of learners. In low-income countries, there are examples of roles introduced to address these issues.[238] In Bangladesh, the non-governmental organization JAAGO provides instruction to a group of 12 remote schools (3,000 pupils) using video lessons and local class moderators. Families receive community officer support and expertise provided centrally, including a psychologist to support learning difficulties and poverty-related issues of violence and early marriage. Evaluations show that from a low base, 100 percent of those attending JAAGO primary schools and 93 percent at junior high passed.[239]

At a larger scale, Camfed's Learner Guides – young women mentors from the community – deliver specialized curricula and help girls and boys build their confidence, learn more effectively, and set goals. Unlike teachers from outside the area, Learner Guides are local volunteers with experience in poverty challenges. They act as the missing link between school and community, especially on health and welfare issues. In schools, Learner Guides facilitate an extracurricular pastoral curriculum covering self-esteem, financial literacy, relationships, and barriers beyond school. Evaluations show increased confidence, questioning of gender norms for boys and girls, and retention and engagement for marginalized girls. Pupils in participating schools demonstrated increases in their math and English scores.[240]

A new role to be considered is a community education worker, undertaken by or in close collaboration with a community health worker to improve access, attendance, and retention – especially of the most marginalized students. In Kenya, as part of Education Development Trust's Let Girls Succeed program, local community health workers are engaged to support inclusive education for girls, playing a role in ensuring access and identifying barriers to learning.[241] This community education/health worker role would liaise with households and work with learners, schools, and communities to find solutions. They could be particularly beneficial when learners' communities are underrepresented in the school and where there are high levels of absenteeism and dropouts. Their support could help free up teachers' time to focus on instruction.

Roles beyond classroom teachers can help connect students to their school and support the well-being and welfare of students

Figure 8 illustrates an example continuum of roles that could form part of a learning team within and across schools. Although they are organized by the four core functions in an education system (leadership and management; teaching and learning; student welfare; and administration and operations support),[242] some roles may cut across functions. Different roles will be relevant depending on the context, whether the school is at primary or secondary level, and the type of instruction (examples of different learning configurations are provided in Chapter 6). Any additional resources should be prioritized to the area of greatest need. For example, a learning assistant may support a teacher in literacy and numeracy lessons where foundational learning levels are very low but may not be needed in other classes. Box 8 briefly describes the illustrative teaching and learning roles.

Figure 8 - A continuum of illustrative roles in learning teams at school level

Source: Adapted from Jones, Charlotte, Ruth Naylor and Tal Rafaeli (Education Development Trust), Yeukai Mlambo, Ann Nielsen and Iveta Silova (Arizona State University), and Freda Wolfenden (The Open University). 2019. "Designing the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

Leadership and Management	Teaching and Learning				Student Welfare	Operations and Admin
School Leaders: • School principals • School deputy/ asst. principal • Head of year/ Head of subject	**Specialized Teachers:** • Inclusion specialist • Subject specialist • Literacy specialist	**Experienced Teachers:** • Classroom teacher	**Beginner Teachers:** • Teacher trainee • Newly qualified teacher	**Learning Support Staff:** • Learning assistant (volunteer, national service program or more formalized) • Remedial tutor	**Welfare Support Staff:** • Community education worker/ community health worker • Community-based mentors	**Operations and Admin Staff:** • Admin support staff • Operations manager

Skill optimization

Instructional leadership and inclusion

Data-driven improvement

Collaborative policy making

Teamwork

Vision 2: Learning teams

5.2   Reorient school leader roles to instructional leadership and inclusion

Almost all government schools have a school principal or head teacher, and larger schools may have wider leadership roles such as deputy principals, leaders of grades, and curriculum areas. These are often highly experienced staff with many years of teaching experience. In practice, school principals struggle to implement instructional leadership (see Box 9) and tend to focus on traditional management duties.[243] Reasons include factors such as poor preparation for new responsibilities, local cultural norms around leadership that see school leaders as a "figurehead" rather than an instrumental leader for teaching,[244] and a heavy administrative workload. Overcoming these challenges and reorienting at least one school leadership role (principal or deputy principal) to instructional leadership has been shown to help increase learning outcomes by up to 0.84 standard deviations.[245]

A school leader should be enabled to focus on data-driven instructional leadership rather than administration

A school leader should be enabled to focus on data-driven instructional leadership rather than administration. A review of school leadership policies and practices by UNESCO concluded that effective school leadership that provides instructional guidance and fosters continuous improvement is the key to successful, large-scale, and sustainable education reform.[246] This happens most powerfully when leaders support a culture of teacher learning and motivation.[247] Further research suggests that school leaders are most effective when they have sufficient autonomy and support in decision-making,[248] dedicate time to instructional leadership, and create a culture of collaboration and shared responsibility.[249] This can include transforming schools into sites of professional development through mentoring and coaching, facilitating peer learning, ensuring teachers work collaboratively to facilitate improvement in instructional practices,[250] and encouraging a focus on shared goals.[251]

To help leaders do this, time for instructional leadership could be freed up by using technology to assist in administrative and management functions such as data collection and analysis and timetabling. Administrative tasks (e.g. finance, management of school resources and facilities) could be shifted to lower-cost support staff who could be shared across schools if necessary.

Preparation for school leaders (see Section 4.3) should include training on how to strategically use data for instructional leadership. Instructional leaders need to be able to draw on diagnostic evidence of performance (including lesson observations, learning outcomes data, indicators of learner well-being, equity, and inclusion) benchmarked against contextually relevant standards, and to select from a range of evidence-based teaching strategies to prescribe appropriate treatments. Experts working at the district or regional level and guided by common rubrics and standards could support school leaders.[252] Pedagogic coordinators in the Ceará example (see Section 4.3) had access to evidence-based teaching strategies through the self-help materials provided by the program. An evidence-based supervision project in Jordan used a similar practice.[253]

*The PEAS schools in **Uganda** use an alternative school leadership model that allows for a focus on instruction. They have split administrative and instructional leadership into two distinct roles – a school director and a head teacher. The head teacher oversees teaching and learning, which includes continued professional development, monitoring learning progress, managing learning resources, timetabling, student discipline, and child protection. The head teacher reports to the school director, who has responsibility for the School Improvement Plan and mediates between the school and the community, managing both the PTA and the Governors. Relative to other private and public schools, management in PEAS schools is good, resulting in improved student outcomes.[254]*

New focus areas and responsibilities could be assigned to senior management roles. For example, nominating a member of senior management to be a welfare lead to help shape behavioral policies, safeguarding, and inclusion would encourage a greater focus on inclusion. A dedicated role such as a deputy principal could have oversight of managing the new teaching and learning teams. The risk that the best teachers may shift into manager roles could be mitigated by designing technical career paths. Box 10 briefly describes the illustrative leadership and management roles.

Box 10: School level – illustrative leadership and management roles

School leader, principal, or deputy principal with instructional leadership role coordinates teaching and learning teams and focuses on data-driven instructional leadership rather than administration; diagnoses barriers to better teaching and learning; provides coaching to staff; and oversees staff professional development in alignment with school needs.

Deputy principal with responsibility for student welfare sets behavioral standards and procedures as well as safeguarding and inclusion policies and ensures that student welfare needs are addressed.

Skill optimization

Instructional leadership and inclusion

Data-driven improvement

Collaborative policy making

Teamwork
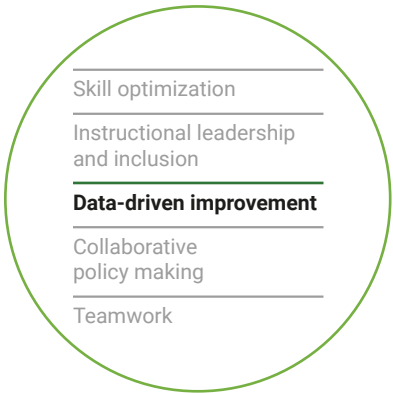
Vision 2: Learning teams

5.3 Reorient the district to provide instructional leadership and data-driven improvement

Very little comparative evidence on the impact of the district on learning outcomes in low-income countries exists. This may be because core district-level functions like teacher training and school improvement in low-income contexts are often delivered through programs led by actors such as NGOs, donors, and private-sector organizations rather than by districts. Understanding the evidence from these programs provides useful insight.

Studies from high-income contexts show that districts can play a transformational role in inclusion and improving school, teaching, and learning quality.[255] In many systems, districts already have a cadre of staff, or at least local institutions that could be strengthened to fulfill the districts' potential to impact schools. In practice, the workforce at the district level can lack role

design, preparation, and management expertise to effectively improve teaching and learning and build a school improvement culture.[256] Poor management practices at the district level can also lead to inequitable distribution of resources. By working more collaboratively, providing instructional leadership and specialist support, and using data for decision-making, districts could be a significant driver of improvement in education systems.

The district should move from monitoring compliance to data-driven school improvement and instructional leadership. School supervision often focuses on compliance monitoring alone, which does not have a strong effect on teaching and learning quality. A recent rigorous review suggests that supervision can be effective when it includes: support for school self-evaluation, building school capacity, ensuring schools have access to improvement resources, and providing feedback in a respectful and constructive manner.[257] School supervisors should be able to provide support for schools to use data. Evidence suggests that school data is critical for raising outcomes and equity, but schools need support to use data effectively.[258]

District teacher training roles often focus on one-off, off-site trainings for school staff, but a more sustained approach to professional development can improve learning outcomes. The 2018 evaluation of the STIR Education program found that giving district-level officials the time and ability to conduct developmental classroom observations of teachers in between network meetings doubled, and in some cases tripled, the rate of teacher classroom practice change across 70 districts.[259]

*In **Bangladesh,** the English in Action program focused on facilitating collaboration between teachers and district staff for instructional support, and the district was identified as a key driver of its success. Collaboration with district staff (Upazila staff) and other education officers not only strengthened learning outcomes at the classroom level, but improved technical skills at the district level as well.[260]*

*Curriculum support officers in **Kenya's** Tusome program made regular classroom visits using tablets to provide instruction support and upload data on student reading progress and teacher practice. This allowed district offices to generate an aggregate picture of their progress compared with other districts, as well as comparative data on their own schools. This degree of classroom-level monitoring, support, and data collection is unprecedented in Kenya and is a shift in prevailing norms under which teachers and education officials typically work in Sub-Saharan Africa.[261]*

Effective use of data could help districts provide strategic change leadership and target resources to address equity and inclusion. Fulfilling districts' transformative potential requires strong leadership. Despite a trend of decentralization in many countries, district leaders and managers are underutilized as potential strategic actors for local change.[262] District leaders are often producers of data for use by the state or ministry, but not yet users of data for local strategy and decision-making. The data analysis function at the district level should shift to support data-driven planning, provide analysis to help leaders identify gaps in performance among schools, teachers, and students, and prioritize district-wide resources. Data analysts could help identify par-

ticularly effective approaches at the school level and encourage the sharing of high-impact practices. Technology could be used to undertake routine collection, analysis, and reporting. Strategic use of performance data was a significant factor in five cities around the world that implemented successful education reform. Using reliable data effectively, the local leaders were able to challenge underperformance and identify the outlier schools where performance was exceptionally good.[263]

*In **Rio de Janeiro**, the district was able to help schools identify struggling students and provide them with support. This involved analyzing data at every level of the system down to individual students, leading to the identification of 28,000 students in grades four through six as "at risk" in terms of literacy. As a result, a highly successful catch-up program was put in place. Using the data to identify functionally illiterate students and the remedial classes that followed helped the reform achieve a 97 percent functional literacy rate of sixth graders, 2 percent above their target. [264]*

Data can also be used to better target specialist support, such as itinerant specialist inclusion teachers. In Ghana and other countries, inclusion-related district roles such as girls' education officers exist. These roles could be enhanced by focusing on learning outcomes rather than just access, and working closely with school-facing instructional leadership teams. Districts could also build school and teacher capacity to diagnose needs themselves and proactively commission support. Box 11 briefly describes the illustrative district roles.

Box 11: District level – illustrative roles

District leader builds an area-wide commitment to high quality, inclusive teaching, and learning.

District manager/education officer plans and manages initiatives to create cycles of improvement.

Supervisor supports schools to undertake data-driven school improvement and inclusive learning; uses data to support school self-evaluation; and ensures schools have access to improvement resources.

Pedagogical coach provides subject specialist coaching to support the professional learning of teaching and learning teams, e.g. through classroom observations and feedback.

Inclusion specialist provides specialist inclusion advice; builds the capacity of schools; and ensures equity in access and learning.

Data analyst produces reliable, accurate data and analysis to support decision-making.
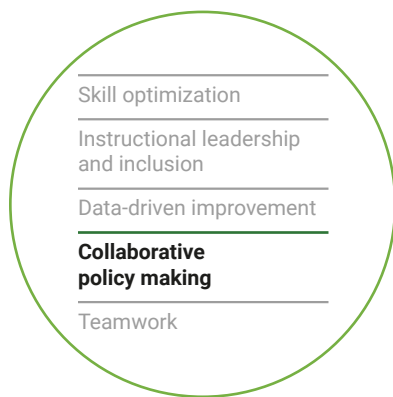
Vision 2: Learning teams

5.4   Shift state-level focus to evidence-based strategic change in collaboration with the workforce

A detailed discussion of workforce reform at the state level is beyond the scope of this report. However, some challenges and opportunities in relation to the state's effective support of the education workforce at the district and school levels are discussed below.

In strong education systems, the policies, actors, and relationships at all levels align with a coherent, shared vision to enhance the learning experiences and outcomes of all students.[265] Ideally, the creation of such a vision would be done by the state, accompanied by evidence-informed policies for implementation and accountability, standards, and feedback mechanisms to support it. Standards would be set for key education workforce roles to encourage evidence-informed professionalism and excellence in teaching and learning. However, the state level often takes an overly technocratic approach to education delivery,[266] focusing mainly on cascading policies. This approach hinders the state's ability to identify effective policies, scale best practice, and successfully lead systemwide change.

The state should collaborate with the workforce and other key partners to drive strategic change based on robust data and evidence. Evidence shows that rapid improvements in teaching and learning quality, and in closing the achievement gap for marginalized students, are almost always achieved when there is clear change leadership. To shift from bureaucratic administration and policy cascades towards the development of management relationships that support large-scale instructional change, states need to conduct rapid cycles of planning, action, reflection, and revision. The state level should have the capacity to steer cycles of improvement in education delivery, modelling, and linking to expectations from district-level leaders. Emerging evidence suggests that rapid school improvement requires a strong feedback loop from the front line – through data, insights, and consultation – on what is working and why.[267]

Strategy and policy teams need better access to international and local evidence on what works, including what works at scale. Education policy and strategy are insufficiently based on evidence of what drives inclusive teaching and learning at scale. Systems can often be data rich but not data driven, missing opportunities to better understand sector needs and learn from policy implementation.[268] Central governments need to consider how to build capacity as brokers of this evidence, working with international bodies, national research institutes, and universities to ensure that pre-service and in-service teacher training institutions embed evidence into curricula and teacher training materials. To improve the use of existing evidence, the state needs to strengthen its ability to mediate research findings for busy frontline practitioners.

5.5　Create structures and practices to support learning teams

Skill optimization

Instructional leadership and inclusion

Data-driven improvement

Collaborative policy making

Teamwork

Vision 2: Learning teams

To create learning teams, elements of the workforce life cycle, such as initial training and professional development, need to change. This more collaborative approach would benefit the large number of untrained or unqualified teachers in low-income contexts who need to improve their practice.

Initial teacher training would need to be updated to equip trainees to work in learning teams. This would include skills to help them continuously improve, learn from each other, and cooperate to evaluate student learning. Training should include tools and resources to help teachers become reflective and adaptive practitioners who can conduct research, solve problems, and innovate solutions.[269]

Box 12: Peer learning enabling factors

Several enabling factors need to be in place for peer learning networks to be effective and sustainable:
- Formal support, including sponsorship from a school or district leader
- Strong facilitation
- Access to high levels of expertise
- Ability to harness social media, as appropriate
- Ability to be operationalized through school clusters

Reference: Naylor, Ruth, Charlotte Jones and Pearl Boateng. 2019. "Strengthening the Education Workforce" Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

Professional development would be enhanced by peer collaboration, which has strong positive impacts on learning outcomes. A study in New Zealand found that teacher peer collaboration was associated with a 17.2 percentage-point increase in the proportion of students achieving the standard versus a 9.4 percentage-point increase in the control group.[270] A systematic review of teacher collaboration concluded, "When teachers collaborate, the performance of students progress. Schools undergo cultural changes, are more innovative, and become characterized by a flattened power structure…[teachers] progress with regard to job performance, but on a personal level teachers seem to benefit as well (e.g. feeling less isolated, more motivated, improved morale)." [271] Several factors have been identified to enable effective and sustainable peer learning (see Box 12).

Learning teams could form professional learning communities. Studies show that these can support improved teaching and learner outcome[272] and motivation. However, findings from a review of evidence from 25 countries indicate that only around one-fifth of teachers reported participating in mentoring or collaborative work.[273] Professional learning communities of teachers that reflect on students' work and data are linked to school improvement.[274] Local professional learning communities (at the school or cluster level), when

> **Learning teams could form professional learning communities. Studies show that these can support improved teaching and learner outcomes and motivation**

supported through good facilitation and given access to specialist expertise (e.g. subject, pedagogy, tools), can work together to identify problems, devise strategies to address them, and build the evidence base of what works. A shared knowledge base of practice and appropriate form of quality assurance are preferable. Such peer learning approaches can contribute to individual and school development as well as support intrinsic motivation, leading to increased effort, job satisfaction, retention, effectiveness, and, ultimately, professionalism and continuous improvement. Peer learning can be effective at all levels of the education workforce, including for school and district leaders.

*Lesson Study is a collaborative peer learning approach originating in **Japan** in which primary and secondary teachers share knowledge and skills to improve teaching through joint planning, demonstration, and assessment of lessons. Lesson Study has spread to more than 50 countries, and in **Zambia** the approach aims to strengthen school systems by encouraging teamwork among teachers and improving the supervision of school managers. Using this approach, the government has flipped its teacher training approach to one that recognizes the assets teachers bring and gives them the space to build on these assets. Evaluations demonstrate that with Lesson Study, Zambian students have more opportunities to conduct hands-on activities and develop critical thinking, presentation, and teamwork skills.[275]*

*STIR Education has developed a Teacher Intrinsic Motivation model, which focuses on the development of school-led teacher networks in which teachers regularly share ideas with peers and gain support to try new practices in the classroom. The networks are supported by education system officials who are given the tools and skills to conduct training, workshops, and coaching for the teacher networks by STIR staff. Evaluation data on the STIR model shows positive impact on teacher motivation, teacher practice, and student learning outcomes. In **Delhi**, students in the pilot program were found to have improved math scores (0.15 standard deviations in learning gains versus the control group). Mid-line data from **Uganda** indicates an improvement in teacher attendance. STIR's model is low-cost, at just USD $0.50 per child per year in Delhi and USD $1 per child per year in Uganda.[276]*

Many of the case studies reviewed for this report include peer learning as a central element to their success. For example, in the English in Action (EiA) program, paired teachers were encouraged to plan lessons together, observe each other's lessons, and work through activities. Cluster-level meetings enabled participants to develop shared understanding and practical actions for how EiA's methods could be successful in the local context.[277] The exchange of practice through teacher learning circles is a core strategy in Lesson Study in Zambia and Education Development Trust's program in Kenya, which resulted in an improvement of 0.52 standard deviations in girls' learning outcomes over and above a control group.[278]

To facilitate differentiation within the workforce, managerial and technical tracks could be introduced to diversify career tracks. This is also a way of retaining excellent teachers in the classroom rather than having them promoted to management roles. In Singapore, after three years of teaching, teachers are assessed annually to gauge their potential for three different career paths: a teaching track (for classroom and master teachers), a leadership

track (for subject/level heads, school principals, and superintendents), and a senior specialist track (for government officials). Teachers with the potential to be school leaders are moved to middle management teams and receive training to prepare them for their new roles. Middle managers are assessed for their potential to become assistant principals or principals, and specialized training is provided for school principals.[279]

To encourage teamwork, teams need to be motivated around the same goals aligned across a system. Strong leadership is required, and students, teachers, and officials will need a much stronger sense of autonomy, mastery, and purpose. Consideration must be given to both team and individual incentives.
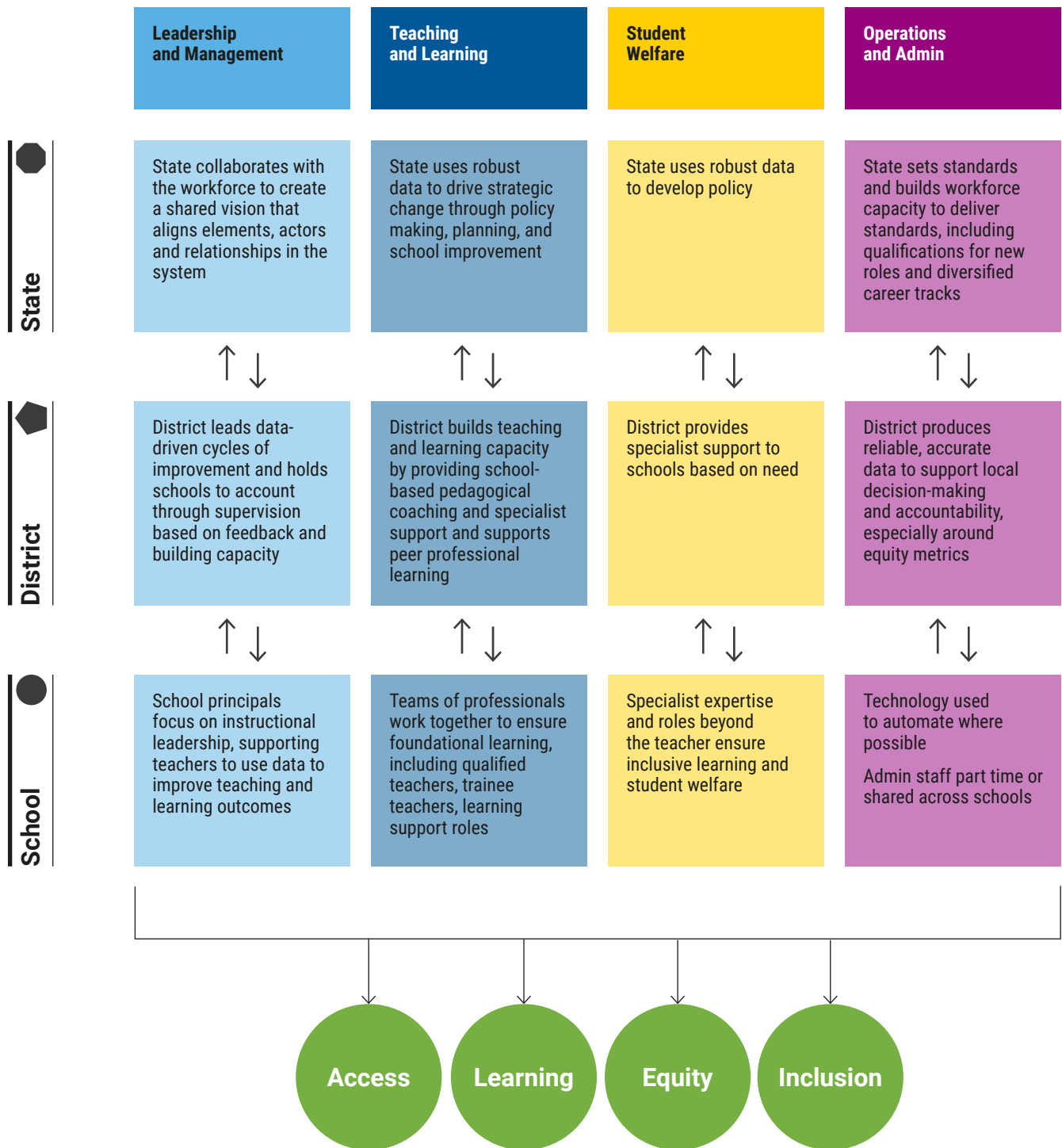
As systems move towards a more professionalized workforce, new qualifications will be needed for recognized professional roles such as head teachers, district education officers, and learning assistants. A literature review found that training programs leading to formal qualifications for learning assistants are rare, even within high-income countries.[280]

5.6 Key shifts in the education workforce at each level with a learning team approach

Figure 9 summarizes the key shifts for a learning team approach by function at the school, district, and state levels. Given that every country is at a different stage of development, some of these shifts may have already been undertaken.

Figure 9 - Key shifts for a learning team approach by function at each level in an education system

Source: Adapted from Jones, Charlotte, Ruth Naylor and Tal Rafaeli (Education Development Trust), Yeukai Mlambo, Ann Nielsen and Iveta Silova (Arizona State University), and Freda Wolfenden (The Open University). 2019. "Designing the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

	Leadership and Management	Teaching and Learning	Student Welfare	Operations and Admin
State	State collaborates with the workforce to create a shared vision that aligns elements, actors and relationships in the system	State uses robust data to drive strategic change through policy making, planning, and school improvement	State uses robust data to develop policy	State sets standards and builds workforce capacity to deliver standards, including qualifications for new roles and diversified career tracks
District	District leads data-driven cycles of improvement and holds schools to account through supervision based on feedback and building capacity	District builds teaching and learning capacity by providing school-based pedagogical coaching and specialist support and supports peer professional learning	District provides specialist support to schools based on need	District produces reliable, accurate data to support local decision-making and accountability, especially around equity metrics
School	School principals focus on instructional leadership, supporting teachers to use data to improve teaching and learning outcomes	Teams of professionals work together to ensure foundational learning, including qualified teachers, trainee teachers, learning support roles	Specialist expertise and roles beyond the teacher ensure inclusive learning and student welfare	Technology used to automate where possible. Admin staff part time or shared across schools

Access · **Learning** · **Equity** · **Inclusion**

Box 13: EWI in Ghana: Redesigning the education workforce

Ghana recently made the transition to lower-middle-income status and has achieved considerable expansion of access to basic education and improved gender parity. Despite significant financial commitments to the sector, the quality of learning outcomes has not kept pace. Several education workforce challenges that contribute to the low quality of learning outcomes include: low-quality teaching; teacher absenteeism and attrition; inequitable deployment; and the need for improved accountability systems and more effective school and district leadership and management.

Ghana has embarked on a very ambitious education reform agenda with 12 priorities, including a new standards–based curriculum, transformation of teacher training, teacher professionalization, and school inspection reforms. The Ghana Education Service (GES), the implementing agency with oversight of the largest workforce within the Ministry of Education (at the national, provincial, district and school levels) through which all reforms need to be implemented, is undergoing institutional reform for efficient delivery. A new decentralization bill provides a good opportunity to consider how to harness district-level resources more effectively – the current model district contains up to 61 roles.

The GES reform aims to rethink how the education workforce could be better designed to empower teachers, school leaders, and district officials to focus on improving learning outcomes, properly deploy teachers, support equitable and inclusive access to education, and enable more effective school management.

In support of these reforms, EWI has partnered with PricewaterhouseCoopers to work with the GES and involve key stakeholders to develop:
- An education workforce design to deliver the Education Sector Plan 2018-30 together with a fully costed implementation plan; and
- A review of the functions and structure needed at the national, regional, district, and circuit/ school levels using an organization design approach, along with job descriptions with core competencies and skills for key roles at district and school level.

The work is still underway but early opportunities have been identified around improving instructional leadership at the school and district levels, professionalizing roles at the district level, and considering greater differentiation in the teacher role. The revised design is expected by the end of 2019.

Transforming education systems into learning systems

Key messages for policymakers

● **Develop school networks and harness system leaders** to enable schools and districts to exchange evidence and knowledge about effective instruction and management approaches. Policies should encourage schools to function as networks with roles such as system leaders and specialists working across schools.

● **Facilitate a research and development culture** throughout the workforce, with government policies, funding, and structures supporting evaluative research, use of data for decision-making, sharing of lessons, and scaling or targeting of effective innovations across the system. Policy would be informed by frontline evidence as well as national and international research, and adapted to meet changing needs.

● **Test and develop innovative learning configurations,** including technology-assisted learning, to better address individual learning needs and give learners access to a wider variety of knowledge sources and ways of learning.

● Foster greater **cross-sectoral partnerships and collaboration** where it leads to better education outcomes, through supportive policies, funding, and governance structures.

Vision 3: Learning Systems
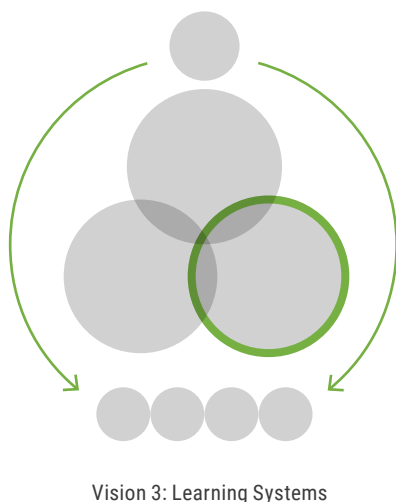
The vision for the future education workforce involves schools and education professionals becoming part of a learning system that adapts to change continuously and in which professional learning is shared and scaled, benefitting more students more quickly. The school as an institution is likely to remain the central hub for knowledge sharing and will be needed to provide a safe space for children to learn, but learning spaces and configurations will evolve and new ones will emerge as technology and personalized learning become more available. This is happening already.

To transform an education system into a learning system, the following approaches can be used:

1. Develop innovative learning configurations to address individual learner needs
2. Develop school networks and harness system leaders
3. Leverage cross-sectoral partnerships
4. Encourage a research and development culture where high-impact innovations are identified and scaled

Figure 10 illustrates the learning system theory of change and outlines immediate outcomes from each of these approaches.

Figure 10 - Theory of change for a learning system

Source: Education Commission, 2019

Key approaches of a learning system

- Develop innovative learning configurations to address individual learner needs
- Develop school networks and harness system leaders
- Leverage cross-sectoral partnerships
- Encourage a research and development culture where high-impact innovations are identified and scaled

Intermediate outcomes

- Systemwide learning and capacity to adapt to future challenges
- Intrinsic motivation and professionalism – collective ownership of learning and improvement
- Teaching relevant to real world challenges
- More effective teaching – scaling of high-impact practices so all students benefit

Outcomes

- Access
- Learning
- Equity
- Inclusion

Each learning system must be tailored to contextual needs, but illustrative implications for workforce roles are presented at the end of each section and a diagram of key shifts in the functions at all system levels in Section 6.5.

Learners as individuals

School networks

Cross-sector partnerships

Research and development

Vision 3: Learning Systems

6.1 Develop innovative learning configurations to address individual learner needs

Emerging innovations suggest that the education workforce could respond to individual student needs more effectively with different learning configurations. Depending on the learning configuration and class size needed for a lesson, learning teams overseen by a qualified teacher could be created from different role combinations. Students would experience different learning configurations and the school would maximize its available resources. Managing the complexity of this will require additional coordination skills and training at the school level, in the form of a managing teacher role, for example. The African School for Excellence (see Table 1) shows that using a mix of roles and learning configurations can be cost-effective. Although evidence is limited, effective examples of new learning configurations (often small-scale) do exist around the world and even in low-capacity contexts, as shown in Table 1.

Table 1 - Examples of new learning configurations

Learning configuration	Example	Illustration
Large class lessons delivered by off-site specialist teachers broadcast through interactive radio or TV, facilitated by class teacher	In the *MGCubed* project in **Ghana**, teaching was delivered by expert teachers via video to rural populations and facilitated by a class teacher or assistant, leading to improved English and math scores and reduced out-of-school rates.[281]	Science specialist — Class teacher — 60 students
Technology-based content sources and interactive learning applications, facilitated by a learning assistant	In **Sudan**, *Can't Wait to Learn* delivers tailored education through research-driven, curriculum-based gaming technology on tablet computers with a facilitator. Students improved nearly twice as much in math and almost three times as much in reading as those using traditional approaches.[282]	Class teacher — Learning assistant — 60 students + 20 tablets

| Learning configuration	Example	Illustration
Lessons supported by volunteers from other sectors (e.g. health, business) alongside teachers	*Educate!* trains entrepreneurs and employees from local businesses to teach **Uganda**'s entrepreneurship curriculum alongside teachers in schools. Students were 50 percent more likely to be employed from a base of 17 percent in the comparison group and *Educate!* graduates earned 95 percent more than their peers.[283]	
Small group remedial learning using teaching at the right level with a community volunteer, learning assistant, or trainee teacher	The *Teacher Community Assistant Initiative* in **Ghana** used local high school graduates as community assistants through the existing National Youth Employment Program to lead in- and after-school remedial classes for small groups of students in primary school, significantly improving skills in literacy and numeracy on average.[284]	
Peer learning, group problem solving, and creative team tasks facilitated by a classroom teacher **Project work (individual or group) mentored by learning assistants (at primary) or volunteers from other sectors (at secondary)**	In **South Africa**, *The African School for Excellence* serves low-income families and operates a "rotational" model in their classrooms – students rotate between teacher-facilitated lessons, small group peer learning activities, and individual work on computers. This model places the teacher in a facilitator role supported by technology.[285] For each cycle of three rotations, a fully qualified teacher is only needed in one rotation (instructional) while in the other two academic advisors (trainee teachers) can manage the classroom. Students outperform the wealthiest students in South Africa by 2.3 times in math and 1.4 times in English. The program is cost-effective at USD $800 per student per year.[286]	
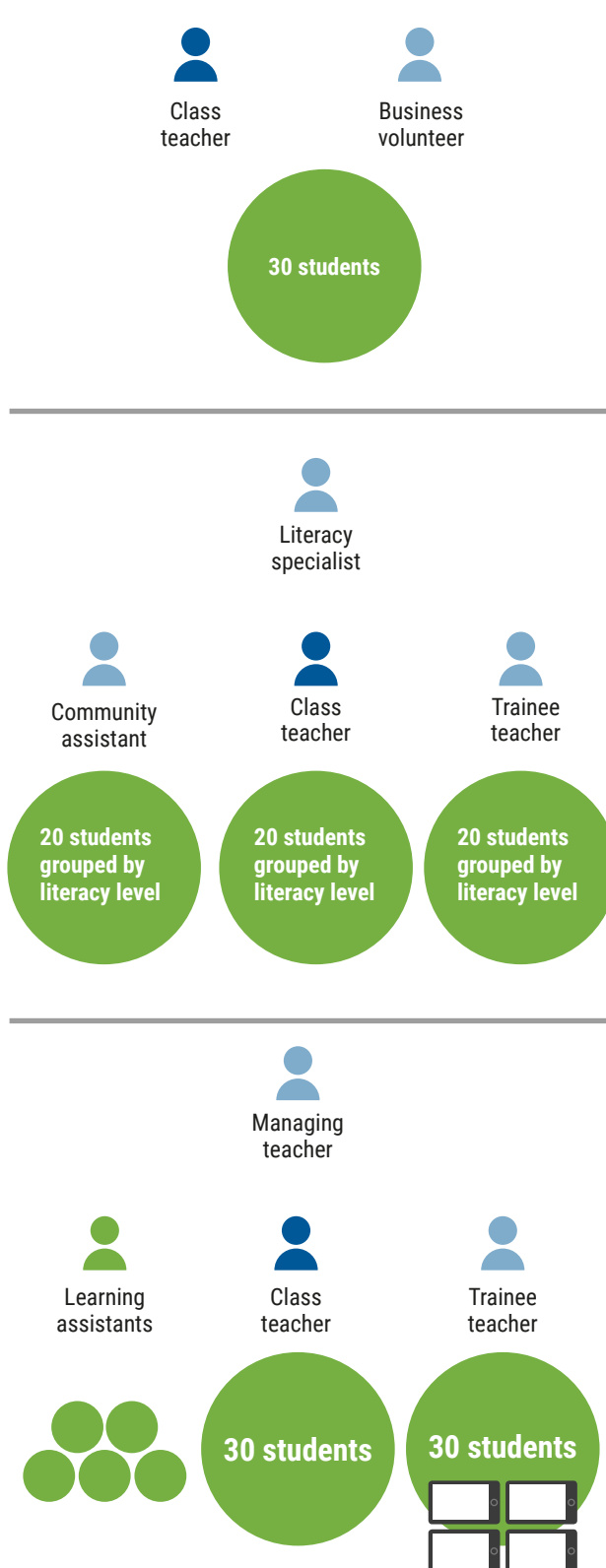
Early evidence suggests adaptive learning technologies could be particularly effective in complementing new learning configurations. A model currently being tested in universities in the United States and in some developing countries involves the use of adaptive learning software to deliver personalized learning. This frees up time for teachers to provide individual attention to each student based on data the system generates and to lead active learning lessons to build higher-order skills (see Box 14 on the EWI work in Vietnam). Early evidence suggests this has a positive impact on student outcomes.

*In urban **India**, the Mindspark program, a technology-aided afterschool program, provides students with personalized instruction. It uses an adaptive computer-assisted learning software with a set of games, videos, and activities that pull from a database of over 45,000 questions to test students and provide explanations and feedback. The software uses data to identify the learning level of every student, deliver customized content targeted at this level, and dynamically adjust to the student's progress. The program also includes small-group instruction, during which teaching assistants cover core concepts that were not customized to each student's learning level. It has improved performance in both math and Hindi across multiple grade levels.*[287]

One of the potential benefits put forward for adaptive learning is that once the software has been designed and configured for a particular context, the marginal cost of rolling it out at scale is low.[288] This depends on the availability of low-cost devices to access the software; the Internet or access through an offline version; the training and support for teachers to use the technology; and the safe storage and use of data. The successful integration of new technologies in conjunction with the workforce has yet to be tested and evaluated at scale in low- or middle-income settings. This is one of the goals of the EWI work in Vietnam (see Box 14).

Box 14: EWI in Vietnam: High-tech, high-touch learning

Although Vietnam is well known for its highly improved education system, the government recognizes that educating students with the STEM skills needed to meet its Socio-Economic Development Plan is still a challenge. To address this, the Prime Minister issued an instruction to develop new approaches to improve STEM education in junior and high schools and to encourage learning experiences that enhance problem-solving, creative thinking, and adaptability.

EWI is partnering with the Ministry of Education and Training and Arizona State University (ASU) to develop a prototype adaptive learning course for math teachers and students. The course draws on ASU's work on "high-tech, high-touch learning," which has shown how adaptive and active learning can be used to free up teachers' time to focus on "high-touch" learning through projects, discussions, hands-on experiences, and nurturing higher-order skills such as complex problem-solving and socio-behavioral skills. The student experience is personalized; the software adapts to their learning level and the teacher can provide targeted support to each student using data from the software. Over 65,000 students at ASU have used adaptive courseware across many subjects. In college algebra, students have achieved a 25 percent increase in pass rates with the new learning experience, with those furthest behind making the most progress.

High-Touch Learning with Teachers

Create

Evaluate

Analyze

Apply

High-Tech Learning with Adaptive Systems

Understand

Remember

Bloom´s Taxonomy
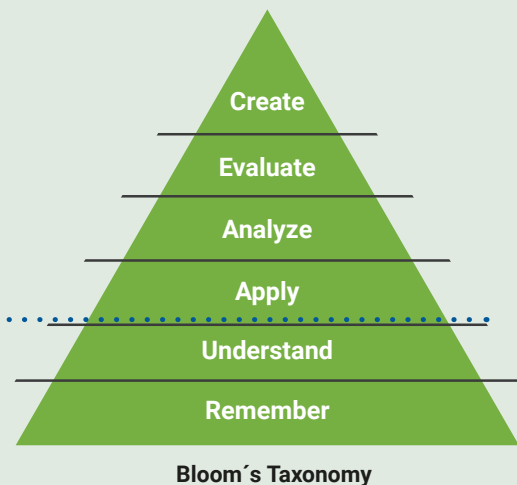
© Dale P. Johnson (2015)

EWI is also reviewing what education workforce roles are needed to provide STEM education. This includes a pilot program to include trainee math teachers as learning assistants in the adaptive and active learning class to both support teachers and provide trainees with more experiential training. EWI is exploring the potential of using an adaptive learning approach to train teachers in the new curriculum.

The project will be externally evaluated and findings shared in early 2020.

6.2   Develop school networks and harness system leaders

Evidence shows that when schools collaborate, they tend to improve more rapidly. Networks of schools and educators have demonstrated they can organize the diverse expertise needed to solve complex educational issue. Historically in low-income countries, collaboration across schools has been through school clusters. Clusters have been identified as key mechanisms to support new leaders, share innovations, transfer professional knowledge, and encourage greater efficiency in resource use.[289] In Ethiopia, clusters supported by cluster resource centers have increased teacher motivation and improved practices.[290] Particularly in rural areas, school clusters can support the sharing of pedagogical innovations and good practice when traditional teaching and learning methods are not generally adapted to the context. But they need to be managed effectively. A recent World Bank study on school reform in Dubai concludes that school collaboration is a promising approach that promotes cost-effective school-to-school learning.[291]

*A study of **five rapidly improving school systems** (Vietnam, Brazil, England, UAE, and the United States) that have improved student outcomes and/or closed the attainment gap for disadvantaged students identified school collaboration as a key reform strategy. For example, pairing high- and low-performing schools were part of the **London** Challenge and school reforms in **Rio de Janeiro, Brazil**.[292]*

*A landmark study between 2004 and 2009 by the universities of Toronto and Minnesota across nine states in the **United States** looked at the effect of local system characteristics on student achievement. It concluded that networks that encouraged collaborative professional learning accounted for 17 percent of the variation in student achievement across districts.[293]*

School collaboration can take many forms, from the simple sharing of resources among schools, to deeper collaboration based on peer school evaluation. As stated in Chapter 3, networks deliberately establish connections and work towards common interests and goals. This can include peer mentoring among head teachers, collaborative teacher professional development strategies, and implementation across schools.

High-performing professionals can play a role as "system leaders" to share their experience and practice with other schools and foster school collaboration. Using system leaders is a cost-effective and powerful way to support peer learning and increase the professionalization of education leadership. Teachers are more likely to change their practices when they see colleagues they admire – not just official leaders – championing desired improvements.[294] In addition, using high-performing head teachers to mentor others working in similar schools is effective. It motivates practitioners to raise standards because they can see what is possible in contexts like their own and gives them access to highly tailored local solutions.[295] The concept has been used to support rapid school improvement in several contexts.

*As part of **Rio de Janeiro's** successful school turnaround strategy, the city's Secretary for Education used sophisticated data analysis to identify "godmother schools" as system leaders, which then collaborated with struggling schools in the same area to support them to transform learning.[296]*

*The Education Development Trust has been pioneering a systems approach to strengthening school leadership in **Kenya**, **India**, and **Rwanda** based on successful models from the UK and New Zealand. It identifies high-performing school principals, pairs them with principals in similar but lower performing schools, and trains and supports them to develop mentoring relationships built around a defined school improvement priority. In Rwanda, almost 500 national and local "Leaders of Learning" were appointed to lead data-driven school improvement planning across their districts, working in collaboration with peers through one-to-one coaching and professional learning communities. The approach has had impressive impacts on student learning outcomes in the UK for both the beneficiary school and the system leader's school. Pilots in Kenya and India have shown statistically significant improvements in the leadership competence of mentors and their ability to give quality feedback. Teaching quality in the mentees' schools also increased by 20 percent, based on a standardized teaching quality instrument.[297]*

The aim of the Teach For All network of partners — which recruit well-qualified, diverse graduates to teach in under-resourced schools for a minimum of two years — is for alumni to continue as system leaders, either inside or outside formal education. As school leaders, policymakers, advocates, social entrepreneurs, or civic leaders, alumni aim to drive change within the broader education ecosystem or across sectors affecting education.[298]

Formal awards and public recognition of high-performing professionals can be used to motivate high-performing teachers and encourage innovation. Examples include the Varkey Global Teacher Prize, the World Innovation Summit for Education (WISE) Awards, and the Star Teacher Awards in Punjab, Pakistan.[299]

As the capacity of schools increases, school networks can provide professional development. Skilled school-based practitioners can share their expertise and knowledge across school networks and beyond. For example, Singapore's Teachers Network Initiative encourages teachers to share effective practice from their own classroom experiences with other teachers through informal learning circles, rather than relying only on a central body of experts to prescribe how best to improve teaching and learning.[300] By strengthening professional collaboration, schools can lead change and improvement for themselves with collaborative school improvement plans and reflective practice. Schools can work closely with teacher education institutions to undertake practitioner research and share results across schools, thus increasing their professionalism.

With effective school networks, district roles can focus on network support and identifying and disseminating good practice. As school networks lead professional development, evidence shows that districts can play an important role in facilitating peer-to-peer learning and experimentation.[301] Districts could provide overall direction for area-wide school improvement and align efforts to tackle common local barriers to improved teaching and learning. They could also broker the supply and demand of specialist expertise across the district to support equitable and efficient resource management. The OECD and UNICEF's recommendation that district-level officials "encourage professional learning and development, promote innovations and school-to-

By strengthening professional collaboration, schools can lead change and improvement for themselves

school collaboration, and help disseminate good practice" supports this.[302] Districts should also create their own forms of networks for knowledge sharing, skills development, and reflection on practice so they can continuously learn.[303] Through increased collaboration, a culture of trust and shared responsibility can develop where people are assumed to be motivated and capable and everyone feels accountable for the education system's success.

New competencies and skills are needed to drive school networks. School and district leaders need to know how to manage a learning system, lead area-wide learning, and scale best practices. These competencies need to be considered as part of strengthening the system and incorporated into role selection, initial training, and professional development.

Box 15: School and district level – illustrative roles needed to work with school networks

School principal as system leader leads collaborative school improvement and strategic resource management to continuously improve outcomes and ensure equitable resourcing across a network.

Teacher as system leader raises quality of teaching and learning by quality assuring peer-led teacher CPD and scaling best practices so all students can benefit.

Inclusion specialist builds a learning culture that ensures inclusive management, teaching, and learning across the network.

Learners as individuals

School networks

Cross-sector partnerships

Research
and development

Vision 3: Learning Systems

6.3   Leverage cross-sectoral partnerships

Partnerships within the education system and beyond – including families and communities, higher education, cultural institutions, and businesses – can support broader education goals.[304] New evidence demonstrates the importance of partnerships and coalition-building for successful education reforms.[305] With networks, the education system can engage and connect to other actors to make education more relevant for learners, forge a greater connection to the world outside school, and provide a broader range of skills and expertise to address education challenges and foster innovation.

South Korea created strategic partnerships outside the education system to improve the relevance of secondary education during the changing labor market in the 1990s. High-status Meister high schools utilized high-level industry experts as school principals, and teachers and schools were encouraged to collaborate with industries to enrich curricula and establish internships for students and teachers. Wide-ranging measures were introduced to incentivize students to participate and to persuade parents and employers to support the system. Piloting, testing, and scaling new and disruptive approaches were key to success, building a wide base of support, and ensuring quality control and accountability.[306]

Cross-sectoral partnerships can be formed at all levels. At the school level, learners are likely to interact with a wider range of professionals, and community resources can support greater applied and real-world learning. Building on the learning team approach, volunteers or occasional staff from the local community can supplement lessons with applied and project-based learning, helping connect what children are learning to real-world issues. These volunteers can be drawn from the business sector, community organizations, youth organizations, other parts of the social sector, or universities. At the secondary level, these roles can help improve the relevance of work-related skills and bridge the gap between education and the labor market. Although much less common, examples exist in low-income countries.

*INJAZ in **Jordan** partners with volunteers from private-sector companies to provide lessons on business skills, including financial literacy, ethical leadership, teamwork, creative thinking, communication, and interpersonal skills. About 23,000 volunteers have been trained. Private-sector companies also adopt schools, share information and data, and provide employment and internship opportunities to graduates, creating better links between school and work. An internal study found that INJAZ graduates had an unemployment rate of 19 percent compared to the national rate of 32 percent.[307]*

*Educate! in **Uganda** draws on entrepreneurs and employees from local businesses to teach the entrepreneurship curriculum alongside teachers in schools. In addition to initially relieving teachers of having to get up to speed on new topics, this approach builds their capacity in this area over the long term.[308] Educate!'s quasi-experimental study demonstrated that participants were 50 percent more likely to be employed from a base of 17 percent in the comparison group and that Educate! graduates earned 95 percent more than their peers.[309]*

When involving support from outside the school, additional safeguarding requirements may be needed, and some schools may have access to only a narrow range of local expertise. Use of carefully curated video content, social media, and livestreamed interactive sessions can be used to give learners access to expertise from other sectors when distance and/or safeguarding concerns limit face-to-face interactions.

Emerging evidence suggests that as teacher capacity improves, school principals can focus more on building external connections. Connection-building activities can include working with parents, developing community relationships, and interacting with organizations such as foundations and publishers to enhance school resources.[310]

*A study of **Pittsburgh** public schools in the United States suggests that school leaders who build the school's external social capital are associated with improved teaching and learning. This research found that "when principals spent more time building external social capital, the quality of instruction in the school was higher and students' scores on standardized tests in both reading and math were higher."[311]*

An inter-sectoral peer mentoring program for school leaders can improve school management. The Partners for Possibility program in South Africa pairs school principals with business leaders who act as thinking partners to

design change solutions for under-performing schools.[312] Drawing on "action learning" approaches, the business leader and school principal participate together in a leadership development program and then jointly tackle problems within the school. Case study evidence indicates that the initiative is leading to improved school functioning, and the program has been taken up by the Gauteng Department of Education.[313]

At all levels, closer coordination is needed with health and social services professionals who provide specialized services to schools such as assessment of physical and mental health, counselling, health education, and addressing domestic issues that impact learning (e.g. early childbearing, children acting as caretakers, domestic violence). This can also strengthen overall service provision to children with disabilities,[314] but requires greater coordination and collaboration across sectors. District partnerships with a wider set of actors and intermediary organizations like businesses and NGOs could also foster innovation and address systemic barriers to education outcomes through new connections and organizational structures.

New competencies and skills are needed to leverage cross-sectoral partnerships. School and district leaders need competencies in building relationships, collaboration, communication, and cross-sectoral planning and budgeting. These competencies should be considered as part of strengthening the system and incorporated into role selection, initial training, and professional development.

Box 16: School and district level – illustrative roles driven by cross-sectoral partnerships

Community members or experts from across sectors can be drawn from the business sector, community and non-profit organizations, universities, or social sectors to provide specialist expertise or knowledge to help schools apply real-world learning.

Health and welfare professionals provide specialized services to schools such as physical and mental health assessment, counseling, and health education, and address domestic issues that impact learning.

Learners as individuals

School networks

Cross-sector partnerships

Research and development

Vision 3: Learning Systems

6.4 Encourage a research and development culture where high-impact innovations are identified and scaled

In a learning system, the school becomes the site of experimentation and innovation. New workforce functions and roles are needed to promote a research and development culture where high-impact innovations are identified and scaled so the whole education system benefits.

School networks can provide fertile ground for knowledge exchange and surfacing of innovations. Some scholars suggest that the novel interactions and information exchanges in network communities facilitate innovation because

they can surface and test new insights with diverse sets of individuals working in highly varied circumstances. This enables more fluid exchanges across contexts and institutional boundaries.[315]

Actors at all levels of the system will need to become both users and producers of evidence and data. They will require access to data that is relevant to their needs, and the data they generate must feed into the decisions of other actors in the system.[316] Advances in technology and digitization will most likely continue to democratize data generation and analysis, particularly at the local level. Roles such as data analysts will need to build data literacy at all levels, help create an evidence-based culture, and use sophisticated analytics to draw insights about local causes of underperformance. Districts and networks can then disseminate the analysis with embedded feedback loops throughout the system.

Policy should be informed by this frontline evidence, as well as national and international research, and adapted to meet changing needs. A growing body of research relating to civil-service effectiveness and reform highlights the need to improve the use of evidence by policymakers and for them to mediate research findings for busy frontline practitioners.[317] It also highlights the need for new institutional and leadership capacities in change leadership and adaptive policymaking that responds in an agile way to the complexities of implementation.[318] District and state levels should include these functions in their design.

*In **Vietnam**'s rapidly improving education system, research shows that policymakers have a very strong learning system in place, based on rapid feedback on evidence of what works: "the 'logical system' [is] simultaneously both 'top down' and 'bottom up.' Mandated policies are cascaded down from the national government to schools [...] there is in place a feedback loop that involves the rapid reporting of frontline views on implementation problems up the system through the middle tier to the national ministry."[319]*

A research and development culture should be cultivated at all levels of the system to identify, research, codify, and scale innovations. [320] Initial training and professional development would be needed for all key roles in self-directed learning, peer-learning, evaluation skills, and skills in generating and using evidence to enable professionals to make evidence-based decisions. These skills are not easily acquired through short-term training, so development of such skills should be embedded in initial teacher training courses. When equipped with the right skills and tools, teachers can use rigorous research methodologies, such as randomized control trials, within their own schools. This could lead to teacher-led clinical trials of pedagogical approaches and help generate professional knowledge just as practitioner-led clinical trials have contributed to the development of medicine. Teachers in the UK who engaged in the design and delivery of a randomized control trial demonstrated improved evidence-based behaviors.[321] Singapore's Teacher-Researcher Networks (learning communities composed of faculty researchers from the National Institute of Education, senior specialists from the Ministry of Education, and teacher-researchers) illustrate how a research culture can be cultivated across a system.[322]

At all levels in the system, actors will need to produce and use evidence and data to inform decision-making

Teacher training institutions could train and develop key roles beyond teachers. As an important part of an adaptive, evidence-based system, these institutions serve as knowledge hubs or centers of excellence to generate new research from practicing members of the workforce. This research can then be incorporated into preparation and professional development programs as well as policy development and implementation. The education workforce can play a key role as change agents. Strong partnerships among the key stakeholders – universities, schools, policymakers, and unions – would be required to facilitate this.[323]

6.5 Key shifts in the education workforce at each level in a learning system

To summarize the key shifts above, Figure 11 shows the four functions in an education system (leadership, management, and governance; teaching and learning; student welfare; and administration and operations support) at the school, district, and state levels. It illustrates potential shifts in how the functions are performed when moving to a learning system. Given that each country is at a different stage of development, some of these shifts may have already occurred in some contexts.

Figure 11- Key shifts across functions at each level to transform into a learning system

	Leadership and Management	Teaching and Learning	Student Welfare	Operations and Admin
State	Continues to provide political leadership; strategy and policy development; performance management Establishes culture of trust and professionalism	State promotes an R&D culture, supporting experimentation for the continuous improvement of learning outcomes	Continues to develop policy e.g., safeguarding but works more closely with the workforce Establishes cross-sectoral partnerships	Use of data analytics, including big data, open data, machine learning Strategic education workforce management
District	Leadership for area-based school improvement Sets collaborative frameworks for shared performance monitoring	Facilitates teacher collaboration Quality assurance of teacher-led CPD Innovation leadership Cross-sectoral alliances to supplement teaching and learning	Strategic partnerships with other services Brokers resources for area-wide equity	Use of data analytics Strategic workforce management such as school leadership succession planning
School Networks	System leaders lead networks of schools in generating and sharing evidence and surfacing innovations around common challenges	Peer coaching and collaboration Shared professional development Shared specialist expertise	Shared services and expertise	Technology-enabled data collection and analysis Shared operations and admin services
School	Self-evaluation External relationship building Instructional leadership School improvement	A differentiated workforce utilizes more diverse learning configurations, to address individual needs and provide greater opportunities for more sophisticated learning	Collaboration with other services Greater connection to wider expertise, the workplace and the community	HR and financial management Data collection and analysis

Access · Learning · Equity · Inclusion

Figure 12 illustrates a potential range of roles by function that could be formed at the school level within a learning system (those in bold added for the learning system). Different roles will be relevant depending on the context and whether the school is at primary or secondary level. As explained in Section 6.1, varying combinations of these roles would be needed for different learning configurations. Many of these roles have been described throughout this chapter.

Figure 12 - A continuum of illustrative roles at school level in a learning system

Source: Adapted from Jones, Charlotte, Ruth Naylor and Tal Rafaeli (Education Development Trust), Yeukai Mlambo, Ann Nielsen and Iveta Silova (Arizona State University), and Freda Wolfenden (The Open University). 2019. "Designing the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

Leadership and Management	Teaching and Learning				Student Welfare	Operations and Admin
School Leaders:	**Specialized Teachers:**	**Experienced Teachers:**	**Beginner Teachers:**	**Learning Support Staff:**	**Welfare Support Staff:**	**Ops and Admin Staff:**
• **System leaders** • School principals • School deputy/ asst. principal • Head of year/ Head of subject	• Inclusion specialist • Subject specialists • Literacy specialists • **ICT specialists**	• Classroom teacher • Managing teacher	• Teacher trainee • Newly qualified teachers	• Learning assistant (volunteer, national service program or more formalized) • Remedial tutor • **Online learning facilitator** • **Experts from across sectors**	• Community education worker/ community health worker • Community-based mentors • **Health/ welfare specialists**	• Admin support staff • Operations manager • **Technician**

How to make education workforce reform happen

Key messages for policymakers

Navigating the political economy

- **Before designing or embarking on reform**, policymakers should analyze the political context to understand what is possible and identify windows of opportunity for major reform. It may not be possible to achieve the desired change through a single reform; sequencing, strategic bundling of interventions, and gradual integration of reforms are options to consider.

- **Reform processes must recognize the education workforce and their representative organizations as change agents** and engage them in genuine dialogue to design, implement, and sustain education workforce reform. Policymakers also need to engage other key stakeholders, including parent groups, civil society, and government bodies in other sectors to identify risks and opportunities and ensure joint ownership.

- The **design of a reform** should draw on robust evidence, both international and local, to clarify options and build the case for reform. Careful attention to best practice delivery and change management approaches should inform how changes are implemented.

- Key to successful **implementation** is ongoing communications with all stakeholders, monitoring and evaluating implementation closely, and adapting as necessary. Measures of success at all levels in the system need to be defined, measured, and analyzed.

- In order to **sustain change**, reform goals must be embedded within sector plans and through legislation. Building the capacity of supporting accountability structures and recognizing reform leaders is also crucial.

Planning, costing and financing the education workforce

- **Financial support for investments in the human and social capital of the workforce is needed to ensure the fundamental right to education and to meet SDG 4.** Teachers are the most important determinant of learning outcomes at school level and rightly, they represent the largest share of the investment in education. Smart investment in the workforce will lead to longer-term returns through improved efficiencies and greater effectiveness. Some of the approaches outlined in this report require an increase in investment (e.g. hiring more trained and qualified teachers, specialist teachers, or formal support roles), while others may produce efficiencies or improve cost-effectiveness of workforce investments (e.g. redistribution of teachers, reorienting roles towards learning, use of differing learning configurations). Investment choices will be context-specific.

- **To unlock resources, Ministries of Education need to make the investment case for change convincing.** By using cost-benefit analysis, reformers can compare options and demonstrate the learning gains workforce reform can achieve as well as the economic and social returns improved learning can generate. Investments in the education workforce should be prioritized towards the poor and most marginalized to deliver the greatest returns.

- As the education workforce becomes more diverse and multifaceted, **costing models need to reflect a wider range of roles, levels, geographies, and composition of the workforce.** Accurately estimating the short- and long-term costs of the workforce is an important element in any planning or workforce reform effort. Efforts to collect additional data on the current workforce, including roles beyond teachers, are needed. It will be important to continuously review and improve costing models and ensure the availability and use of accurate data.

7.1 Navigating the political economy of workforce reforms

The political economy of any context heavily influences any attempt at education workforce reform. This section provides considerations for and examples of strategies that have been used to address the political economy challenges and opportunities of implementing education workforce reforms. It is structured using the stages in a reform process:

1. Initiating and designing reforms
2. Implementing reforms
3. Scaling up and sustaining reforms

This section draws on political economy literature, workforce reform strategies, and political economy analyses in two of the EWI countries: Ghana and Vietnam. As with other chapters, evidence on successful system-wide reforms in low-income countries is limited.

1. Initiating and designing reforms

Start with an understanding of the political context

Political economy analysis helps to illuminate important dynamics of the reform process.[324] Each education workforce is embedded within a political context that has certain characteristics – social, cultural, and economic – which must be understood as part of any reform effort.[325]

The structural characteristics or governance structure, including the type of state as well as the bureaucratic culture and norms of state institutions, are an important starting point.[326] For example, in many countries a large share of total education spending goes to government administration, with many of these jobs open to political appointment. This creates conditions for clientelism and corruption, which can lead to strong opposition to reforms.[327] Understanding implications of governance structures is a key aspect of political economy analysis that can help guide what is possible.

Another critical aspect of political economy analysis is the political moment for reform. Agendas of the political parties in power as well as election cycles can both bolster and hinder reforms. Reforms that are complex, take time to implement, require more resources, and face stronger opposition will likely be more difficult during competitive electoral environments.[328] Periods of political and social transitions, such as emergence of new elites or changes in the relative power of social groups, can create opportunities for reform.[329] Some countries have strategically leveraged key windows of opportunity to advance reforms: Sistema de Aprendizaje Tutorial – the alternative secondary education program in Honduras – benefited from the high political pressure on Central American governments to provide secondary schooling to rural areas in the 1990s.[330]

Build on robust evidence to clarify the options and constraints and create buy-in

Data on the current education workforce (such as composition and capacity) must be understood and should guide workforce design. Robust evidence is required to gauge the likely effects of different options given the wider policy

Each education workforce is embedded within a political context which must be understood as part of any reform effort

environment.[331] Data demonstrating the potential impact can also be used to build the case for reform. This has been used successfully in Latin American education workforce reforms.[332] In Kenya, robust evidence on impact from a smaller-scale pilot was crucial to the scale-up of the Tusome early grade reading program.[333] However, depending on context, if evidence challenges the status quo, there may be resistance to the reform.

Engage key stakeholders to identify risks and opportunities and ensure joint ownership

Respect for teacher unions as design partners of reforms is a key feature of sustainability

The design of reforms should engage key stakeholders and identify their needs, interests, and motivations.[334] This is critical to create buy-in by those who will implement and be affected by the reforms. Engaging stakeholders in the development of education policy can cultivate a sense of joint ownership about the need, relevance, and nature of reforms and help identify unforeseen risks and opportunities.[335]

Common stakeholder engagement strategies include mapping stakeholder groups, undertaking consultations, interviews, and surveys, or visiting district and school sites. Some scholars recommend a process of "backward mapping" in which those closest to the point of implementation are engaged in the policy process from the outset, under the assumption that those closest to the source of the problem have the greatest ability to influence it.[336] However, this can be difficult as not all stakeholders are formally organized, particularly marginalized groups. Evidence from the health sector suggests that marginalized groups can be organized through coordinated social movements, user lobbies, and explicit promotion of user participation in policymaking.[337]

Teachers and their unions are key primary stakeholders to engage at an early stage as they can highlight the existence and scale of potential risks or unintended consequences and provide additional evidence to support policy objectives. Respect for teacher unions as design partners of key, or even controversial, reforms is a fundamental feature contributing to reform sustainability or "resoluteness"[338] (see Box 18). This is especially true for contentious workforce reforms such as promotion and compensation. Evidence has shown that without buy-in from a critical mass of teachers, new teacher compensation systems will not succeed.[339]

Other members of the workforce should be involved in the design process, including district officials. In some countries, education support personnel are unionized, but in many contexts they are not, making it more difficult to engage them systematically. In Uganda and India, the STIR program consulted district officials to understand their needs and priorities to help improve the intrinsic motivation of thousands of district and subdistrict officials and 200,000 teachers. As a result, the program provided district officials with special training and links to networks that supported their efforts to motivate teachers and bound them to the reform process.[340] In cases where some stakeholders resist change, overcoming opposition can be tricky as their voices are often strong. One way to address this is to build pro-reform coalitions that can also facilitate joint ownership.

Dialogue and collaboration with a wider set of stakeholders can be useful for both reform design and building pro-reform coalitions. This should include those that may not be formally organized or are outside the education sector:

- **Parents** often face challenges in acting collectively either because they are so dispersed geographically or stratified socially.[341] They are usually not organized to participate in dialogue at the system level and may lack knowledge of the potential gains from different policies.[342] Engaging parents would be vital in moving towards a learning team approach given their potentially greater role in schools.

- Engaging **civil society organizations** can be helpful to identify innovation and leapfrogging opportunities, and to partner in holding governments to account. They can also play a role in conducting research and providing technical assistance.[343]

- Under certain circumstances, engaging **private-sector partners** could potentially be beneficial. One example is through high-visibility commissions or expert panels. In Australia, the expert panel set up in 2010 by Prime Minister Julia Gillard to review school funding was chaired by a respected business leader.[344] When considering the future education workforce, engaging the private sector will be important at all levels in the system, to both draw on their expertise, and negotiate for reforms that rely on their goods or services (e.g. technology).

*The T-TEL program in **Ghana** to reform initial teacher training illustrates well how key stakeholders can be engaged in policy design and implementation. Despite initial institutional resistance to change and a desire to maintain the status quo by many stakeholders, extensive consultations and early and ongoing engagement meant that these political challenges were mitigated. These consultations took various forms such as stakeholder forums, curriculum reform forums, writing workshops, presentations by the government to teacher unions, teacher training colleges, universities, partner schools, and national-level policy events and learning summits. Persuasive evidence and fostering ownership and leadership of change by education experts and the workforce within education institutions helped to engage stakeholders rather than expecting them to be passive recipients of the reform.[345]*

Engaging stakeholders from across sectors will become increasingly important for the future education workforce as cross-sector collaboration becomes more prevalent. The health sector actively seeks out cross-sectoral opportunities to collaborate with and influence non-health sectors, from light-touch coordination across sectors to collaborative problem-solving for deeply rooted social problems. Although every sector has its own mandate, funding streams, interests, incentives, languages, and disciplinary cultures which can conflict,[346] coordination is possible. In Peru, the reform team at the Ministry of Education successfully worked with economists in the Ministry of Finance, broadening the policy network and technical support for implementation.[347]

Leverage political capital at all levels to ensure successful implementation

Education leaders need to calibrate the degree of political support they can count on at all levels and plan the size and scope of the reform program accordingly.[348] This means understanding the political capital that heads of government and ministers have and are willing to spend on education reform. Leadership continuity has been essential in catalyzing and sustaining reforms

Education leaders need to understand the political capital that can and will be spent on education workforce reforms

in the world's most improved school systems.[349] Maintaining trust at the top level is also crucial.[350] This can be difficult as turnover in ministerial appointments is higher in education than other areas, partly because ministers often resign when their reforms generate too much political conflict.[351]

Lack of political will at the local level often undermines reforms,[352] but identifying local champions can help drive the case for reform. Engaging the community through a learning team and learning system approach can catalyze local political will to sustain reform. In some initiatives, local ownership strategies are also very effective, and when given the opportunity local leaders can emerge organically.

*The Lesson Study program in **Zambia** (see Chapter 5) introduced peer-to-peer collaborative learning practice for primary and secondary teachers. Before it was introduced, Zambian officials observed the program in other countries and saw the benefits firsthand. Of these officials, a small group of "local champions" emerged – some of whom were former schoolteachers. They had insights about local realities, helped identify innovative solutions on the ground, and could be held accountable if actions were not completed. These leaders became the driving force within the government to scale up the program, resulting in improved teaching skills that were correlated with improved student pass rates on the Grade 12 national exam.[353]*

2. Implementing reforms

Effective implementation requires a coherent plan and strategically timed rollout

To be coherent, incentives must be aligned to the reform needs, the responsibilities of each actor, and how the actors interact with each other. This is especially important for a future education workforce that is working in teams across networks. "Delivery approaches" have been used to help address alignment of reform goals across actors by using detailed plans or "roadmaps" that outline roles and responsibilities and incorporate real-time data feedback loops. More research is needed to understand this approach,[354] and clear lines of accountability, good leadership, and management must be in place.[355]

The level of decentralization impacts implementation of reforms and can delegate more responsibility and decision-making power to the stakeholders closer to the ground, such as district officials and school leaders. This approach can introduce more influence and flexibility at the local level, which may allow officials to leverage their positions in ways that minimize rent-seeking and corruption.[356] But in some contexts, decentralization can add to the complexity of political economy dynamics, depending on coordination, resources, and relative capacity across levels of implementation and may not be more effective. Costing and financing is a core element of any coherent reform plan as many reforms fail due to insufficient funding.

Reformers should consider sequencing, strategic bundling of initiatives, and gradual integration of reforms. Sequencing can be driven by technical logic (for example, an initial teacher training reform would be more effective after a teacher recruitment reform), but it can also be driven by political con-

> To be coherent, incentives must be aligned to the reform needs, the responsibilities of each actor, and how the actors interact with each other

siderations and perceptions of reforms that would be more palatable at the outset. In Peru, Ecuador, and Colombia, voluntary teacher evaluations were introduced before compulsory ones.[357] Another strategy is bundling reforms with existing initiatives. For example, cross-sectoral collaboration between education and health workers could be facilitated through the institutional architecture of pre-existing school feeding programs. Contentious reforms can also be bundled with other compensatory policies.[358] Piloting and gradual integration of the policy over time instead of a sudden major change can stabilize the implementation process and make it more likely to succeed.

Chile initially created the National Teacher Evaluation Program, which concentrated on teacher skills rather than directly linking student performance and teacher pay. It was initially introduced on a voluntary basis through a teacher self-evaluation and then piloted over two years before becoming compulsory, giving actors time to adjust to higher standards. The general consensus from impact evaluations indicates that these measures have had a positive effect on education quality.[359]

Ongoing communication with those implementing the reform is critical

Ongoing communication with key stakeholders provides critical feedback throughout the process and facilitates adaptation of the reform. Effective communication strategies were key to the implementation of major teacher policy reforms in Mexico, Ecuador, and Peru. The expansion of ICT and new modes of communication like social media can be very effective forms of communication.

*The Education Secretary of **Rio de Janeiro**, Claudia Costin, was the first to use Twitter to communicate directly and daily with the municipality's 55,000 teachers. She built trust and support among teachers during a four-year period of progressive reform by responding to critical feedback without defensiveness and publicly acknowledging and acting on useful suggestions.[360]*

A data-driven approach to monitoring and evaluation of implementation provides information for course correction

Monitoring and evaluation of implementation should be data-driven and lead to adaptation throughout implementation. This can be done through setting benchmarks, appraisal mechanisms, and education workforce information systems.

*The Tusome program in **Kenya** monitored implementation of the program's progress by tracking teacher adoption and application of desired instructional practices and student outcomes. Curriculum support officers and head teachers conducted structured observations of teachers' classroom instruction and sampled student performance data, which was collected and shared on a dashboard using tablets. Early signs suggest that these regular monitoring systems are leading to a type of normative shift in expectations of and support for teachers, even without negative consequences (or, conversely, remunerative rewards) being tied to the outcomes of the monitoring data.[361]*

Effective communication strategies were key to the implementation of major teacher policy reforms in Mexico, Ecuador, and Peru

3. Scaling up and sustaining reforms

In order to scale and sustain reforms, there must be complementary support structures at all levels in the system

Sustainability of a reform requires integration with the larger education system

Political economy challenges often undermine scaling interventions, even those that show initial potential. Experience from previous system-wide education reforms across diverse contexts suggests that actors who maneuver and situate reforms within existing institutions increase the potential for introducing and sustaining change.[362] A recent study of successful scaling experiences in education demonstrates how innovation more readily takes root and scales when it responds directly to challenges facing the state and aligns with existing government priorities and policies.[363]

*Escuela Nueva, the school model that has scaled in **Latin America** and elsewhere, has deliberately worked through government systems with a bottom-up approach. Their model shows that system connection and local autonomy can coexist and be sustainable. They have had an explicit strategy to liaise with government through links with the national curriculum, information sharing, interactions with ministry personnel, and seeking financial and political support. They have also related their own assessments to national assessments.[364]*

Reforms should be complemented by support structures to enable scale-up

In order to scale and sustain reforms, there must be complementary support structures. These can include embedding reform goals within sector plans and through legislation, capacity building of roles to support accountability structures, strengthening institutional structures, formally recognizing reform leaders to encourage sustained political will, and developing human capacity to sustain long-term impact.[365]

*The Tusome program in **Kenya** includes system-wide capacity-building to ensure long-term sustainability. Tusome trains curriculum support officers, administrators, teachers, and instructional coaches on practical classroom-based strategies, and trains principals in instructional leadership and management of new learning materials. The program even provides training for national and regional education leaders to address gaps in policies that impact early-grade reading. Support structures are strengthened by institutionalizing monitoring mechanisms.[366]*

Recognizing the education workforce as change agents is critical to any successful workforce reform

For any workforce reform to be successful, the education workforce themselves must be empowered to be change agents. It is important to involve them at an early stage in the design and development of a reform, harnessing their motivation and encouraging them to work as champions or system leaders. This is a critical step in moving towards learning teams and a learning system.

*The STIR initiative in **Uganda** and **India** fosters system-wide conditions that boost teachers' motivation. The program builds teacher networks and trains officials to reignite teacher motivation at scale within the existing teacher workforce. These networks allow teachers to see tangible results in the form of increased motivation and improved mastery of curriculum and content.[367]*

In some cases, the bureaucratic environment is so deeply entrenched within a system that it can be difficult for people who have been part of the system to become agents of change. One strategy is to draw key stakeholders, including those outside the government sector, into high-visibility reform commissions or expert panels.[368] Another strategy is to identify visionary leaders and enlist the international community to support them as change agents. As part of an international learning team, prominent leaders can facilitate knowledge sharing and networking opportunities across countries and recognize reform successes on the global stage at forums and high-level meetings.

7.2 Planning, costing, and financing the education workforce

To create and sustain a high-quality education system, financing needs to be above and beyond what is currently being spent in low- and middle-income countries. Using a global costing model, the Education Commission estimates total spending (public and private) needs to rise to 10 percent of GDP by 2030 to meet SDG 4. But to achieve this goal, countries must also invest in reforms that approach education spending as investments for learning. This must include reforms to make the education workforce more effective, since teachers are the most important determinant of learning outcomes at the school level and they rightly represent the largest share of the investment in education.[369] On average in low-income countries, almost 80 percent of total education spending is on teacher salaries,[370] and demand for teachers will rise along with student numbers. As outlined throughout this report, investment is also needed in other members of the workforce at the school, district, and state levels to improve education outcomes for all.

Understanding and planning for changes in the workforce is fundamental for any education system. This includes understanding demand and aligning supply; introducing or amending salaries, benefits, and incentives; and adopting workforce strengthening approaches (e.g. training and professional development). As the workforce moves towards a wider array of roles and costs, financing strategies must be considered in planning and investment discussions.

Planning for and estimating the costs of a fully redesigned workforce, especially in its more ambitious future form, is challenging.[371] Some of the proposals outlined in this report inevitably increase costs (e.g. hiring enough trained and qualified teachers, specialist teachers, or formal support roles), while others may produce efficiencies and improve cost-effectiveness (e.g. redistribution of teachers, reorientation of roles towards learning, use of different learning configurations). Allocations of teachers, supplementary roles, improved leadership at the school, district, and national levels, and their associated unit costs will be highly context-specific. In many cases, salary profiles are not available for new roles and will depend on local labor market conditions, including alignment to other occupations requiring similar levels of skills.

As the education workforce becomes more diverse and multifaceted, planning and costing models need to follow suit. While there have been substantial improvements, many education sector plans still lack a robust costing and financing plan. Costing information on the education workforce and associ-

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ated reforms in low-income countries is often limited to some simplistic calculations in sector plans and is often abstract and disconnected from budgeting discussions. Few low-income countries have specific education workforce planning and allocation models, despite increased attention to these models in health systems[372] and in developed countries. This report presents an analysis of existing models and proposes ways of improving costing exercises in the future.

The goal of *free* equitable, quality primary and secondary education for all implies that the large majority of education workforce costs will be absorbed by the public sector. However, financing needs often outstrip available resources. Global estimates using standard teacher-pupil ratios suggest that under current trends in 87 countries, available domestic finance will be insufficient to meet overall costs of providing quality education by 2030. In 17 countries, available domestic finance will not even be sufficient to meet workforce costs.[373] As a result, countries must consider different financing options and carefully prioritize resource allocation to ensure marginalized children are sufficiently supported.

As teacher salaries already represent a significant share of recurrent education budgets in most countries, requests for further investment in the education workforce must be convincing. Despite education's significant positive impact on development, ministers of finance and development partners will compare competing investments and will recognize that any investment in the workforce will be for the long term. A thorough cost-benefit analysis of any workforce reform is required for policymakers to change the status quo. This should be informed by social dialogue with the workforce and their representative organizations.

To aid this, this chapter discusses:

1. **Existing planning and costing models of the workforce across a range of low- and lower-middle-income countries** by assessing how the education workforce is modeled now; identifying where improvements can be made; and highlighting lessons from other sectors.
2. **Improving workforce investments** taking into account economy, efficiency, cost-effectiveness, and equity.
3. **Financing education workforce reforms,** including the role of national governments[374] and the international community.
4. **An illustrative example of modeling workforce reform**.

1. Education planning and costing models

Current education planning and costing models

While planning and costing of the workforce requires continuous discussion, it comes to the fore during various planning processes: when sector plans are formulated; when budgets are allocated to different parts of the education system (basic, higher education, etc.); and when activities are planned. Ideally, these are interlinked, and systems plan activities that are clearly prioritized within a budget based on their comparative benefits. In practice, these pro-

cesses are often largely independent, with countries developing system-level costing models within sector planning documents that are misaligned with annual budgeting discussions.

To inform this report, approximately 10 education sector costing models from low- and lower-middle-income countries and international organizations[375] were reviewed, along with the nascent literature on sector planning and cost guidance for projects. While there have been substantial improvements, many education sector plans still lack a robust costing and financing plan, and the majority of projects and activities undertaken lack accurate cost data. GPE has made strides in improving the quality of education sector plans, but cost planning is still one of the main weaknesses. A recent evaluation of education sector plans finds that only 68 percent of plans from 2016-2018 are considered "achievable" − although this is up from 25 percent in 2014-2015. Seven out of nine plans considered not "achievable" had funding gap estimates based on unrealistic assumptions or the lack of a sound financial framework. Discrepancies between the action plans and financial framework were considered a major issue overall.[376]

Existing costing models have multiple challenges:

- Planning models focus on student flows, while workforce projection models are rare and workforce allocation processes not codified or transparent.
- **Costing the education workforce is overly simplified**, usually involving multiplying the number of teachers by the average teacher salary. The number of teachers needed is often calculated by just dividing the number of children enrolled by a desired pupil-teacher ratio. Basic data is generally weak, inconsistent, and difficult to disaggregate. Most models do not distinguish between different salary scales for teachers and do not include data on other school staff, including existing roles such as head teachers. Accurate modeling is impossible with this level of disaggregation.
- **Workforce compensation structures are incomplete.** Less than half the models reviewed included costs for workforce incentives. Teacher training costs are just given as totals, with no details on reach. Less than one-quarter of models included disaggregation based on different roles of teaching staff; geographical allocations; and considerations of marginalization such as gender and disability. The likely result is a dramatic underestimate of the true costs of the workforce and incomplete information on the support planned for them.
- **Data on costs and effectiveness of specific interventions is rarely considered in models** and was not included in any of the 10 models reviewed**.** This means that prioritization against objectives and learning outcomes is very difficult. Despite growing literature around effectiveness, data on the costs of specific interventions is often unavailable.
- **Costing models are often wish lists, both in terms of activities and the projections around resources**. In addition to the statistical challenges, one major shortcoming of these models is they are not updated in tandem with budgeting exercises, meaning that discussions around the *de facto* prioritization of resources to activities are often missing from conversations at joint-sector reviews.

A recent evaluation finds that only 68 percent of education sector plans are considered "achievable"

Improvement is complicated by capacity issues, meaning that models face a tradeoff between sophistication and tractability. However, without improvements, they are likely to remain one-off box-ticking exercises, wasting their potential use as ongoing tools to improve systemic planning and learning.

Improving planning and costing models for education workforce reform

To inform improvements to costing models, it is helpful to draw on lessons from the health sector given its much greater progress in costing and data for planning. The education sector has a history of costing analysis and discussions,[377] but it is far behind the health sector in a number of areas: 1) the use of cost-effectiveness for cost modeling; 2) agreement of standardized effectiveness metrics (though progress is being made in education[378]); 3) development of costing analysis methodologies specifically for low-income countries,[379] and 4) the use of matching algorithms for complex workforce allocations.

Sector cost modeling in health builds on cost-effectiveness analysis, and separates out the main costs into three strands: 1) the cost of intervention services (costed at the delivery level); 2) the cost of system inputs, such as human resources, infrastructure, and information systems; and 3) program support activities, such as training and community support, which are matched to the interventions and system inputs.

An important characteristic of cost modeling in health is that the programs are delineated – for example, costs for tuberculosis, malaria, and reproductive and newborn health are all calculated separately. Shared system inputs are then added, alongside the support services needed.

Some cost-effectiveness approaches used in health could be potentially useful in education, such as:

- **Bottleneck analysis** – This approach identifies major issues or "bottlenecks" hampering the delivery of health services and uses cost-effectiveness information to identify appropriate interventions for investments. By focusing on specifics, precise cost estimations can be compiled and then clearly communicated to raise funding. For example, if literacy is a bottleneck impacting learning outcomes, then hiring literacy assistants can be costed and directly related to solving the problem as shown in Box 19, clearly justifying the investment.
- **Intervention-led approach** – This approach identifies a wider set of reforms by selecting packages of cost-effective interventions, e.g. a learning team made up of several different interventions or approaches. By combining several interventions, each with its own evidence of cost-effectiveness, a stronger case can be made to increase funding. This requires robust cost-effectiveness data.
- **Algorithms to improve matching of workforce preferences** – This approach in health is well documented and could offer opportunities for education systems to more accurately match the workforce's preferences to school allocation. Systems such as the National Residency Matching Program in the United States could be adapted to suit the needs of the education workforce, improving the efficiency of deployment and avoiding additional incentive payments.

Less than a quarter of costing models included data that considered marginalization

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> **Box 19: Highly effective interventions to solve bottlenecks in the education workforce**
>
> The Teacher Community Assistant Initiative (TCAI) in Ghana and Balsakhi Program in India were both cost-effective interventions that used learning assistants to improve foundational learning. Both helped solve this key bottleneck and improved student outcomes.
>
> TCAI focused on the provision of remedial education by pedagogical assistants recruited from nearby communities. It helped increase learning outcomes for class sessions by 0.142 standard deviations and 0.133 standard deviations for sessions outside school hours. The cost per child per year was USD $20.24 (including TCAI salaries for both during and outside school hours) and the cost-effectiveness ratio was USD $142.56 per standard deviation of learning or 0.70 standard deviations per USD $100 spent, equivalent to 0.62 year of schooling.
>
> The Balsakhi Program included tutors, usually young women recruited from the local community, working with children in grades two, three, and four who were identified as falling behind their peers. This program saw an increase in learning of 0.14 standard deviations in the first year and 0.28 standard deviations in the second year, with the largest gains in math. Program cost per child was USD $5.71 and the cost-effectiveness ratio was USD $41.40 per standard deviation of learning or 3.07 standard deviations per USD $100 spent.
>
> Reference: Atherton, Paul, Alasdair Mackintosh, and Alfonso Accinelli with Caine Rolleston. 2019. "Planning, Costing, and Financing the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

Some key principles can improve the reliability of costing and planning models for future education workforce reforms. The most critical are discussed below.

Disaggregation of functions and roles

Effective costing of education workforce reforms must start with a detailed understanding of the current workforce[380] – disaggregating by roles, functions, and levels. Full remuneration packages, not just salaries, should be included to account for pay scales and the range of incentives offered within any given role. Models must move away from having just "teachers" to a more accurate representation of the different levels or types of teachers before considering a range of school roles. This also applies to district and centralized government roles, which are seldom costed realistically.

To obtain equitable distribution, workforce data should be compiled from the school up, disaggregated for equity and inclusion characteristics (such gender and disability), and account for differences by districts and geography such as urban/rural. Staff deployment must be matched with the demography and student flow data by districts and/or rural-urban sectors. This is critical to

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examine pupil-workforce ratios for each area. This data should be combined with population growth rates[381] to more accurately map future needs, and with teacher preferences to improve the quality of the matching of the workforce to schools.

Data system needs

Governments must ensure that their data systems are capable of facilitating these improvements. This requires cross-government approaches to ensure that the data is captured regularly. Technology can significantly improve data gathering and processing efforts. For example, in Sierra Leone the 2018 Annual School Census was digitized and conducted in 10 weeks (compared to six to 12 months), including a new teacher database enabling information to be used before it is deemed out-of-date.[382]

The greatest revolution will be incorporating learning outcomes data (and the implications of this) throughout wider education system planning. Investment in systems and project management tools to capture and analyze costs and learning outcomes data, and the inclusion of this data in costing models, will allow policymakers modeling different policy options to move beyond just considering the inputs to also estimating potential impacts on learning outcomes far more confidently.

2. Improving workforce investments

To improve workforce investments, ensuring value for money and equitable distribution is crucial for investments in workforce reforms. Four elements typically frame discussions around value for money. The "Four E's" are economy (how much do/should we pay the workforce?), efficiency (what are the outputs from this workforce?), effectiveness (how does the workforce enable learning outcomes?), and equity (how do we ensure the benefits are achieved for all?).[383] However, value for money should not be at the expense of providing education as a human right.

Improving *economy* of workforce spend

Salaries and compensation schemes for the workforce. As the bulk of education costs are workforce salaries, governments should carefully consider their compensation schemes to maximize investment impact. Remuneration policies, alongside other benefits and work conditions, are key levers to attract and retain high-quality professionals. A wide range of teacher compensation schemes are operational throughout low- and lower-middle-income countries. A few principles stand out:

- **To be financially attractive, the workforce should get comparable or higher salaries than equivalent professions.[384]** Given the subsistence wages in informal settings, policymakers need to qualify a market wage with an understanding of an acceptable minimum wage, which will both enable retention and ensure teachers are not in poverty and seeking secondary work.
- **To retain teachers, increases in salaries should be steeper and linked to professional experience, skills, and competencies.[385]** Salary profiles are currently too flat. An average Sub-Saharan African teacher's salary after 15 years of service is only between 11 and 36 percent higher than when they

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started.[386] Moreover, the most common way of organizing teacher careers across the world is through a "single schedule salary structure,"[387] which means increases are automatic periodic steps until the top.[388] The lack of salary progression makes the profession less attractive and is a driver of high attrition rates.[389]

- **Systems need to account for the full range of financial incentives for teaching – including specific incentives for hard-to-reach schools, shortage subjects, and pensions.** Many incentive structures are in place around the world, and governments should seek the right mix of financial and non-financial incentives for the workforce.
- **Financial rewards, while the most significant education workforce costs, are by no means the only rewards for teachers and other education personnel**. To motivate staff and ensure continued professionalism of the education workforce, the system should include recognition, responsibility, and growth opportunities[390] that are both pecuniary and non-pecuniary.

Wider costs of the workforce

While they dominate discussions, salaries and incentives are not the only costs of the workforce – reform processes also have costs. Planning discussions and models often overlook this and fail to present the full range of costs, focusing just on personnel remuneration. Reform efforts and the need for different training routes for new roles will require changes to the number, content, duration, and costs of training. These additional reform costs can include: consultations on and design of reforms; costs of new recruitment approaches; increased requirements for initial teacher training; professional development to upgrade skills of current staff or for new roles; cost of technology to support reforms; staff attrition or early retirement; and costs of evaluations and updating data systems.

Improving *efficiency* of workforce spend

Increasing the efficiency of education workforce spend is crucial to persuading ministries of finance (and other potential funding sources) to increase education budgets.[391] There is currently a weak link between funding, accountability, and school performance.[392] As salaries represent the largest share of the education budget, policies to improve the efficiency of the education workforce will arguably have the greatest impact.

Existing systems often have opportunities to increase their efficiency, including:
- More equitable distribution of the current workforce (even with relocation incentives) can be more efficient than hiring new staff in the most marginalized areas. Improving matching of the workforce to schools can boost workforce effort and outcomes.
- Improving management and accountability systems can reduce absenteeism and "ghost teachers." Sierra Leone implemented a biometric teacher registration system that eliminated ghost teachers.[393]
- Task shifting, notably of administrative and/or routine tasks, can improve efficiency. Many teachers spend time performing administrative tasks rather than teaching.[394] These tasks can be done by differently qualified staff and/or technology at a lower cost. School leaders and district staff often focus on compliance rather than formative assessment and instructional guidance. Shifting their focus to instructional leadership enabled by shared administration roles or technology could help free up their time. Using a

<div style="color: blue; font-weight: bold;">
As salaries represent the largest share of the education budget, policies to improve the efficiency of the education workforce will arguably have the greatest impact
</div>

mix of roles and learning configurations, the African School for Excellence model (see Chapter 6) costs just 60 percent of what traditional government secondary schools spend.[395]
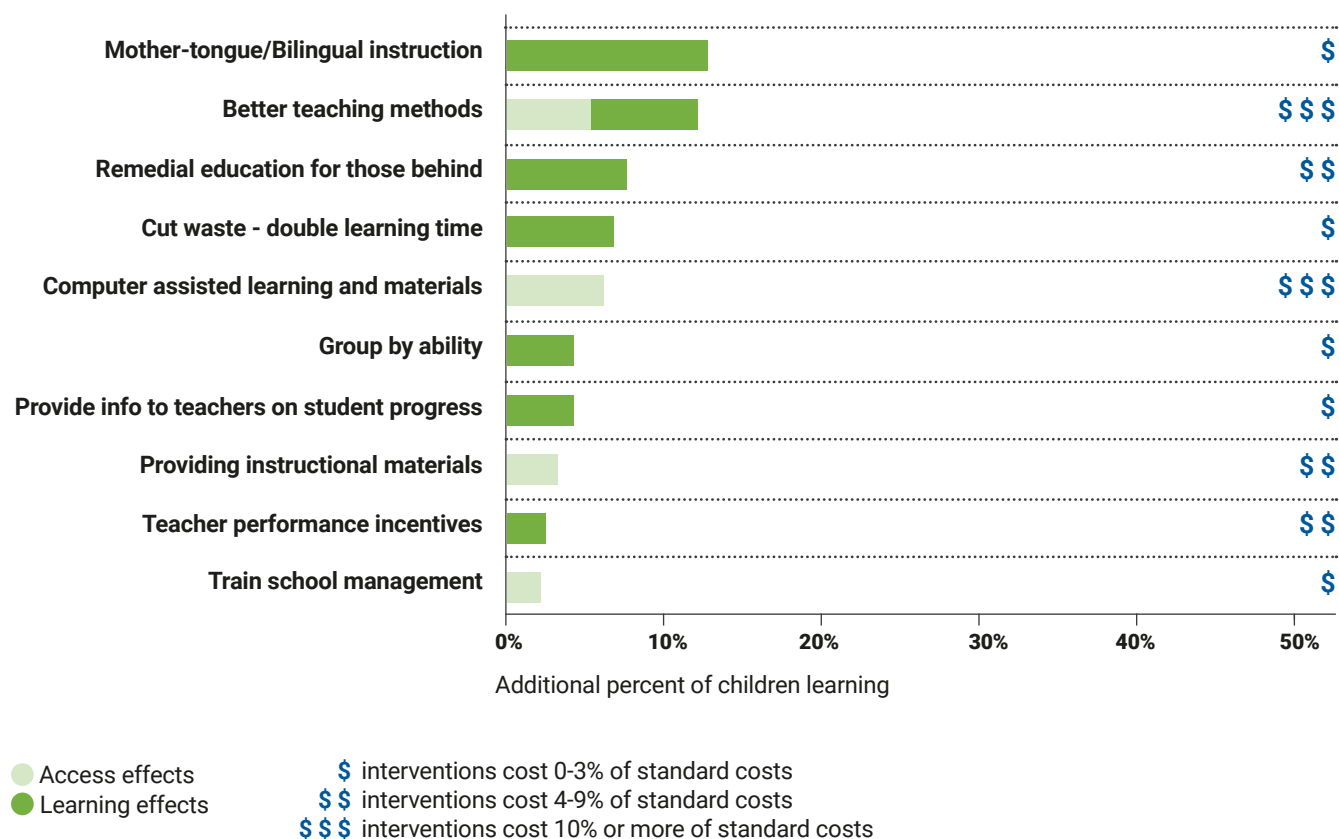
Improving *cost effectiveness* of workforce spend

Some highly effective reforms included in the three visions show that education workforce reforms do not always need to be expensive.

Value-for-money research is increasingly shifting away from focusing narrowly on what teachers are paid to include how they are paid and what they do. The Education Commission conducted a rigorous analysis of available research on specific practices to improve access and learning around the world. Figure 13 highlights some of the strongest available evidence of cost-effective practices related to teachers and teaching. They include increasing learning time,[396] teaching in the student's mother tongue,[397] and targeting instruction to the correct level.[398] All show high potential for improving learning at relatively low cost. Impact and cost-effectiveness will in practice vary according to the context and manner of implementation.

Figure 13 - Highly effective practices to increase access and learning outcomes

Source: Education Commission analysis, 2016[399]

Access effects
Learning effects

$ interventions cost 0-3% of standard costs
$ $ interventions cost 4-9% of standard costs
$ $ $ interventions cost 10% or more of standard costs

Note: The access and learning effects are based on a baseline of 50 percent (of enrollment, completion, or reaching learning targets) and measured as percentage points gained. The costs of these interventions are estimated relative to average baseline standard costs of what is being spent on education today – using average class size, materials, support, and salaries. The chart shows only interventions related to teachers and other members of the workforce.

Some highly effective reforms included in the three visions show that education workforce reforms do not always need to be expensive

Improving _cost-effectiveness data_ to evaluate workforce reforms

While cost-effectiveness analysis is in its infancy in education, recent advances have been made in developing the comparable measures of outcomes that are required. These include Equivalent Years of Schooling (EYOS), which uses impact evaluation evidence relative to a control group to estimate the impact in terms of the equivalent school year in the local context. Ideally, over time this can be applied to evidence on workforce reforms to help policymakers prioritize within a range of interventions. As it stands, there is currently not enough information to use this methodology to generalize between workforce interventions.[400] However, there are pockets of evidence that look at different outcomes and can form the beginning of a cost-effectiveness database that can inform decision-making as it develops.

Evidence from Tusome in Kenya shows how different packages of profes-sional development interventions produced different learning outcomes, scaled to the same USD $100 cost. This enables assessment of the most cost-effective approach: the package of coaching, textbooks, and teacher guides had the biggest impact on learning – 19.7 additional learners met the benchmark per USD $100. The Teacher Community Assistant Initiative in Ghana shows that Remedial Community Assistants had the biggest impact on learning, generating 0.62 equivalent years of schooling; Normal Curriculum Community Assistants and teacher training generated fewer equivalent years of schooling (see Figure 14).

Figure 14 - Cost-effectiveness evidence from a professional development program and a community assistant program

Tusome Program — Kenya Early Grade Reading

Professional development interventions | Benchmark learners per USD $100

Prof Devt +Coaching	→	2.9 learners
+ 1:1 Textbooks	→	8.8 learners
+ Teacher Guides	→	19.7 learners

Teacher Community Assistant Initiative — Ghana Teaching at the Right Level
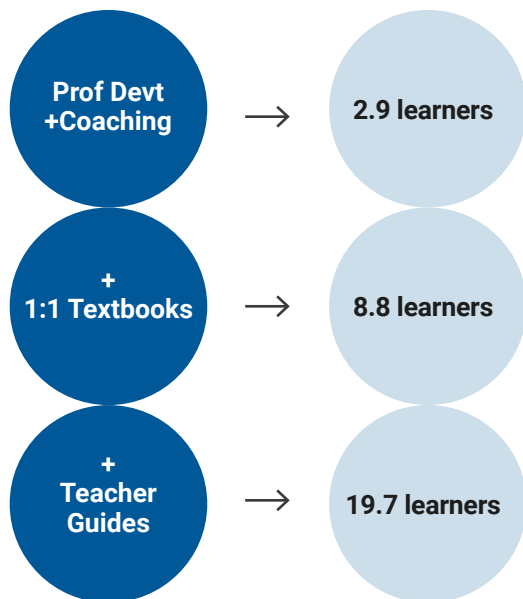
Community assistant interventions | Estimated Years of Schooling (EYOS)

Teacher Training	→	0.37 EYOS
Normal Curriculum Community Assistants	→	0.47 EYOS
Remedial Community Assistants	→	0.62 EYOS
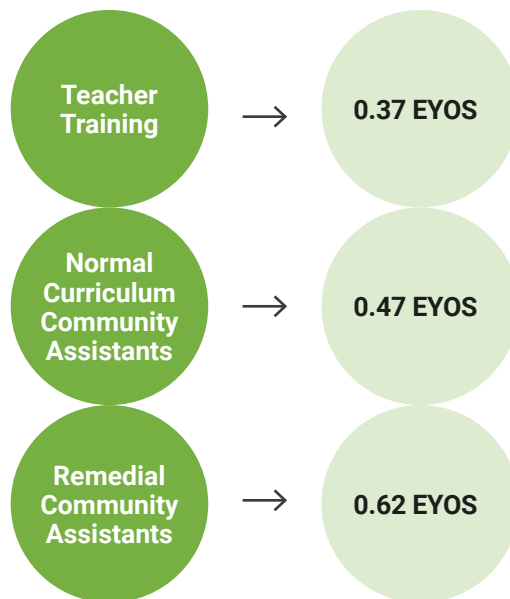
Improving *equity* of workforce investments

Governments can also use their financing more equitably and alleviate the cost burden from poorer households, which currently have to pay more as a share of their household income than richer households. Research by Cambridge University's REAL Centre shows that the ratio of public education spending on the richest versus the poorest gets larger as the level of education gets higher. Primary education spending is skewed to the rich in about two-thirds of countries, but secondary and higher education spending is skewed to the rich in all countries.[401] On average, in low-income countries, 46 percent of public education resources are allocated to educate the 10 percent of students who are most educated.[402] There is great variation in the extent of inequity. In Ethiopia, for instance, the richest households receive 72 times more than the poorest households in government spending on secondary education. Other countries such as Namibia and Ghana have spending that is much less regressive; the richest households receive 1.7 times more than the poorest households in Namibia and 4.9 times more in Ghana.[403]

Despite this discrepancy, spending that is focused on the poor and marginalized delivers the greatest economic and social returns.[404] The Education Commission advocates "progressive universalism" where investments in

education and the education workforce are prioritized towards lower levels of education and to those left behind instead of prioritizing funding based on political pressures and inertia. Because salaries are the largest component of expenditure, ensuring progressive allocations of resources across the education system will be highly correlated to a progressive distribution of the workforce. The application of progressive universalism and its implications for equitable finance and workforce allocations is an area where more research is needed.

3. Financing workforce reforms

As recurrent salaries are a large share of workforce costs, long-term domestic financing is key to financing education workforce reform. At the same time, education systems in developing countries tend to rely on international aid and household expenditure in addition to domestic revenues. This section discusses the implications of this for workforce reform and identifies possible pathways for funding reforms.

The role of national governments

Domestic allocations to education have been increasing in low-income countries since the mid-1990s, supporting a rapid expansion of education and the teacher workforce.[405] Since 2000, public spending on education has grown, driven primarily by robust GDP growth and growth in taxes and total expenditures rather than by greater prioritization of education. Total education expenditures have grown by just under 6 percent per year, which is below the estimated spending needed to achieve SDG 4. [406]

In one-third of low- and middle-income countries with sufficient data, teacher salary costs across primary and secondary schools exceed the amount of government spending on education at all levels

In many countries domestic financing of education is not sufficient to cover teacher salaries, which are the largest share of government expenditure on education. In one-third of low- and middle-income countries with sufficient data, teacher salary costs across primary and secondary schools exceed the amount of government spending on education at all levels. In about half of countries, the amount spent on salaries is over 75 percent of the total amount of government spending for the education sector (see Figure 15). Many of the countries where salaries exceed the amount of government spending are low-income, Sub-Saharan African countries as well as conflict-affected states that strongly depend on overseas development aid (ODA) to finance recurrent education system costs.[407]

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Figure 15 - Teacher salaries as a percentage of total government expenditure on education

Source: Education Commission analysis, 2019

Number of countries by teacher salary costs as a percent of government expenditure on education
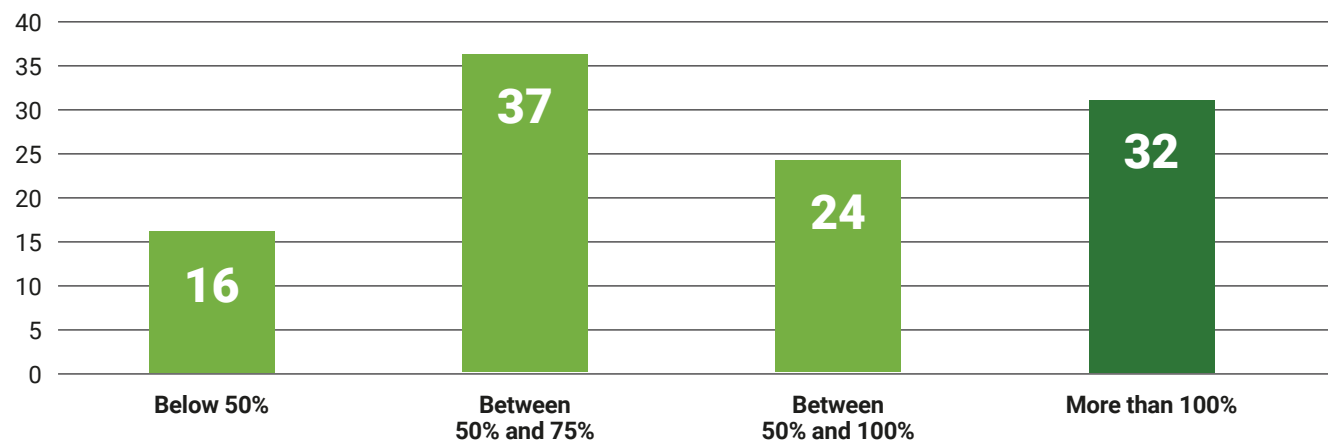
Teacher salaries (primary and secondary levels) as a proportion
of total government spending on education

The Education Commission's *Learning Generation* report recommended a number of strategies to increase domestic spending on education. Countries need to leverage the dividend from growth by increasing spending on education through reallocating spending, raising revenues, or both. Specific **recommendations to support increased financing for education include:** general tax reform; earmarking taxes for education; tackling illicit financial flows; reforming fossil fuel subsidy regimes; investing natural resource revenues; performance budgeting; and fiscal decentralization (see Table 2).[408]

Table 2: How can governments increase domestic financing for their education workforce?

Increase total government budget through economic growth	Increase the tax share	Negotiate for a larger share of the budget for education	Fund deficits by issuing bonds or seeking long-term loans	Improve allocative efficiency of the budget
Policies that boost the economy can increase the potential tax base as well as increase demand for education from households	Expansion of the tax base, improved compliance, and earmarked taxes for education	Make the investment case to the ministry of finance, e.g. repayment through increased future taxation	Use of supplementary IDA loans to pay for targeted interventions can pay for themselves by increased future tax collections	Mechanisms such as medium-term budgeting; performance budgeting; fiscal decentralization; and hypothecation

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Some countries have successfully increased domestic education financing for workforce reforms. In Mozambique, funding to education increased from 4.3 percent of GDP in 2006 to 6.5 percent in 2013, which allowed for almost 10,000 teachers to be trained and hired annually from 2008 to 2010, an annual increase of over 10 percent.[409] These teachers were posted in areas with over-crowded classrooms to try and increase more effective teaching and learning.

Adding new roles to the workforce creates recurring liabilities (for decades with pensions). The preference for permanent contracts to retain workers in the profession means sustained long-term funding is required. Domestic financing is the clearest pathway, but is inherently limited by governments' ability to raise revenues and the political will to allocate these funds to education.[410] To generate political will, ministries of education must work alongside ministries of finance to make a powerful case for more funding, based not only around education as a human right, but also by articulating clear pathways to impacts and benefits. Figure 16 provides an example where community assistants are clearly justified through their impact on learning and subsequent impact on tax revenues, which demonstrates that the intervention pays for itself in the long-term.

Figure 16 - Teacher Community Assistant Initiative: Converting learning outcomes data into an investment case

Source: Atherton, Paul, Alasdair Mackintosh, and Alfonso Accinelli with Caine Rolleston. 2019. "Planning, Costing, and Financing the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

The quantity and quality of research into improving learning outcomes continues to increase -- but dissemination of the results is often not easily accessible.

Impacts are frequently reported in terms of increases in standard deviations (SD) of test scores - by itself these are of very little interest to policymakers.

To be more useful to policymakers, convert results into **Equivalent Years of Schooling** (EYOS) and the **Net Present Value** (NPV) of increased lifetime earnings

The Teacher Community Assistant Initiative (TCAI) in **Ghana** increased learning outcomes by 0.14 SD. This is equal to an increase of 0.62 EYOS, **meaning this initiative delivers the equivalent of an additional five and a half months of schooling!**

Assuming increased earnings of 9 percent per year of schooling, average earnings of approximately 0.9 x GDPpc (USD $1,496) and tax recovered (using Ghanaian tax brackets) means **this initiative would generate an Internal Rate of Return (IRR) of 12 percent and pay for itself within 23 years!**

Support from the international community

In the poorest countries, international donors should still play a key role in education funding – but current trends are disappointing. Despite large and growing financing needs, education's share in overall assistance, including from multilateral development banks (MDBs), dwindled from 13 percent to 10 percent between 2002 and 2016.[411] Total ODA stands at USD $12 billion, including concessional financing from MDBs. This is far below the estimated financing gap for 2020 of close to USD $40 billion.[412]

But even if all donor countries raise their aid budgets to the target of 0.7 percent of gross national income and channel more to education, a large financing gap will still remain. Donor funds play a substantial role in supporting the workforce, though aid to teacher training is in decline.[413] It is well documented that an increase in ODA will be required to achieve the SDGs,[414] complementing an increase in domestic resources.

Three major challenges in international aid architecture exist: too little grant and concessional financing for low-income countries; the unmet financial needs for education in emergencies (not within the scope of this report); and inadequate external finance for education in lower-middle-income countries where tax revenue is not able to keep pace with declines in aid.

- For **low-income countries**, there must be a greater prioritization of ODA as many funds are not reaching the poorest countries. For example, the 10 countries with two-thirds of the world's out-of-school children received just a quarter of the aid. Additional and more efficiently targeted aid allocations are needed to provide the skilled workforce required for these children to access education and learn. There is a downward trend in aid to Sub-Saharan Africa. In addition, the poorer the country, the more likely it is that aid flows outside the government budget. This makes it difficult to build education systems, of which the education workforce is a vital part.
- Even with higher levels of domestic investment, **lower-middle-income countries** face a "missing middle" financing gap as they are less eligible for ODA but still lack sufficient external financing for education with their tax revenue. New instruments such as the International Finance Facility for Education that boosts MDB financing can offer a solution here.[415]

In contrast to health, education has received limited support from private philanthropic foundations. Foundations based in the United States decreased their share of funding for education from 7 percent in 2005 to 4 percent in 2015, but at the same time increased financing for health from 39 to 44 percent.[416] Individual giving directly to providers (such as Save the Children) also plays a role in supporting the education workforce in low-income settings. Given the nature of these funding sources, they are more suitable for funding non-recurrent expenditures and public goods, and have traditionally supported project-based training activities. These activities play an important role in workforce reforms and should be integrated into wider system needs and aligned to sector planning and costing processes to ensure coherence.

Given the recurrent and long-term nature of workforce costs, international donors are often reluctant to support workforce spending. However, international donors could make an important difference in diagnosing needs, sup-

porting the will to reform, planning reform, supporting reform, and helping government to more effectively mobilize and allocate resources (see Table 3).

Table 3: Illustrative areas where the international community can support the costing and financing of workforce reform

Diagnosing the needs	Supporting the will to reform	Planning reform	Supporting reform	Mobilizing resources
• Improving data on the current workforce, e.g. improving teacher management systems in Malawi and the capacity to use it for diagnosis and decision-making • Improving sophistication of costing and financing models • Improving alignment between supply and demand and allocation and deployment of teachers • Ensuring regular sector analysis and planning discussions through local education groups	•Ensuring realistic workforce planning in MTEF processes •Showcasing benefits of workforce reform through evidence from other countries, e.g. GPE's Knowledge Innovation Exchange	• Funding costs of planning reforms, including support workshops for ensuring inclusivity and evaluation plans, e.g. mirroring GPE sector planning grants • Supporting comparable effectiveness metrics (LAYS) to evaluate reforms	• Long-term concessional loans with special consideration for salaries for workforce reforms • On-budget multiyear support to cover specific fiscal deficits • Direct technical assistance and funding to "capital" expenditures – e.g. training, materials, teacher colleges	• Helping ministries develop investment cases for reforms • Support to explore ways of unlocking more financing, e.g. innovative financing mechanisms, such as the International Financing Facility for Education, which can help unlock additional funding and enhance World Bank and regional development banks' financing for education in lower-middle-income countries

4. Modeling workforce reform costs

As mentioned in the introduction, modeling the costs and benefits of workforce reforms in this report is challenging given the different parameters of each country, the multitude of assumptions that must be made, and the fact that the EWI country work is still in progress so the cost modeling has yet to be undertaken. However, the principles discussed above are put into practice in a prototype country workforce costing model, developed by EWI as a public good, and a low-income country case study.

A prototype workforce costing model
The EWI research team has developed a prototype of an improved country-level education sector workforce costing model. The "Prototype Workforce Costing Model" is based on disaggregating existing models and introducing new roles to allow for a more nuanced cost modeling of the workforce. This can be localized using country-specific planning data, which will generate a more nuanced workforce cost estimate for that country.

While the model needs further refinement, it is useful to illustrate how modeling sector costs can help support workforce design and investment decisions for a specific country. For example, the prototype model can be used to assess the implications of introducing learning assistants for the lowest-performing 10 percent of schools to provide a boost to foundational learning. If learning assistants receive half the wage of entry-level teachers, this would increase

costs by approximately 0.68 percent per year. This can be compared to another option. For example, introducing pedagogical coaches to improve teaching practice would command a higher wage but the roles would be shared across schools. This would increase costs by approximately 0.57 percent per year, making them slightly less expensive.

These costs can then be considered together with any evidence on such roles and their impact on learning outcomes (as highlighted in Table 2) and other political and contextual factors to develop a more nuanced discussion of which education workforce reform should be undertaken. The model can also show clearly how policy decisions (such as how many schools share a pedagogical coach) can make a policy more or less affordable, or how these policy choices may be constrained by budget allocations.

An illustrative example of a full workforce reform is not presented here as the costs are so dependent on the existing situation in any given country – particularly salary scales and existing capacity. A link to the prototype model however will be provided on the Education Commission website together with the background paper. This model can be adapted for any country.

Illustrative examples of costing workforce interventions for a specific country

This section illustrates how two different workforce interventions included in this report have been costed for a particular country. Interventions can be costed in varying levels of detail, but typically follow the same steps. The first step is to ascertain the key actions that are required within the reform, and within these which ingredients are required – these can be human inputs, facilities, equipment, materials, or other resources. The greater the level of detail, the higher the accuracy of the overall budget. Unit costs are then sourced for each input,[417] which can be obtained from actual expenditure[418] within systems or by estimation.

The first intervention is **modeling teacher reallocation costs** and evaluates the relative cost-efficiency of two different workforce allocations (within school and within chiefdoms) based on data from an illustrative Sub-Saharan African country. First, all the steps necessary to undertake the intervention were identified (for example, developing allocation guidelines, consulting with key stakeholders, providing incentives for relocation), then costs applied based on previous exercises and plans to understand the total cost of the reform. This was then combined with the personnel costs of teachers to assess the cost-efficiency of the two scenarios (one optimistic and one conservative). Over a period of five years, reallocating teachers using these two allocation approaches would increase the cost-efficiency of the system even after accounting for the reform effort itself – the cost per child per year would fall from USD $150 to USD $44 using the conservative estimate.

Box 20: Modeling teacher reallocation costs

Example 1: Modeling teacher reallocation costs

An analysis of class- and school-level pupil-teacher ratios (PTRs) finds significant variation, and a policy decision is made to redistribute teachers to improve equity, from those schools where the PTR is below 20 to those where it is above 40. The costs for this are illustrated below, for a pilot and then scale-up, evaluated for an annual budget:

	Number of teachers	PTR	Number of students	Cost of teachers	Cost of reallocating	Cost per child over 5 years
Current situation	1,905	20	38,100	USD $5.7m		USD $150
Option 1a - Optimistic	1,905	40	76,200	USD $5.7m	USD $7m	USD $33
Option 1a - Conservative	1,905	30	57,150	USD $5.7m	USD $7m	USD $44

	Key activities / Cost description		Unit cost (USD)	Number of units	Frequency per year	Year 1	Years 2-5
	Legislation in place allows head teachers to allocate teachers across grades	Fixed	1,000	1	1	1	…
Within-school redistribution	Develop recommendations/ guidelines for effective teacher allocation per grade	Fixed	2,000	1	1	1	…
	Distribute guidelines to schools	Per school	30	7,002	1	1	…
	Support visits to schools	Per school	60	175	1	1	…
Within-chiefdom transfers	Develop strategy for transferring teachers within chiefdoms	Fixed	2,000	1	1	1	…
	Consultation with stakeholders	Fixed	2,000		1	1	…
	Communication of strategy	Fixed, to all schools	30	7,002	1	1	…
	Recruitment of teachers willing to be transferred	Per teacher	30	7,002	1	0	…
Incentives for relocation (pilot districts)	Deployment/relocation to other schools	Per teacher	600	252	1	1	…
	Incentive for relocation (augments progressively)	Per teacher	1000	252	1	0.4	…
	Accommodation for teachers in hard-to-staff areas	Per teacher, per hard-to-staff school	400	749	1	0.38	…
Incentives for relocation (non-pilot districts)	Deployment/relocation to other schools in capital area	Per teacher	600	749	1	0	…
	Deployment/relocation to other schools	Per teacher	600	904	1	0	…
	Incentive for relocation in capital area	Per teacher	200	749	1	0	…
	Incentive for relocation (augments progressively)	Per teacher	1,000	904	1	0	…
	Transport for teachers in hard-to-staff areas in capital	Per teacher, per hard-to-staff school	120	749	1	0	…
	Accommodation for teachers in hard-to-staff areas	Per teacher, per hard-to-staff school	400	904	1	0	…

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The second intervention modeled is **a route to qualification for unqualified teachers.** The route to qualification was designed around subsidizing a distance-learning course run by existing teacher training colleges, with staged enrollment and communication costs covered. The costs are split into the steps needed, and could be easily varied, e.g. the government could subsidize more or less of the tuition costs or provide incentives. The costs can also be expanded to include the increase in recurrent costs, as qualified teachers are entitled to a higher wage. Ideally these costs can then be combined with available localized estimates of the impact of this kind of route to qualification on learning outcomes to develop an indicative estimate of the cost-effectiveness of the intervention.

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Box 21: Modeling costs for a route to teacher qualification

Example 2: Modeling costs for a route to teacher qualification

	Key activities / Cost description		Unit cost (USD)	Units	Freq. per year	Quantity				Cost 2019 (USD $'000)	Cost 2020 (USD $'000)	...
						2019	2020	2021	2022			
Selection of teachers	Select unqualified teachers to gain a qualification	Fixed	1,500	1	1	1	1	0	0	1.5	1.5	...
	Recruitment process - teachers are assessed against current teacher ability	Per trainee teacher	0	7941	1	0.6	0.4	0	0	—	—	...
	Communication of results	Fixed	0	1	1	1	1	0	0	—	—	...
Enrol teachers	Payment of stipend to trainee teacher to enrol in distance-learning qualification	Per trainee teacher	50	1	1	0.5	0	0	0	235	162	...
	Payment of distance-learning fee subsidies (1-year program) - *cohort 2020*	Per trainee teacher	200	164	1	0.5	0.5	0	0	16	—	...
	Payment of distance-learning fee subsidies (2-year program) - *cohort 2020*	Per trainee teacher	200	1,307	1	0.5	0.5	0.5	0	131	131	...
	Payment of distance-learning fee subsidies (3-year program) - *cohort 2020*	Per trainee teacher	200	3,235	1	0.5	0.5	0.5	0	323.5	323.5	...
	Payment of distance-learning fee subsidies (3-year program) - *cohort 2021*	Per trainee teacher	200	3,235	1	0	0.5	0.5	0.5	2	—	...
Training of coaches	Development of coaching program	Fixed	2,000	1	1	1	0	0	0	2	—	...
	Materials for coaching	Per coach	1	1,172	1	417	543	388	161	489	636	...
	Training of coaches (5 days per coach)	Training per coach	30	1	1	417	543	388	161	12.5	16	...
Ongoing coaching	Coaching visits to current teachers	Per visit	20	20	12	182	155	0	0	874	744	...
	Coaching visits of teachers and monitoring of trainee teachers	Per visit	20	20	12	235	388	388	161	1,128	1,862	...
	Payment of phone credit for teachers	Per trainee teacher, per month	25	1	12	6485	9639	7777	3235	1,946	2,892	...
	Payment of phone credit for district coach	Per coach	50	1	12	14	14	14	14	8	8	...
	District coach salary	Per coach, per year	2,250	1	1	14	14	14	14	31.5	31.5	...
Total Cost	**USD $20m**	Per teacher	**USD $2,532**									

Agenda for action

This report outlines three interacting visions for the education workforce to improve access, learning, equity, and inclusion in a changing world: 1) strengthening the education workforce, 2) developing learning teams, and 3) transforming education systems into learning systems. This final chapter considers the actions necessary to realize these visions.

This report does not recommend a universal set of reforms; the design of reforms will depend on each system's maturity, the rate of change possible, and the system's current capacity at all levels. Reforms should take a long-term view, but stepping-stone solutions may be necessary where urgent action is needed. Potential tools to help policymakers think through education workforce reform are included in Annexes A, B, and C. More work is required to prototype and test elements of these visions to refine them for each country and learn what does and does not work in specific contexts. These results must be measured, evaluated, and shared within and between countries to build the evidence base and inform policy.

In parallel with the development of this report, the Education Commission has been working with three countries to draw on some of this report's evidence and new thinking to address their own education workforce challenges. Sierra Leone is considering how to improve workforce planning and management to enable more efficient allocation and deployment of teachers to better match supply and demand and close its teacher gap. Ghana is redesigning its education workforce to better align with learning, inclusion, and more effective management. And Vietnam is prototyping a high-touch, high-tech learning approach with changed workforce roles to explore how it may lead to greater personalized learning and higher order outcomes in mathematics. The Education Commission calls on others to follow their lead – from those working on the front lines in schools to those operating at the global level on policy reform – to work together to test, analyze, scale, and promote changes that better support the education workforce and young people to learn and collaborate so they have the skills they need to succeed.

8.1   Call to action for policymakers and the education workforce

Policymakers and decision-makers must make strengthening their workforce a priority and consider how learning teams and learning systems can address their needs. **They should work with teachers, other members of the workforce, and their unions** to:

1. **Diagnose** the current inefficiencies and weaknesses of their education workforce by generating and analyzing data on its composition, supply, demand, capacity, and effectiveness and how it aligns to the long-term country vision and education sector plan. Diagnosis should consider why existing policies and job descriptions, which may seem appropriate on paper, are not being implemented in reality.
2. **Experiment, research, and evaluate** new approaches to see what works and at what cost, using more effective cost-modeling approaches.
3. **Lead a coalition for change** drawing on political economy analysis.

The Education Commission calls on others to follow the lead of the three EWI countries and test, analyze, scale, and promote changes to reform the education workforce

This report recommends action in five areas.

1. Strengthening the education workforce

- **Professionalize teachers and other key workforce roles *throughout* the workforce life cycle** – from recruitment to initial training to professional development and career progression. These policies must be coherent and support each other and align with other education policies, e.g. curriculum policy.
- **Workforce selection should use transparent and fair approaches that consider required dispositions and competencies**. Hiring directly from underserved areas and, where necessary, providing alternative training routes that address local population needs should be considered.
- **Invest in initial teacher training using evidence of what works** and support teacher training institutions and their workforce to adapt and reform. This includes putting a stronger emphasis on addressing trainees' foundational subject knowledge before building and applying greater subject and pedagogical knowledge; including more school-based practicum; and aligning teacher training to what is relevant for the curriculum and context. Training courses should be inclusive in terms of trainee accessibility, course content, and trainers. Structured induction programs should be introduced for teachers and other roles when starting new jobs, and mentoring encouraged during the initial years.
- **Make professional development opportunities available to all teachers as well as other key roles.** These should be practice-based cycles of quality improvement oriented towards teaching and learning. Evidence suggests professional development is most effective when it focuses on a specific subject, tailored to topics relevant to the local context, and provides supporting materials, coaching, follow-up visits, and collaboration opportunities to complement training. Low-tech approaches can facilitate professional development when combined with face-to-face approaches. For teachers who lack core competencies, policymakers should consider a range of pedagogical support strategies – including structured pedagogy and frequent rounds of formative assessment – which should lead to greater autonomy as competencies develop. Career progression should be based on achievement of professional skills and competencies and result in salary increases.
- **Address the root causes of workforce absenteeism, including timely, accessible, and competitive salaries** at the level of similarly qualified professionals, as well as **improved accountability**. Requests for teachers to undertake activities that impact scheduled instructional time should be minimized and fair accountability mechanisms established.
- **Use robust data to better match supply and demand,** taking workforce preferences and equitable distribution of resources into account. Data should be used to target specialized support to schools, prioritizing the most marginalized.

2. Developing learning teams

- **Establish and optimize the right mix of workforce skills and expertise and build learning teams, prototyping new approaches as necessary**. Consider how existing roles can be repurposed to align with learning, equity, and

inclusion and how team composition can leverage the expertise of higher-performing teachers and those with specialist skills by combining them with less experienced teachers, trainees, and learning support staff. If not already part of the formal workforce, consider engaging support staff (salaried or voluntary) to support the most marginalized learners in particular and to address student inclusion, well-being, and welfare.

· **Enable school leaders to focus on instructional leadership rather than administration** by considering the potential of technology or support staff to take on more administrative functions; training school leaders to undertake instructional leadership and providing necessary support tools; and **strengthening the district** to provide coaching and support for data-driven school improvement and specialist inclusion needs.

· **Create structures and practices to enable all roles to work in learning teams at every level in the system**. These should be embedded in initial training and can include professional learning communities; peer collaboration; training or qualifications for key roles beyond teachers; managerial and technical career paths; and team-based goals and incentives. Strong feedback loops should be established among school, district, and state to inform and drive strategic change.

3. Transforming education systems into learning systems

· **Develop networks to enable schools and districts to exchange evidence and knowledge about effective instruction and management approaches**. Policies should foster the conditions to allow schools to work as networks and roles such as system leaders to work across schools.

· **Encourage a research and development culture throughout the workforce**, with government support for evaluative research, data-based decision-making, knowledge sharing, and scaling or targeting of effective innovations. **This could include developing and testing alternative learning configurations**, including technology-assisted learning, to address individual learning needs and increase access to a wider variety of knowledge sources and ways of learning.

· **Enable greater cross-sectoral collaboration** with supportive policies, funding, and governance structures. These should welcome a wider range of professionals and community members into schools to support applied and real-world learning, bridge the gap between school and work, and enhance school resources. At district and state levels, closer coordination should be facilitated between health and social-service sectors to meet learner needs and address systemic barriers to learning. Collaboration should be fostered with technology providers to develop, test, and scale cost-effective technology-based solutions.

4. Generating political engagement to support and sustain reform

· **Analyze the political context to understand what is possible and identify windows of opportunity for major reform**. It may not be possible to achieve the desired change through a single reform; sequencing, strategic bundling of initiatives, and gradual integration of reforms are options to consider.

· **Recognize the education workforce as change agents and engage them**

in genuine dialogue to design, implement, and sustain education workforce reform. Engage other key stakeholders, including parents and guardians, civil society, and government bodies in other sectors to identify risks and opportunities and ensure joint ownership. Robust evidence, both international and local, should be used to build the case for reform and clarify options.

- **Draw on change management best practices to make change happen**. Key to implementation is ensuring ongoing communications with all stakeholders and monitoring and evaluating implementation closely and adapting as necessary. Measures of success at all levels in the system need to be defined, measured, and analyzed.
- **Embed reform goals within sector plans and through legislation** to sustain reform. It is crucial to build the capacity of accountability structures and recognize reform leaders.

5. Making the case for reforms through detailed, long-term financial plans that demonstrate benefits as well as costs

- **Develop costing models that reflect a wider range of roles, levels, geographies, and composition of the workforce and the reform options under consideration**. Analyze cost-effectiveness of different options when possible.
- **Make a clear investment case for change by demonstrating potential efficiencies and justifying additional investment.** Draw on cost-benefit evidence to demonstrate the learning gains workforce reform can achieve and the economic growth and social returns that improved learning can generate.
- **Develop a financing plan including all sources available**; increasing domestic spend on education to pay for recurrent education workforce costs, targeting international aid to leverage government commitments to the poorest and the most effective reforms. Investments in the education workforce should be prioritized towards the poor and most marginalized, since they will deliver the greatest returns.

Mitigating risks

Given the challenge of workforce reform and the need to test learning team and learning system approaches further, this section highlights some risks that will need to mitigated.

- **Recruitment of learning support staff without teaching qualifications may appear to be an attractive strategy for overcoming teacher shortages**. While this report argues that such staff, with appropriate training and development, could be valuable members of learning teams, they should not be used as replacements for qualified teachers where those are needed. Schools and systems that include community volunteers as part of their workforce should be aware of the child protection risks and put safeguarding measures in place.
- **Technology-assisted instruction can play a role in learning teams** where the workforce is trained and equipped to use it, **but it cannot be seen as a replacement for qualified teachers** where they are needed.
- **Reforms to initial teacher training need to consider the pool of potential applicants**. Raising the entry requirements for teacher training courses can

be counterproductive if sufficient supply of possible candidates does not exist, and increasing the academic content of training courses is unlikely to lead to higher-quality teaching in systems where many teacher training candidates still lack core competencies in the curriculum they will teach.

- **Structures and policies that promote competition between individuals and schools can act as a barrier to collaboration**, making it difficult to develop learning teams and learning systems.

8.2 Call to action for international actors

Countries need to drive reforms, but the international community must support country governments to strengthen and create a workforce to achieve SDG 4.

International agencies, NGOs, civil society, and donors should support governments to review their education workforce, taking into account good practice approaches for strengthening it and considering how to include relevant elements of the learning teams and systems approaches. They should support governments to test, evaluate, and scale system-wide reforms and provide platforms on which lessons can be shared. They could establish or build on an existing international alliance to support and share further rigorous research and work collaboratively to support policymakers financially and technically to make their education workforce more effective.

Global partners, including GPE, the UNESCO IIEP, and the World Bank, could work together and support countries to develop an education system workforce diagnostic tool and better costing and financing models to understand and tackle workforce reform. They could also finance the design and/or implementation of workforce reform with appropriate instruments. Any financial support should encourage countries to prioritize education in their own domestic spending, which will cover the largest share of workforce costs.

Researchers and funders of research should test, prototype, and evaluate the impact and cost-effectiveness of new approaches to workforce reform in low-income contexts. This includes testing and evaluating system-wide reform elements of the life cycle that are particularly under-analyzed – including the impact of teacher standards, teacher recruitment, reforms to initial teacher training, systemic approaches to upgrading large numbers of unqualified teachers at scale, and multiple career tracks. All elements of the workforce life cycle for roles other than teachers should also be analyzed along with system-wide reforms over time.

Testing and evaluation of many design elements for the education workforce are also needed. These include the changing role of the teacher; skills optimization; the relative value of different learning team combinations; cost-effective workforce approaches to address student welfare and inclusion; strategies to streamline operations; technology's role and its impact on the workforce; effective workforce structures, roles, and capabilities at the district and state levels; and enabling factors for the education workforce to implement learning teams and systems approaches.

The international community must support country governments to strengthen and create a workforce to achieve SDG 4

Further work is needed to understand *how* **effective education workforce reforms are implemented and taken to scale**. Identifying key success factors and ways to address challenges and barriers to reform are critical.

With only 10 years left until 2030, this must be the decade of delivery. We have no time to waste. To ensure equitable and inclusive learning for all, now is the time for all actors –most importantly policymakers and members of the education workforce themselves – to be open to new ways of working and learning together. It takes a team to educate a child; by building learning teams and learning systems, we can harness the human and social capital of the wider workforce and create a learning generation.

Annexes

Annex A

Design principles

To guide thinking about design of the future education workforce, the EWI research team developed design principles based on SDG 4's goals of access, learning, equity, and inclusion. Existing evidence on what works to improve learning outcomes and for workforce effectiveness as outlined in the report was also considered. These principles underpin the three visions and are incorporated in each one with some variation. Given every education system has its own unique context and challenges, a set of design principles can be a useful starting point for policymakers to use when embarking on workforce reform. The design principles would of course need to be developed to address each country's needs and ideally would be aligned to a long-term education sector plan. For example, a specific set of design principles is being developed as part of EWI's support of the reform of the Ghana Education Service (see Chapter 5); the principles are based on a detailed needs assessment and aligned to the 2018-2030 education sector plan.

1. Design the workforce around learner outcomes	• Structure the workforce around action needed to **maximize learner outcomes** (based on available evidence), and recognize the diversity of students' learning needs and their welfare • Ensure explicit integration of **equity and inclusion** into the design and composition of the workforce roles at all levels, making equitable resource management and practices central to role design and competencies
2. Design workforce organization structure, skills, and culture based on drivers of professional and systemwide change	• **Acknowledge the skills and knowledge that the education workforce already possesses, identify gaps** and provide opportunities to cultivate these and develop new skills that contribute positively to teaching, learning, and building professionalism • Create a **collaborative workforce** with professional learning teams at all levels of the system, where teachers are supported by specialist staff within and beyond the school • Encourage use of **evidence**, data, innovation, reflection, and adaptation • Design leadership roles and team configurations that build a **culture of professional trust,** shared responsibility, and collective efficacy – the softer elements of design are as important as the hard wiring of structures and roles • Design structures that promote **accountability and professional challenge**, as well as support • Design **career pathways** that **motivate and retain** professionals, including progression routes between school, district, and state levels
3. Design the workforce using robust data to inform feasibility and affordability	• Understand **data** on the current workforce, including the challenges and opportunities especially in the most marginalized areas • **Acknowledge the resources** available (human and financial) and the current capacities and capabilities in the system • **Model the costs and benefits**, offsetting significant investment costs by building on existing strengths and structures

Annex B

Guiding questions for strengthening the education workforce

To strengthen the existing workforce, policymakers could consider these guiding questions.

Questions for consideration

1. Analyze the existing education workforce	• Where are the most critical bottlenecks to access, learning, equity, and inclusion within the system and how are these driven by current challenges within the education workforce?
	• What are the composition of skills and capabilities within the current workforce at each level? Is there a gender balance?
	• Are there shortages of specific skills and capabilities within the education workforce? What are the specific needs and how will the production pipeline meet those needs?
	• What is the capacity of teacher training institutes or other organizations to support workforce strengthening?
2. Consider different policy levers throughout the workforce life cycle and embed systems thinking	• What are the current binding constraints or inefficiencies in the workforce life cycle that affect education outcomes?
	• What local and international evidence exists that can be drawn on to address those challenges?
	• Are new approaches needed to attract, recruit, and prepare staff? Do these need to address overall shortages, or shortages in specific locations or expertise? Is there a potential pipeline of teachers – i.e. sufficient secondary school graduates?
	• What is the relationship between qualifications, capabilities, and performance of workforce members and how does this impact prioritization of investment?
	• How can existing approaches to motivate and develop staff be strengthened? Where are the biggest needs? How is professional development currently provided and how does that compare to good practice? Does the current career structure recognize and reward merit?
	• What improvements are needed to lead, monitor, and manage the workforce? How effective are existing accountability structures? What is the balance between compliance and instructional leadership?
	• How do workforce policies and initiatives need to be aligned across system levels and throughout the workforce life cycle?
	• What interdependencies exist between workforce reforms and other policy initiatives including wider reforms? What does the education workforce need to do differently to enable some of those reforms?
	• What steps and what timeframe are needed for long-term development of a fully professionalized workforce? What interim strategies are needed for the existing workforce? The longer-term impacts on workforce professionalism should be considered alongside immediate potential gains.

3. Consider cultural, social, equity, and political factors	• What are the political economy considerations for education workforce reform?
	• What is the cultural and political status of teachers and other workforce roles?
	• Are career entry, training, and progression opportunities accessible to all? How will proposed reforms impact gender equity and representation of minority groups within the workforce?
	• What is politically feasible regarding the development or management of those already in the workforce who do not meet revised standards and qualification requirements?
	• Do the most marginalized children need tailored approaches?
4. Present a clear business case for investment in workforce reform	• Are existing policies being implemented efficiently and as intended?
	• Is current investment sufficient to cover the costs of a workforce capable of delivering and realizing the economic potential of quality education for all? What are the priorities?
	• Have the long-term costs and benefits of different workforce strengthening policy options been carefully considered?
5. Involve the workforce in policy development	• How can policymakers most effectively engage with the school-based workforce?
	• How can policymakers harness the potential of the workforce as agents of change?
	• How can policymakers identify, celebrate, and build on local innovation and existing strengths?

Annex C

Guiding questions for designing the workforce using learning team and learning system visions

To consider how to redesign the existing workforce taking into account learning teams and learning systems, policymakers could consider these guiding questions.

Questions for consideration

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1. Consider cultural, social, equity, and political factors

- **What are the needs of the education sector plan?** What are the key functions needed to deliver those goals?

- **What is the size, scale, and capacity of the state and district system**? This includes distance (catchment size) and connectivity (geographical and technological). The larger the scale, the larger the scope for specialized roles. In smaller jurisdictions, collaboration across districts may be needed to provide specialist support. Where there are remote areas, ratios of face-to-face staff may need to be higher as each role holder will have a smaller case load to allow time for travel.

- **What is the language mix of the workforce and how does this align to learner needs**?

- **What is the gender balance and diversity of the workforce in relation to student demographics?** Which groups are underrepresented and at different levels of seniority? How will proposed reforms impact gender equity and representation of minority groups?

- **What is the level of complexity of middle-tier structures,** e.g. regional, district, cluster, and even smaller units of organization?

- **What is the cultural and political status of workforce roles**? E.g. school principal roles may be highly valued as outward facing community leaders, with no appetite for instructional leadership; therefore investment in instructional leadership may have more impact in deputy principals.

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2. Be respectful of the maturity of the system and the pace of change desired

- **What are the current binding constraints or inefficiencies in the workforce model that affect education outcomes?** For example, if a major limiting factor is the lack of mother-tongue teachers to support foundational learning, then more investment in local learning assistants may be prioritized. If closing within-district achievement gaps is a major priority, then investment in data analysts and district managers may be prioritized.

- **What is the current capacity of the workforce – what is manageable for the pace of change desired?** If there is already a system or institutions for local in-service teacher training, for example, the move to pedagogical coaching may be a manageable incremental step for the system. For other systems, the introduction of coaches may require a major workforce investment. Where capacity is lower, additional quality assurance and management may need to be considered, such as additional lead pedagogical coaches.

- **What is the quality of existing data on the workforce?** What are the gaps in workforce data that need to be addressed to improve workforce planning?

- **How decentralized are workforce accountabilities?** The more decentralized the system, the more technical skills and accountabilities will need to be designed into workforce roles at the school and district levels. If the system is highly centralized and school principals have limited managerial authority to take school improvement action, then investment in pedagogical coaches rather than supervisors may be wiser.

- **How can policymakers take a long-term view?** Introducing new ways of recruiting teachers with the right dispositions and skills will take several years before it impacts student outcomes, and many years before they are consistent across a country.

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3. Consider learning team and learning system approaches

- **How can the skills and expertise of the workforce be optimised?** How can they be better aligned towards learning, equity and inclusion? How can more experienced teachers work together with less experienced ones?

- **What structures and practices need to be in place to enable more team-work?**

- **How can school and district leaders focus more on instructional leadership and data-driven improvement?** What do they currently do they either needs to be done by someone else, technology or eliminated?

- **What kind of learning configurations could maximize the skills of different workforce roles?** How could alternative learning arrangements, including those that are tech-assisted, help target individual learning needs?

- **What structures and practices must be in place to facilitate schools working more effectively together to improve education outcomes?** What formal measures can support the exchange of evidence and knowledge about effective instruction and management approaches?

- **How can cross-sectoral collaboration improve education outcomes?**

- **How can a culture of research and development be encouraged throughout the system?** How can the government support shared research, evaluation, evidence, and lessons learned to help scale up or target effective innovations?

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4. Embed systems thinking into workforce redesign

- **How can workforce initiatives be aligned across system levels**? For example, efforts to improve pedagogical coaching at the district level will struggle if a culture of coaching and trust is not cultivated and modeled by leaders at the state level.

- **What interdependencies exist between workforce reforms and other policy initiatives, including wider reforms across the workforce life cycle**? E.g. if pedagogical coaches are promoting particular teaching standards, are inspectors and supervisors using these in their accountability frameworks to send consistent messages to teachers?

	• **Are the right systems in place to support the success of workforce roles?** If supervisors have a role in supporting school performance review, for example, what systems are in place to ensure the review system is effective, such as incentives for performance?
	• **What wider policy choices are relevant to workforce reforms**? E.g. if a strong national- or state-level inspectorate is desired, this will impact the priorities of the supervisor role.
5. Be mindful that a workforce design exercise is about people and change at scale, not drawing new organizational charts	• **What success measures and evaluation processes can be implemented for new initiatives to generate new local evidence on what works?**
	• **What key skills, behaviors, and culture are needed to make workforce design successful**? These should also be defined alongside new roles.
	• **How can the government best engage the workforce in design and policy decisions?** What types of tools and strategies are most effective at connecting policymakers and the workforce in meaningful dialogue?
	• **How can key roles be designed as champions for change**? Workforce redesign offers opportunities to establish key roles, such as pedagogical coaches, as champions for change who can influence and motivate colleagues to work in new ways that have more impact on learning outcomes.
	• **How can policymakers build on bright spots in the system** and existing strengths? E.g. localities with high levels of parental engagement could leverage this to recruit community volunteers.

Endnotes

1   Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

2   Pritchett, Lant. 2015. "Creating Education Systems Coherent for Learning Outcomes." RISE Working paper, Washington, DC: Center for Global Development; Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

3   Barber, Michael and Mona Mourshed. 2007. *How the world's best-performing school systems come out on top*. McKinsey & Company; Mourshed, M., C. Chijioke, and M. Barber. 2010. *How the world's most improved school systems keep getting better*. McKinsey & Company; Organisation for Economic Cooperation and Development. 2010. *Strong performers and successful reformers in education: lessons from PISA for the United States*. Paris, France: OECD Publishing. Vegas, E., A. Ganimian, and A. Jaimovich. 2012. *Learning from the best: improving learning through effective teacher policies.* Washington, DC: World Bank Group.

4   Bloom, Nicholas, Renata Lemos, Raffaella Sadun, John Van Reenen. 2014. "Does Management Matter in Schools?" *NBER Working Paper 20667.* Cambridge, MA: National Bureau of Economic Research (NBER).

5   United Nations. 2013. *The Millennium Development Goals Report*. New York: United Nations.

6   Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

7   Heckman, James J., John Eric Humphries, Greg Veramendi, and Sergio S. Urzua. 2014. "Education, Health, and Wages." *NBER Working Paper 19971*. Cambridge: National Bureau of Economic Research (NBER); Heckman, James J., Jora Stixrud, and Sergio S. Urzua. 2006. "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics* 24 (3): 411–82; Heineck, Guido, and Silke Anger. 2010. "The Returns to Cognitive Abilities and Personality Traits in Germany." *Labour Economics* 17 (3): 535–46; Díaz, Juan José, Omar Arias, and David Vera Tudela. 2012. "Does Perseverance Pay as Much as Being Smart? The Returns to Cognitive and Non-cognitive Skills in Urban Peru." Working paper, World Bank, Washington, DC.; Valerio, Alexandria, María Laura Sánchez Puerta, Namrata Raman Tognatta, and Sebastián Monroy-Taborda. 2016. "Are There Skills Payoffs in Low- and Middle-Income Countries? Empirical Evidence Using Step Data." *Policy Research Working Paper 7879*. Washington, DC: World Bank. *World Development Report: Learning to Realize Education's Promise*. 2018. World Bank.

8   Manpower Group. 2018. "Talent Shortage Survey." Manpower Group.

9   GCE and Handicap International. 2014. "Equal Right, Equal Opportunity: Education and Disability." Johannesburg: Global Campaign for Education (GCE).

10 Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

11 UNESCO. 2016. "Leaving No One Behind: How Far on the Way to Universal Primary and Secondary Education?" *Policy Paper 27/Fact Sheet 37*. Quebec: UIS (UNESCO Institute for Statistics).

12 King, Elizabeth and Rebecca, Winthrop. 2015. "Today's Challenges for Girls' Education." Washington, DC: Brookings Institution; Sperling, Gene B., Rebecca Winthrop, and Christina Kwauk. 2016. *What Works in Girls Education: Evidence for the World's Best Investment*. Washington, DC: Brookings Institution.

13 UIS. 2018. *Handbook on Measuring Equity in Education*. Montreal: UIS (UNESCO Institute for Statistics).

14 Hanushek, Eric A. and Steven G. Rivkin. 2010. "Generalizations about Using Value-Added Measures of Teacher Quality." *American Economic Review* 100 (2): 267-71; Hanushek, Eric A., John F. Kain, Daniel M. O'Brien and Steven G. Rivkin. 2005. "The Market for Teacher Quality." *NBER Working Paper 7082*. Cambridge, MA: National Bureau of Economic Research (NBER); Rockoff, Johah E. 2004. "The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data." *American Economic Review* 94 (2): 247-252; Evans, David K. and Fei Yuan 2018. "Working Conditions of Teachers in Low and Middle-income Countries." *Background paper for the World Bank's 2018 World Development Report: Realizing the Promise of Education for Development*. Unpublished.

15 Béteille, Tara and David K. Evans. 2019."Successful Teachers, Successful Students: Recruiting and Supporting Society's Most Critical Profession." Washington, DC: World Bank ; Chetty, Raj, John Friedman, Jonah Rockoff. 2014. "Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood." *American Economic Revie,* 104 (9): 2593–632; Sanders, William L. and June C. Rivers. 1996. "Cumulative and Residual Effects of Teachers on Future Student Academic Achievement." *Research Progress Report,* Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center

16 Béteille, Tara and David K. Evans. 2019."Successful Teachers, Successful Students: Recruiting and Supporting Society's Most Critical Profession." Washington, DC: World Bank; Hanushek, Eric A. and Steven G. Rivkin. 2010. "Generalizations about Using Value-Added Measures of Teacher Quality." *American Economic Review*, 100 (2): 267-71; Rivkin, Steven G., Eric A. Hanushek, and John F. Kain. 2005. "Teachers, Schools and Student Achievement." *Econometrica, 73* (2), 417-458; Jonah E. Rockoff .2004. "The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data." *American Economic Review, 94* (2), 247-252; Park, Albert and Emily Hannum. 2001."Do Teachers Affect Learning in Developing Countries? Evidence from Matched Student-Teacher Data from China." Paper prepared for the conference "Rethinking Social Science Research on the Developing World in the 21st Century Social Science Research Council," Park City, Utah.

17 Lewis, Ingrid and Sunit Bagree. 2013. "Teachers for All: Inclusive Teaching for Children with Disabilities." Brussels: International Disability and Development Consortium (IDDC).

18 Navarro, F. Masdeu. 2015. "Learning support staff: A literature review." *OECD Education Working Papers*, No. 125. Paris: OECD Publishing.

19   Lehan, Brendan. 2018. "Teacher Community Assistant Initiative: A national pilot for remedial education shows the value of proactive negotiation of evidence-based projects." Evidence in Practice Research Project. New Haven, Connecticut: Yale School of Management; J-PAL. 2006. "Making Schools Work for Marginalized Children: Evidence from an inexpensive and effective program in India." Policy Briefcase No. 2. Cambridge, MA: MIT Poverty Action Lab; Lakshminarayana, Rashmi, Alex Eble, Preetha Bhakta, Chris Frost, Peter Boone, Diana Elbourne, and Vera Mann. 2013. "The support to rural India's public education system (STRIPES) trial: a cluster randomised control led trial of supplementary teaching, learning material and material support." *PLOS One, 8* (7); Navarro, F. Masdeu. 2015. "Learning support staff: A literature review." *OECD Education Working Papers*, No. 125. Paris: OECD Publishing; Blatchford, Peter, Paul Bassett, Penelope Brown, Clare Martin, Anthony Russell and Rob Webster with Selma Babayigit and Naomi Haywood. 2008. "Deployment and Impact of Support Staff in Schools and the Impact of the National Agreement." London: Institute of Education, University of London; Education Endowment Fund. 2019. "Teaching and Learning Toolkit: Teaching assistants." London: Education Endowment Fund; Cajkler, W. and G.Tennant. 2009. "Teaching assistants and pupils' academic and social engagement in mainstream schools: insights from systematic literature reviews." *International Journal of Emotional Education*, 1 (2), 71-90; Ebersold, S. 2003. "Inclusion and mainstream education: an equal cooperation system." *European Journal of Special Needs Education, 18* (1) 89- 107; Deluca, Marcella and Maria Kett. 2016. "The role of Classroom Assistants on teaching practices and on retention of children with disabilities." London: Leonard Chesire. Disability and Inclusive Development Centre at University College London; Lewis, Ingrid and Sunit Bagree. 2013. "Teachers for All: Inclusive Teaching for Children with Disabilities." Brussels: International Disability and Development Consortium (IDDC).

20   Littlecott, Hannah J., Graham F. Moore and Simon M. Murphy. 2018. "Student health and well-being in secondary schools: the role of school support staff alongside teaching staff." *Pastoral Care in Education*, *36* (4): 297-312; J. Bishop, B. A. Whitear and S. Brown. 2001. "A review of substance use education in fifty secondary schools in South Wales." *Health Education Journal 60* (2): 164–172; Pound, P., R. Langford, and R. Campbell. 2016. "What do young people think about their school-based sex and relationship education? A qualitative synthesis of young people's views and experiences." *BMJ Open 6* (9).

21   Leithwood, K. and D. Jantzi. 2006. "Linking leadership to student learning: the contribution of leader efficacy." *Educational Administration Quarterly* 44 (4): 496-528.

22   Christopher, Day and Pamela Sammons. 2013. "Successful leadership: a review of the international literature." Reading: Education Development Trust; Robinson, Viviane M.J. and Helen S. Timperley. 2007. **"**The Leadership of the Improvement Teaching and Learning: Lessons from Initiatives with Positive Outcomes for Students**."** *Australian Journal of Education, 51* (3); UNESCO. 2016. "Leading Better Learning: School leadership and quality in the Education 2030 agenda: Regional reviews of policies and practices." Paris: UNESCO; New Leaders for New Schools. 2009. "Principal effectiveness: a new principalship to drive student achievement, teacher effectiveness, and school turnarounds." New York: NLNS.

23   STIR and ID insight. 2018. "Impact of STIR's programming on teacher motivation and student learning: Endline report." IDinsight; Kotze, J., B. Fleisch and S. Taylor. 2019. "Alternative forms of early grade instructional coaching: Emerging evidence from field experiments in South Africa." *International Journal of Educational Development, 6 6*(1), 203-213; Coffey. 2017. "Endline Evaluation Report: Step change window." Coffey. EDT. "Let All Girls Learn: A Case Study in Successful Educational Reform." Reading: Education Development Trust; Lewis, Ingrid and Sunit Bagree. 2013. "Teachers for All: Inclusive Teaching for Children with Disabilities." Brussels: International Disability and Development Consortium (IDDC).

24   Leithwood, Kenneth. 2013. "Strong Districts and Their Leadership." Toronto, Ontario: The Institute for Education Leadership; McAleavy, Tony, Alex Elwick and Alex Hall-Chen. 2018. "Sustaining success: high-performing government schools in London." Reading: Education Development Trust (EDT).

25   Pritchett, Lant. 2015. "RISE Working paper: Creating Education Systems Coherent for Learning Outcomes."; Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

26   Darling-Hammond, Linda, Dion Burns, Carol Campbell, A. Lin Goodwin, Karen Hammerness, Ee-Ling Low, Ann McIntyre, Mistilina Sato and Ken Zeichner. 2017. *Empowered Educators: How High-Performing Systems Shape Teaching Quality Around the World.* San Francisco, CA: Jossey-Bass.

27   Mourshed, Mona, Michael Barber, M. and Chinezi Chijoke. 2010. "How the world's most improved school systems keep getting better." Washington, DC: McKinsey & Company.

28   UIS. 2016. "The World Needs Almost 69 Million New Teachers to Reach the 2030 Education Goals." *UIS Fact Sheet 39*. Montreal: UNESCO Institute for Statistics (UIS).

29   Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*, 70. New York, New York: International Commission on Financing Global Education Opportunity.

30   Ingvarson, Lawrence, John Schwille, Maria Teresa Tatto, Glenn Rowley, Ray Peck, and Sharon L. Senk. "An Analysis of Teacher Education Context, Structure and Quality-Assurance Arrangements in TEDS-M Countries: Findings from the IEA Teacher Education and Development Study in Mathematics and Science." Amsterdam: International Association for the Evaluation of Educational Achievement (IEA).

31   OECD. 2018. "In which countries do the most highly qualified and experienced teachers teach in the most difficult schools?" *PISA in Focus 85*. Paris: OECD.

32   Mulkeen, Aiden, William Ratteree and Ilse Voss-Lengnik. 2017. „Teachers and teacher policy in primary and secondary education." Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

33   Mulkeen, Aiden and Nuala Crowe-Taft. 2010. "Teacher attrition in Sub-Saharan Africa: The neglected dimension of the teacher supply challenge." Paris: International Task Force on Teachers for EFA.

34   UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

35   Bold, Tessa, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Jakob Svensson, and Waly Wane. 2016. "What Do Teachers Know and Do in Primary Schools in Sub-Saharan Africa?" Washington, DC: World Bank.

36   Naylor, Ruth and Yusuf Sayed. 2014. "Teacher quality: evidence review." Canberra: Department of Foreign Affairs and Trade (DFAT).

37   Mulkeen, Aiden, William Ratteree and Ilse Voss-Lengnik. 2017. „Teachers and teacher policy in primary and secondary education." Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); Lewin, K.M. and J.S. Stuart. 2003. "Researching teacher education: new perspectives on practice, performance and policy, Multi-Site Teacher Education Research Project (MUSTER). Synthesis Report." London: Department for International Development; Sayed, Yusuf. 2011. "Initial and Further Teacher Education and Training" in B. Ratteree, *Handbook on Human Resource Toolkit of Good Practices for the Teaching Profession*. Geneva: International Labor Organization (ILO).

38   Mulkeen, Aiden. 2010. *Teachers in Anglophone Africa: Issues in Teacher Supply, Training and Management*. Washington, DC: World Bank.

39   Popova, Anna, David K. Evans, and Violeta Arancibia. 2016. "Training Teachers on the Job: What Works and How to Measure It." *Background Paper to the 2018 World Development Report*. Washington, DC: World Bank.

40   Orr, D., J. Westbrook, J. Pryor, N. Durrani, J. Sebba, and C. Adu-Yeboah. 2013. "What are the impacts and cost-effectiveness of strategies to improve performance of untrained and under-trained teachers in the classroom in developing countries? Systematic review." London: EPPI-Centre, Social Science Research Centre, Institute of Education, University of London.

41   Chaudhury, Nazmul, Jeffrey Hammer; Michael Kremer, Karthik Muralidharan and F. Halsey Rogers. 2006. "Missing in Action: Teacher and Health Worker Absence in Developing Countries." *Journal of Economic Perspectives, 20* (1), pp. 91-116; Bennell, P., K. Hyde and N. Swainson. 2002. "The impact of HIV/AIDS epidemic on the education sector in sub-Saharan Africa: a synthesis of the findings and recommendations of three country studies." Brighton: Centre for International Education, University of Sussex; Kremer, M., N. Chaudhury, F.H. Rogers, K. Muralidharan, J. Hammer. 2005. "Teacher absence in India: a snapshot." *Journal of the European Economic Association 3*: 658–667; Alcázar, L., H. Rogers, N. Chaudhury, J. Hammer, M. Kremer, K. Muralidharan. 2006. "Why are teachers absent? Probing service delivery in Peruvian primary schools." *International Journal of Educational Research* 45 (3):117–136.

42   Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

43   Bold, Tessa, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Jakob Svensson, and Waly Wane. 2016. "What Do Teachers Know and Do in Primary Schools in Sub-Saharan Africa?" Washington, DC: World Bank.

44   Nazmul, Chaudhury, Jeffrey Hammer, Michael Kremer, Karthik Mularidharan and Halsey Rogers. 2004. "Roll call: Teacher Absence in Bangladesh." *Working Paper 47043*. Washington DC: World Bank; Bennell, P., K. Hyde, N. Swainson. 2002. "The impact of HIV/AIDS epidemic on the education sector in sub-Saharan Africa: a synthesis of the findings and recommendations of three country studies." Brighton: Centre for International Education, University of Sussex; Alcázar, L., H. Rogers, N. Chaudhury, J. Hammer, M. Kremer, K. Muralidharan. 2006. "Why are teachers absent? Probing service delivery in Peruvian primary schools." *International Journal of Educational Research* 45 (3):117–136; Kremer, M., N. Chaudhury, F.H. Rogers, K. Muralidharan, J. Hammer. 2005. "Teacher absence in India: a snapshot." *Journal of the European Economic Association 3*: 658–667; Glewwe, Paul, Nauman Ilias, and Michael Kremer. 2010. "Teacher Incentives." *American Economic Journal: Applied Economic*s 2: 205-227; Bradley, S., C. Green, and G. Leeves. 2007. "Worker Absence and Shirking: Evidence from Matched Teacher-School Data." Labour Economics 14 (3): 319-334.

45   Azim Premji Foundation Research Group. 2017. "Teacher Absenteeism Study." *Azim Premji University Field Studies in Education Series*. Bengaluru: Azim Premji Foundation.

46   OECD. 2014. "Indicator D4: How much time do teachers spend teaching?" *Education at a Glance 2014: OECD Indicators*. Paris: OECD Publishing.

47   Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

48   Elvers, Jelmer and René Kneyber, Eds. 2016. *Flip the System: Changing Education from the Ground Up*. York: Routledge.

49   World Bank. 2018. *World Development Report: Learning to Realize Education's Promise*. Washington DC: World Bank.

50   Schleicher, Andreas. 2011. *Building a High-Quality Teaching Profession: Lessons from around the World.* Paris: OECD Publishing.

51   Cambridge Education. 2018. *World's Biggest Teaching Survey Results!*. Cambridge: Cambridge University Press.

52   Schleicher, Andreas. 2011. *Building a High-Quality Teaching Profession: Lessons from around the World.* Paris: OECD Publishing.

53   Data from UIS (UNESCO Institute for Statistics).

54   Kirk, Jackie. 2006. "The Impact of Women Teachers on Girls' Education - Advocacy Brief." Bangkok: UNESCO Bangkok.

55   Vaillant, Denise. 2015. "School leadership, Trends in Policies and Practices, and Improvement in the Quality of Education." Paris: UNESCO; UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments*. Paris: UNESCO; UNESCO. 2016. "Leading better learning: School leadership and quality in the Education 2030 agenda." Paris: UNESCO.

56   OECD. 2014. *New Insights from TALIS 2013: Teaching and Learning in Primary and Upper Secondary Education.* Paris: OECD Publishing.

57   Education International. 2019. "Off Track: Educators Assess Progress Towards SDG 4." Brussels: Education International.

58   Robinson, Ken and Lou Aronica. 2015. *Creative Schools: The Grassroots Revolution That's Changing Education*. New York: Viking.

59   UIS. 2016. "UIS Teacher Fact Sheet." Montreal: UIS (UNESCO Institute for Statistics).

60   Custer, Samantha, Elizabeth M. King, Tamar Manuelyan Atinc, Lindsay Read, Tanya Seth. 2018. "Toward data-driven education systems: How leaders use information to measure results and manage change." Washington, DC: Center for Universal Education, Brookings Institution.

61   Custer, Samantha, Elizabeth M. King, Tamar Manuelyan Atinc, Lindsay Read, Tanya Seth. 2018. "Toward data-driven education systems: How leaders use information to measure results and manage change." Washington, DC: Center for Universal Education, Brookings Institution.

62   Schleicher, Andreas. 2018. *World Class: How to Build a 21st-Century School System, Strong Performers and Successful Reformers in Education*. Paris: OECD Publishing.

63   Friedman, Thomas L. 2016. *Thank You for Being Late: An Optimist's Guide to Thriving in the Age of Acceleration.* New York: Farrar, Straus and Giroux.

64 World Bank's *Global Monitoring Report: Development in an Era of Demographic Change*; United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key findings and advance tables. ESA/P/WP/248; United Nations Population Fund. World Population Trends. 2017.; United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, Key findings and advance tables; United Nations, *World Urbanization Prospects: The 2018 Revision*

65 OECD. 2019. *Trends Shaping Education 2019*. Paris: OECD Publishing.

66 United Nations Environment Programme. 2018. "Climate Change Annual Report 2018: Putting the environment at the heart of people's lives." Nairobi: United Nations Environment Programme.

67 OECD. 2019. *Trends Shaping Education 2019*. Paris: OECD Publishing.

68 Schleicher, Andreas. 2011. *Building a High-Quality Teaching Profession: Lessons from around the World.* Paris: OECD Publishing.

69 UNICEF. 2013. *Improving Child Nutrition: The achievable imperative for global progress.* New York: UNICEF.

70 World Bank. 2018. *World Development Report 2018: Learning to Realize Education's Promise*. Washington, DC: World Bank.

71 Care, Esther, Helyn Kim, Kate Anderson, and Emily Gustafsson-Wright. 2017. "Skills for a Changing World: National Perspectives and the Global Movement." Washington, DC: Brookings Institution.

72 OECD. 2018. "Future of Education and Skills: Education 2030." Paris: OECD Publishing.

73 Schleicher, Andreas. 2018. "Valuing Our Teachers and Raising their Status: How Communities Can Help." International Summit on the Teaching Profession. Paris: OECD Publishing.

74 OECD. 2013. *Innovative Learning Environments*. Educational Research and Innovation. Paris: OECD Publishing.

75 OECD. 2015. *Schooling Redesigned: Towards Innovative Learning Systems*. Paris: Educational Research and Innovation, OECD.

76 Wild , Leni and Matt Andrews. 2016. "Doing development differently: Who we are, what we're doing, what we're learning." London: Overseas Development Institute (ODI); PCAST. 2012. "Transformation and Opportunity: The Future of the US Research Enterprise, Report to the President." Washington, DC: The President's Council of Advisors on Science and Technology (PCAST), Executive Office of the President.

77 The Insight Group, Ltd. 2014. "Employee Engagement." *White Paper*. The Insight Group.

78 Hargreaves, Andy and Michael Fullan. 2012. *Professional capital: Transforming the teaching in every school*. New York: Teachers College Press.

79 OECD. 2016. "What makes a school a learning organisation? A guide for policy makers, school leaders and teachers." Paris: OECD Publishing.

80 Kools, Marco and Louise Stoll. 2017. "What Makes a School a Learning Organisation?" *OECD Education Working Papers, No.137*. Paris: OECD Publishing.

81 Donohoo, Jenni, John Hattie and Rachel Eells. 2018. "The Power of Collective Efficacy." *Educational Leadership 75* (6): 40-44.

82 World Bank. 2018. *World Development Report 2018: Learning to Realize Education's Promise*. Washington, DC: World Bank; Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

83 Wesley, P. W. and V. Buysse. 2004. "Consultation as a framework for productive collaboration in early intervention." *Journal of Educational & Psychological Consultation, 15* (2), 127-150; Bruder, M. B. 2010. "Early childhood intervention: A promise to children and families for their future." *Exceptional Children, 76* (3), 339-355 as referenced in Flottman, Rachel, Amy KcKernan and Collette Tayler. "Evidence Paper Practice Principle 2: Partnerships with Professionals." Melbourne: Melbourne Graduate School of Education.

84 D'Amour, Danielle, Marcela Ferrada-Videla, Leticia San Martin Rodriguez, and Marie-Dominique Beaulieu. 2009. "The conceptual basis for interprofessional collaboration: Core concepts and theoretical frameworks." *Journal of Interprofessional Care 19* (1):116-31.

85 Bourgeault, Ivy Lynn, Ellen Kuhlmann, Elena Neiterman, and Sirpa Wrede. 2008. "How can optimal skill mix be effectively implemented and why?" Policy Brief. Geneva: World Health Organization (WHO).

86 Fullan, Michael and Andy Hargreaves. 2016. "Call to Action: Bringing the Profession Back In." Oxford, OH: Learning Forward.

87 Bryk, Anthony, Louis M. Gomez, Alicia Grunow, and Paul G. Le Mahieu. 2015. *Learning to Improve: How America's Schools Can Get Better at Getting Better*. Boston: Harvard Education Press.

88 OECD. 2003. *Networks of Innovation: Towards New Models for Managing Schools and Systems*. Center for Educational Research and Innovations (CERI). Paris: OECD Publishing.

89 OECD. 2015. *Schooling Redesigned: Towards Innovative Learning Systems.* Paris: Educational Research and Innovation, OECD.

90 Bryk, Anthony, Louis M. Gomez, Alicia Grunow, and Paul G. Le Mahieu. 2015. *Learning to Improve: How America's Schools Can Get Better at Getting Better*. Boston: Harvard Education Press.

91 Bryk, Anthony, Louis M. Gomez, Alicia Grunow, and Paul G. Le Mahieu. 2015. *Learning to Improve: How America's Schools Can Get Better at Getting Better*. Boston: Harvard Education Press.

92 Istance, David and Alejandro Paniagua. 2019. "Learning to Leapfrog: Innovative Pedagogies to Transform Education." Washington, DC: Center for Universal Education at the Brookings Institution.

93 Winthrop, Rebecca with Adam Barton and Eileen McGivney. 2018. *Leapfrogging Inequality: Remaking Education to Help Young People Thrive.* Center for Universal Education. Washington, DC: Brookings Institution.

94 Bennell, Paul and Kwame Akyeampong. 2007. "Teacher motivation in Sub-Saharan Africa and South Asia.*"* Education Papers No. 71. London: DFID (Department for International Development).

95 UIS (UNESCO Institute for Statistics). 2006. "Teachers and educational quality: Monitoring global needs for 2015." Montreal: UIS.

96 Liu, Edward and Susan Moore Johnson. 2006. New Teachers' Experiences of Hiring: Late, Rushed, and Information-Poor." Salt Lake City: *Educational Administration Quarterly* 42 (3): 324-360.

97 Haugen, Caitlin, Steven J. Klees, Nelly Stromquist, Jing Lin, Truphena Choti, and Carol Corneilse. 2014. "Increasing the number of female primary school teachers in African countries: effects, barriers, and policies." *International Review of Education* 60 (6): 753-776; OECD (Organization for Economic Cooperation and Development). 2017. "Core skills for public sector innovation: A beta model of skills to promote and enable innovation in public sector organisations." Paris: OECD Publishing; Nesta. 2017. *What are the skills and attitudes for successful public problem solving?.* Available at: https://media.nesta.org.uk/images/nesta_pps_competency_framework_june2017_line1.width-1200.png; Leithwood, Kenneth. 2013. "Strong Districts & Their Leadership." Toronto: Ontario Institute of Education Leadership.

98 Best, Alice, Barbara Tournier, and Chloé Chimier. 2018. "Topical questions on teacher management." Paris: UNESCO IIEP.

99 Klassen, Robert Mark and Lisa Kim. 2019. "Selecting teachers and prospective teachers: A meta-analysis." *Education Research Review* 26: 32-51.

100 Bowles, Terry, John Hattie, Stephen Dinham, Janet Scull, and Janet Clinton. 2014. "Proposing a comprehensive model for identifying teaching candidates." *The Australian Education Researcher* 41 (4): 365-380.

101 Sabel, Jon-Mark. 2017. "5 Teacher Recruitment Best Practices From Atlanta Public Schools." Hire Vue. Available at: https://www.hirevue.com/blog/5-teacher-recruitment-best-practices-from-atlanta-public-schools

102 Estrada, Ricardo. 2017. "Rules vs. Discretion in Public Service: Teacher Hiring in Mexico." *Working Paper No. 2017/11*. Buenos Aires: CAF(Corporación Andina de Fomento)- Development Bank of Latin America.

103 OECD (Organization for Economic Cooperation and Development). 2017. "Core skills for public sector innovation: A beta model of skills to promote and enable innovation in public sector organisations." Paris: OECD Publishing; Nesta. 2017. *What are the skills and attitudes for successful public problem solving?.* Available at: https://media.nesta.org.uk/images/nesta_pps_competency_framework_june2017_line1.width-1200.png; Leithwood, Kenneth. 2013. "Strong Districts & Their Leadership." Toronto: Ontario Institute of Education Leadership.

104 Maheen, Fasi Zaka. 2018. "Five Years of Education Reforms: Wins, losses and challenges for 2018-2023." Islamabad: Alif Ailaan.

105 Naylor, Ruth, Charlotte Jones, and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

106 EDT (Education Development Trust). 2017. "System Leadership in Developing Country Contexts (NLE Playbook Parts 1, 2 & 3)." PowerPoint presentation. Accessed 5 December 2018.

107 Data from UIS (UNESCO Institute for Statistics).

108 Arias, Omar, David K. Evans and Indhira Santos. 2019. *The Skills Balancing Act in Sub-Saharan Africa: Investing in Skills for Productivity, Inclusivity, and Adaptability*. Washington, DC: World Bank.

109 Data from UIS (UNESCO Institute for Statistics).

110 GPE (Global Partnership for Education). 2017. "How GPE supports teaching and learning." *Policy Brief September 2017.* Washington DC: GPE.

111 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

112 Banerjee, Abhijit, Shawn Cole, Esther Duflo, and Leigh Linden. 2007. "Remedying Education: Evidence from Two Randomized Experiments in India." Quarterly Journal of Economics 122(3):1235–1264, Karthik Muralidharan and Venkatesh Sundararaman 2010. "The Impact of Diagnostic Feedback to Teachers on Student Learning: Experimental Evidence from India." *The Economic Journal 120* (546); Esther Duflo, Pascaline Dupas, and Michael Kremer. 2015. "School Governance, Teacher Incentives, and Pupil-Teacher Ratios: Experimental Evidence from Kenyan Primary Schools." *Journal of Public Economics 123* (C):92-11; Geeta Kingdon, Monazza Aslam, Shenila Rawal, Sushmita Das. 2012. "Are contract and para-teachers a cost effective intervention to address teacher shortages and improve learning outcomes?" London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

113 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

114 UNESCO. 2014. *Teaching and learning: Achieving quality for all. EFA Global Monitoring Report 2013-14*. Paris: UNESCO.

115 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

116 Crisp, Martin, Kimberly Safford, and Freda Wolfenden. 2017. "It takes a village to raise a teacher: The Learning Assistant programme in Sierra Leone." The Open University and Plan International.

117 Mulkeen, Aiden. 2010. *Teachers in Anglophone Africa: Issues in Teacher Supply, Training and Management.* Washington, DC: World Bank.

118 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

119 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

120 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); Mulkeen, Aiden. 2010. *Teachers in Anglophone Africa: Issues in Teacher Supply, Training and Management.* Washington, DC: World Bank.

121 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

122 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

123 Barrett, A.M., V. Gardner, M. Joubert, and L. Tikly. 2019. "Approaches to Strengthening Secondary Stem & ICT Education in Sub-Saharan Africa." University of Bristol. Background Paper for *Secondary Education in Africa: Preparing Youth for the Future of Work.* Toronto: Mastercard Foundation.

124 Lewis, Ingrid and Sunit Bagree. 2013. "Teachers for All: Inclusive Teaching for Children with Disabilities." Brussels: International Disability and Development Consortium (IDDC).

125 UNESCO. 2014. *Education for All Global Monitoring Report: Teaching and learning: Achieving quality for all.* Paris: UNESCO.

126 Mulkeen, Aiden. 2010. *Teachers in Anglophone Africa: Issues in Teacher Supply, Training and Management.* Washington, DC: World Bank.

127 Akyeampong, Kwame. 2017. "Teacher Educators' Practice and Vision of Good Teaching in Teacher Education Reform Context in Ghana." *Educational Researcher* (46) 4: 194-203.

128 Mulkeen, Aiden and Nuala Crowe-Taft. 2010. "Teacher attrition in sub-Saharan Africa: The neglected dimension of the teacher supply challenge." Paris: International Task Force on Teachers for EFA.

129 OECD. 2019. *A Flying Start: Improving Initial Teacher Preparation Systems*. Paris, France: OECD Publishing.

130 Wolfenden, Freda, Alison Buckler, Cristina Santos, and Jenna Mittelmeier. 2018. "Re-envisioning and Strengthening the Education Workforce: Initial Literature Review." Milton Keynes: The Open University.

131 Taylor, Nick and Natasha Robinson. 2019. "Secondary Education in Sub-Saharan Africa: Teacher Preparation and Support: Literature Review." JET Education Services. Background Paper for *Secondary Education in Africa: Preparing Youth for the Future of Work*. Toronto: Mastercard Foundation.

132 Mastercard Foundation. 2019. Forthcoming: *Secondary Education in Africa: Preparing Youth for the Future of Work*. Toronto: Mastercard Foundation.

133 OECD. 2019. *A Flying Start: Improving Initial Teacher Preparation Systems*. Paris, France: OECD Publishing.

134 UNESCO. 2016. *A review of evaluative evidence on teacher policy.* Paris: UNESCO.

135 Taylor, Nick, Roger Deacon and Natasha Robinson. 2019. "Secondary Level Teacher Education in Sub-Saharan Africa: Teacher Preparation and Support." JET Education Services. Background paper for *Secondary Education in Africa: Preparing Youth for the Future of Work*. Toronto: Mastercard Foundation.

136 Mulkeen, Aiden, David W. Chapman, Joan DeJaeghere, and Elizabeth Leu. 2007. "Recruiting, Retaining and Retraining Secondary School Teachers and Principals in Sub-Saharan Africa." *World Bank Working Paper No. 99*. Washington, DC: World Bank.

137 World Bank. 2018. *World Development Report: Learning to Realize Education's Promise*. Washington DC: World Bank.

138 Popova, Anna, David K. Evans, and Violeta Arancibia. 2016. "Training Teachers on the Job: What Works and How to Measure It." *Background Paper to the 2018 World Development Report*. Washington, DC: World Bank.

139 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

140 Lewis, Ingrid and Sunit Bagree. 2013. "Teachers for All: Inclusive Teaching for Children with Disabilities." IDDC (International Disability and Development Consortium).

141 Ekins, Alison, Hannu Savolainen, and Petra Engelbrecht. 2016. "An analysis of English teachers' self-efficacy in relation to SEN and disability and its implications in a changing SEN policy context." *European Journal of Special Needs Education (31)* 2: 236-249.

142 Akyeampong, Kwame, Kattie Lussier, John Pryor, and Jo Westbrook. 2013. "Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count?" *International Journal of Educational Development (33)* 3: 272–282.

143 Pryor, John, Kwame Akyeampong, Jo Westbrook, and Kattie Lussier. 2012. "Rethinking teacher preparation and professional development in Africa: an analysis of the curriculum of teacher education in the teaching of early reading and mathematics. *The Curriculum Journal (23)* 4: 409–502.

144 OECD. 2014. "Indicator D6: What does it take to become a teacher?" *Education at a Glance 2014: OECD Indicators*. Paris: OECD Publishing.

145 Evans, David and Anna Popova. 2015. "What Really Works to Improve Learning in Developing Countries? An Analysis of Divergent Findings in Systematic Reviews." *Policy Research Working Paper 7203*. Washington, DC: World Bank.

146 Mukeredzi, Tabitha Grace, Nonhlanhla Mthiyane, and Carol Bertram. 2015. "Becoming professionally qualified: The school-based mentoring experiences of part-time PGCE students." *South African Journal of Education (35)* 2: 1-9.

147 Musingafi, Maxwell Constantine Chando and Rachael Mafumbabte, 2014. "Challenges and prospects for school based mentoring in the professional development of student teachers in Zimbabwe: Academics, mentees and mentors perceptions." *Asian Journal of Economics and Empirical Research (1)* 2: 32-39

148 Wolfenden, Freda, Alison Buckler, Cristina Santos, and Jenna Mittelmeier. 2018. "Re-envisioning and Strengthening the Education Workforce: Initial Literature Review." Milton Keynes: The Open University.

149 Wolfenden, Freda, Simon Cross, and Fiona Henry. 2017. "MOOC Adaptation and Translation to Improve Equity in Participation." *Journal of Learning Development (4)* 2.

150 Mulkeen, Aiden, William Ratteree, and Ilse Voss-Lengnik. 2017. "Teachers and teacher policy in primary and secondary education." *Discussion Paper Education*. Bonn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

151 McAleavy, Tony, Alex Hall-Chen, Sarah Horrocks, and Anna Riggall. 2018. *Technology-supported professional development for teachers: lessons from developing countries*. Reading: Education Development Trust.

152 McAleavy, Tony, Alex Hall-Chen, Sarah Horrocks and Anna Riggall. 2018. "Technology-supported professional development for teachers: lessons from developing countries." Reading: Education Development Trust.

153 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

154 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

155 De, Sourovi, Gunilla Pettersson, Robert Morris, and Stuart Cameron. 2016. "Teacher Development Programme (TDP): Impact Evaluation of Output 1: In-Service Training." *Final Baseline Technical Report*. EDOREN (Education Data, Research and Evaluation in Nigeria).

156 Global School Leaders. "Global School Leaders Introduction." Available at: https://www.globalschoolleaders.org/read-me-1-1-2/

157 Ingersoll, Richard M. 2004. "Why Do High-Poverty Schools Have Difficulty Staffing Their Classrooms with Qualified Teachers?" Washington, DC: Center for American Progress.

158 UNESCO. 2014. *Education for All Global Monitoring Report: Teaching and learning: Achieving quality for all.* Paris: UNESCO.

159 Mott MacDonald. 2018. "Transforming Teacher Education and Learning: Evidence of Impact from Ghana." Presentation at CIES 2018. Mexico City: CIES (Comparative and International Education Society).

160 Naylor, Ruth, Charlotte Jones, and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

161 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

162 UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

163 Loyalka, Prashant, Anna Popova, Guirong Li, Chengfang Liu, and Henry Shi. 2017. "Unpacking teacher professional development." *REAP Working Paper*. Stanford: Stanford University, Freeman Spogli Institute for International Studies; Orr, D., Westbrook, J., Pryor, J., Durrani, N., Sebba, J., and Adu-Yeboah, C. 2013. "What are the impacts and cost-effectiveness of strategies to improve performance of untrained and under-trained teachers in the classroom in developing countries? Systematic review." London: EPPI- Centre, Social Science Research Centre, Institute of Education, University of London.

164 Istance, David and Alejandro Paniagua. 2019. "Learning to Leapfrog: Innovative Pedagogies to Transform Education." Washington, DC: Center for Universal Education at the Brookings Institute.

165 Popova, Anna, David K. Evans, and Violeta Arancibia. 2016. "Training Teachers on the Job: What Works and How to Measure It." *Background Paper to the 2018 World Development Report*. Washington, DC: World Bank.

166 Popova, Anna, David K. Evans, and Violeta Arancibia. 2016. "Training Teachers on the Job: What Works and How to Measure It." *Background Paper to the 2018 World Development Report*. Washington, DC: World Bank.

167 Coffey. 2017. "Endline Evaluation Report: Step change window." Coffey. Education Development Trust (EDT).

168 USAID. 2017. "Tusome External Evaluation Midline Report of the Tusome Activity in Kenya." Washington, DC: USAID (United States Agency for International Development).

169 Kraft, Matthew, David Blazar, and Dylan Hogan. 2016. "The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence." *Brown University Working Paper*. Providence: Brown University.

170 Naylor, Ruth, Charlotte Jones, and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

171 Bruns, Barbara, Leonardo Costa, and Nina Cunha. 2017. *Through the Looking Glass: Can Classroom Observation and Coaching Improve Teacher Performance in Brazil? Policy Research Working Paper 8156.* Washington, DC: World Bank.

172 Piper, Benjamin and Stephanie Simmons Zauilkowski. 2015. "Teacher coaching in Kenya: Examining instructional support in public and nonformal schools. *Teaching and Teacher Education (47)*: 173-183.

173 Cilliers, Jacobus, Brahm Fleisch, Cas Prinsloo, and Stephen Taylor. 2018. "How to Improve Teaching Practice? Experimental Comparison of Centralized Training and In-classroom Coaching." *RISE Working Paper*. Oxford: RISE (Research on Improving Systems of Education).

174 Kotze, Janeli, Brahm Fleisch, and Stephen Taylor. 2019. "Alternative forms of early grade instructional coaching: Emerging evidence from field experiments in South Africa." *International Journal of Education Development (66)*: 203-213.

175 McAleavy, Tony, Alex Hall-Chen, Sarah Horrocks, and Anna Riggall. 2018. *Technology-supported professional development for teachers: lessons from developing countries*. Reading: Education Development Trust.

176 Ibrahim, Mikailu, Nurudeen Lawal, and Fatimata Seye Sylla. 2018. "Improving Reading and Numeracy Outcomes in Nigeria through Strategic Trust Building." *Journal of Childhood Education 94* (3): 25-32.

177 Wolfenden, Freda, Alison Buckler, Cristina Santos, and Jenna Mittelmeier. 2018. "Re-envisioning and Strengthening the Education Workforce: Initial Literature Review." Milton Keynes: The Open University.

178 Reference: Naylor, Ruth, Charlotte Jones and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

179 Snilstveit, Birte, Jennifer Stevenson, Daniel Phillips, Martina Vojtkova, Emma Gallagher, Tanja Schmidt, Hannah Jobse, Maisie Geelen, Maria Grazia Pastorello, and John Eyers. 2015. "Interventions for improving learning outcomes and access to education in low- and middle- income countries: a systematic review." *3ie Systematic Review 24*. London: International Initiative for Impact Evaluation (3ie).

180 English in Action. 2015. "English Proficiency Assessments of Primary and Secondary Teachers and Students Participating in English in Action: Third Cohort (2014)." Dhaka: English in Action.

181 Strigel, Carmen. "Mobile resources to promote teacher efficacy in teaching children with disabilities in Ethiopia." Presentation at CIES 2018. Mexico City: CIES (Comparative and International Education Society).

182 Kremer, Michael, Esther Duflo, and Pascaline Dupas. 2011. "Peer Effects, Teacher Incentives, and the Impact of Tracking: Evidence from a Randomized Evaluation in Kenya." *American Economic Review (101)* 5: 1739-74; Abhijit Banerjee, Rukmini Banerji, James Berry, Esther Duflo, Harini Kannan, Shobhini Mukerji, Marc Shotland, and Michael Walton. 2016. "Mainstreaming an Effective Intervention: Evidence from Randomized Evaluations of "Teaching at the Right Level" in India." *NBER Working Paper 22746*. Cambridge: National Bureau of Economic Research (NBER).

183 Kremer, Michael, Conner Brannen, and Rachel Glennerster. 2013. "The Challenge of Education and Learning in the Developing World." *Science (340)* 6130: 297-300.

184 World Bank. 2018. *World Development Report: Learning to Realize Education's Promise*. Washington DC: World Bank.

185 Kini, Tara and Anne Podolsky. 2016. *Does teaching experience increase teaching effectiveness? A review of the research*. Palo Alto: Learning Policy Institute.

186 Crehan, Lucy. 2016. *Exploring the impact of career models on teacher motivation*. Paris: UNESCO IIEP.

187 Crehan, Lucy. 2016. *Exploring the impact of career models on teacher motivation*. Paris: UNESCO IIEP.

188 GPE. 2017. "Transforming teaching in Kenya." Available at: https://www.globalpartnership.org/blog/transforming-teaching-kenya

189 UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

190 Rossiter, Brian. 2017. "Accountability: How Some Schools are Gaming the System." Available at: http://www.sec-ed.co.uk/blog/accountability-how-some-schools-are-gaming-the-system; Smith, W.C. 2016. "Exploring accountability: national testing policies and student achievement" in Burns, T. and Köster, F. (Eds), *Governing Education in a Complex World*. Paris: OECD (Organization for Economic Co-operation and Development).

191 Snilsveit, B., Stevenson, J., Menon, R., Phillips, D., Gallagher, E., Geleen, M., Jobse, H., Schmidt, T. and Jimenez, E. 2016. "The Impact of Education Programmes on Learning and School Participation in Low- and Middle-Income Countries: A Systematic Review Summary Report." *3ie Systematic Review Summary 7*. London: International Initiative for Impact Evaluation (3ie).

192 UNESCO. 2015. "Teaching Careers in Latin America: Merit-Based Measures for Professional Development." Santiago: OREALC/UNESCO; Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

193 Vaillant, Denise. 2015. "School leadership, trends in policies and practices, and improvement in the quality of education." *Background Paper for EFA Global Monitoring Report 2015*. Paris: UNESCO; UNESCO. 2016. *Leading better learning: School leadership and quality in the Education 2030 agenda*. Paris: UNESCO; UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

194 OECD. 2014. *New Insights from TALIS 2013: Teaching and Learning in Primary and Upper Secondary Education.* Paris: OECD Publishing. OECD 2014

195 Wolfenden, Freda, Alison Buckler, Cristina Santos, and Jenna Mittelmeier. 2018. "Re-envisioning and Strengthening the Education Workforce: Initial Literature Review." Milton Keynes: The Open University.

196 Moyo, D., C.D. Mupande, S.P Musara, and S. Shumba. 2001. "School supervision in Zimbabwe" in *School Supervision in Four African Countries. Volume 2. National Diagnoses*. Paris: UNESCO IIEP.

197 UNESCO. 2014. *Global Education Monitoring Report: Teaching and learning: Achieving quality for all.* Paris, France: UNESCO

198 Bold, Tessa, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Jakob Svensson, and Waly Wane. 2016. "What Do Teachers Know and Do in Primary Schools in Sub-Saharan Africa?" Washington, DC: World Bank.

199 UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

200 Transparency International. 2013. "Global Corruption Report: Education." New York: Routledge.

201 World Bank. 2016. "Teacher management 2.0: improving teacher deployment in Malawi." Washington, DC: World Bank.

202 Pathways for Prosperity Commission on Technology and Inclusive Development. 2019. *Positive disruption: Health and education in a digital age*. Oxford: Blavatnik School of Government, University of Oxford.

203 Global Partnership for Education. 2017. "How GPE supports teaching and learning." *Policy Brief September 2017*. Washington, DC: Global Partnership for Education (GPE).

204 Bruns, Barbara, Leonardo Costa, and Nina Cunha. 2017. *Through the Looking Glass: Can Classroom Observation and Coaching Improve Teacher Performance in Brazil? Policy Research Working Paper 8156.* Washington, DC: World Bank.

205 UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

206 Zeitlin, Andrew, Lawrence Bategeka, Madina Guloba, Ibrahim Kasirye, and Frederick Mugisha. 2011. "Management and motivation in Ugandan primary schools: Impact evaluation final report." London, Department for International Development (DFID); Jephter Mwanza and Nina Ghambi. 2011. "The community scorecard process: methodology, use, successes, challenges and opportunities." London, International Institute for Environment and Development; Moussa Blimpo and David K. Evans. 2013. "School-based management and educational outcomes: lessons from a randomized field experiment. Washington, DC: World Bank.

207 Fullan, Michael, Santiago Rincón-Gallardo, and Andy Hargreaves. 2015. "Professional Capital as Accountability." *Education Policy Analysis Archives (23)* 15: 1- 17.

208 The Insight Group, Ltd. 2014. "Employee Engagement". White Paper. The Insight Group.

209 UIS notes that "the 'ideal' pupil-qualified teacher ratios may depend on a wide variety of complex factors, including the age and academic needs of the pupils represented in the ratio (younger children or those with special educational needs typically require more time, attention, and instructional support from teachers) or the experience, skill, and effectiveness of the teachers (highly skilled teachers may be able to achieve better academic results with larger classes than less skilled teachers with smaller classes). In the absence of a global target on PTR in primary education, the most widely used international benchmark is 40:1" in UIS. "Pupil-qualified teacher ratio." Available at: http://uis.unesco.org/en/glossary-term/pupil-qualified-teacher-ratio

210 Hampson, Martha, Alec Patton and Leonie Shanks. 2013. "10 Schools for the 21st Century." London: Innovation Unit.

211 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

212 Lemma, B. 2006. "Plasma television teachers: When different reality takes over African education" in L. Dahlström and J. Mannberg (Eds.), *Critical educational visions and practices in neo-liberal times*. Umeå: Global South Network Publisher; Tesfaye Semela. 2014. "Teacher preparation in Ethiopia: a critical analysis of reforms." *Cambridge Journal of Education 44* (1): 113-145.

213 Abera, Berhanu. 2013. "The Plasma-Based Instruction in Ethiopia: Utopia or Dystopia?" *Educational Research and Reviews 8* (24): 2325-2338.

214 Johnston, Jamie and Christopher Ksoll. 2017. "Effectiveness of Interactive Satellite-Transmitted Instruction: Experimental Evidence from Ghanaian Primary Schools." *CEPA Working Paper No.17-08*. Available at: Retrieved from Stanford Center for Education Policy Analysis: http://cepa.stanford.edu/wp17-08

215 Global Agenda Council on Education. 2016. "Unleashing Greatness: Nine Plays to Spark Innovation in Education." Geneva: World Economic Forum.

216 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

217 The New Times. "School mentors programme: The successes and challenges." Available at: http://www.newtimes.co.rw/section/read/192590

218 Lewis, Ingrid and Sunit Bagree. 2013. "Teachers for All: Inclusive Teaching for Children with Disabilities." Brussels: International Disability and Development Consortium (IDDC).

219 Lynch, Paul, Steve McCall, Graeme Douglass, Mike McLinden, and Asher Bayo. 2011. "Inclusive educational practices in Uganda: evidencing practice of itinerant teachers who work with children with visual impairment in local mainstream schools." International Journal of Inclusive Education 10: 1119-1134; Lynch, Paul, Patricia Lund, and Bonface Massah. 2014. "Identifying strategies to enhance the educational inclusion of visually impaired children with albinism in Malawi." International Journal of Educational Development 39: 226–234.

220 Singal, Nidhi, De, A., and Shweta Khanna Bhutani. 2016. "A critical analysis of the education of children with disabilities under RMSA: resourcing and provision." Cambridge: Cambridge Education.

221 Singh, D. 2010. "A study of stakeholders' perception of role performance of itinerant teachers in elementary education in UP." Unpublished M.Phil thesis at New Delhi: National University of Educational Planning and Administration (NUEPA).

222 Singal, Nidhi. 2008. "Working towards inclusion: reflections from the classroom." Teaching and Teacher Education 24: 1516-1529; NCTE. 2014). "National Council for Teacher Education (Recognition Norms and Procedure) Regulations, 2014." New Delhi: Government of India.

223 Barber, Michael and Mona Mourshed. 2007. How the world's best-performing school systems come out on top. New York: McKinsey & Company; Barber, Michael, Fenton Whelan, and Michael Clark. 2010. Capturing the Leadership Premium: How the world's top school systems are building leadership capacity for the future. New York: McKinsey & Company; Laura Lewis. 2016. "Leadership Development Guidance Note." Background paper for the report The Learning Generation: Investing in education for a changing world. Teach for All (TFA).

224 Farrell, Peter, Alison Alborz, Andy Howes, and Diana Pearson. 2010. "The impact of teaching assistants on improving pupils' academic achievement in mainstream schools: a review of the literature." Educational Review 62 (4): 435-448.

225 Navarro, F. Masdeu. 2015. "Learning support staff: A literature review." OECD Education Working Papers, No. 125. Paris: OECD Publishing.

226 Cajkler, Wasyl and Geoff Tennant, 2009. "Teaching assistants and pupils' academic and social engagement in mainstream schools: insights from systematic literature reviews." International Journal of Emotional Education 1 (2): 71-90; Ebersold S.2003. "Inclusion and mainstream education: an equal cooperation system." European Journal of Special Needs Education 18: 89-107.

227 Webster, Rob, Peter Blatchford, and Anthony Russell. 2013. "Challenging and changing how schools use teaching assistants: findings from the Effective Deployment of Teaching Assistants project." School Leadership & Management 22 (1): 78-96.

228 Deluca, Marcella and Maria Kett. 2017. "The Role of Classroom Assistants on teaching practices and on retention of children with disabilities." London: Leonard Cheshire Disability and Inclusive Development Centre, University College London.

229 IPA (Innovations for Poverty Action). 2015. "Evaluating the Teacher Community Assistant Initiative in Ghana." Available at: https://www.poverty-action.org/about/randomized-control-trials; Brendan Lehan. 2018. "Teacher Community Assistant Initiative: A national pilot for remedial education shows the value of proactive negotiation of evidence-based projects." New Haven: Evidence in Practice at Yale School of Management, Yale University; J-PAL. 2006. "Making Schools Work for Marginalized Children: Evidence from an inexpensive and effective program in India." Policy Briefcase No. 2. Cambridge: Department of Economics, Massachusetts Institute of Technology (MIT).

230 IPA (Innovations for Poverty Action). 2015. "Evaluating the Teacher Community Assistant Initiative in Ghana." Available at: https://www.poverty-action.org/about/randomized-control-trials; Brendan Lehan. 2018. "Teacher Community Assistant Initiative: A national pilot for remedial education shows the value of proactive negotiation of evidence-based projects." New Haven: Evidence in Practice at Yale School of Management, Yale University.

231 J-PAL. 2006. "Making Schools Work for Marginalized Children: Evidence from an inexpensive and effective program in India." Policy Briefcase No. 2. Cambridge: Department of Economics, Massachusetts Institute of Technology (MIT).

232 Deforges, Charles with Alberto Abouchaar. 2003. "The impact of parental involvement, parental support and family education on pupil achievement and adjustment: A literature review." London: Department for Education and Skills.

233 Bramwell, Daniela, Stephen Anderson and Karen Mundy. 2014. "Teachers and Teacher Development: A Rapid Review of the Literature." Toronto: Ontario Institute for Studies in Education, University of Toronto.

234 Evans, David and Anna Popova. 2015. "What Really Works to Improve Learning in Developing Countries? An Analysis of Divergent Findings in Systematic Reviews." Policy Research Working Paper 7203. Washington, DC: World Bank.

235 Arizona State University. 2018. "Reimagining the Educator Workforce: A Vision for the Educator Workforce Initiatives at MLFTC." Phoenix: Mary Lou Fulton Teachers College, Arizona State University (ASU).

236 Littlecott, H. J., G. F. Moore and S. M. Murphy. 2018. "Student health and well-being in secondary schools: the role of school support staff alongside teaching staff." Pastoral Care in Education 36 (4): 297-312; Pound, P., R. Langford, and R. Campbell. 2016. "What do young people think about their school-based sex and relationship education? A qualitative synthesis of young people's views and experiences." BMJ Open 6 (9).

237 Bonell, C., J. Farah, A. Harden, H. Wells, W. Parry, A. Fletcher, et al. 2013. "Systematic review of the effects of schools and school environment interventions on health: Evidence mapping and synthesis." Public Health Research 1(1): 1–340; Moore, G. F., H.J. Littlecott, R. Evans, S. Murphy, G. Hewitt, and A. Fletcher. 2017. "School composition, school culture and socioeconomic inequalities in young people's health: Multi-level analysis of the health behaviour in school-aged children (HBSC) survey in wales." British Educational Research Journal, 43(2): 310–329; Suldo, S. M., A.A. Friedrich, T. White, J. Farmer, D. Minch, and J. Michalowski. (2009). "Teacher support and adolescents' subjective well-being: A mixed-methods investigation." School Psychology Review 38(1): 67.

238 Istance, David and Alejandro Paniagua. 2019. "Learning to Leapfrog: Innovative Pedagogies to Transform Education." Washington, DC: Center for Universal Education at the Brookings Institution.

239 Naylor, Ruth, Charlotte Jones, and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation. New York: Education Commission.

240 Naylor, Ruth, Charlotte Jones, and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation. New York: Education Commission.

241 Coffey. 2017. "Endline Evaluation Report: Step change window." Coffey. Education Development Trust (EDT).

242 Wolfenden, Freda, Alison Buckler, Cristina Santos, and Jenna Mittelmeier. 2018. "Re-envisioning and Strengthening the Education Workforce: Initial Literature Review." Milton Keynes: The Open University.

243 Vaillant, Denise. 2015. "School leadership, trends in policies and practices, and improvement in the quality of education." *Background Paper for EFA Global Monitoring Report 2015*. Paris: UNESCO; UNESCO. 2016. *Leading better learning: School leadership and quality in the Education 2030 agenda*. Paris: UNESCO; UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

244 UNESCO. 2016. *Leading better learning: School leadership and quality in the Education 2030 agenda*. Paris: UNESCO.

245 Robinson, Viviane, Claire Lloyd, and Kenneth Rowe. 2008. "The Impact of Leadership on Student Outcomes: An Analysis of the Differential Effects of Leadership Types." Educational Administration Quarterly 44 (5): 635-674.

246 UNESCO. 2016. *Leading better learning: School leadership and quality in the Education 2030 agenda*. Paris: UNESCO. Fullan, 2002.

247 Leithwood, Kenneth, Christopher Day, Pam Sammons, Alma Harris and David Hopkins. 2008. "Seven Strong Claims about Successful School Leadership." *School Leadership and Management 28* (1): 27-42.

248 Pont, Beatriz, Deborah Nusche, and Hunter Moorman. 2008. *Improving School Leadership: Vol 1 Policy and Practice*. Paris: OECD publishing.

249 Leithwood, Kenneth and Doris Jantzi 2008. "Linking Leadership to Student Learning: The Contributions of Leader Efficacy." *Educational Administration Quarterly 44* (4): 496-528.

250 Marzano, R. J., T. Waters, and B.A. McNulty. 2005. "School leadership that works: From research to results." Alexandria, VA: Association for Supervision and Curriculum Development.

251 Chrispeels, Janet, Salvador Castillo, and Janet Brown. 2000. "School Leadership Teams: A Process Model of Team Development." *School Effectiveness and School Improvement 11* (1): 20-56.

252 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

253 Churches, Richard, Lina Aghajanian, and Geraldine Hutchinson. 2018. "Evidence-based supervision." Reading: EDT (Education Development Trust).

254 Crawfurd, Lee. 2017. "School Management and Public-Private Partnerships in Uganda." *Journal of African* Economies *26* (5): 539–560.

255 Leithwood, Kenneth. 2013. *Strong districts & their leadership*. Toronto: Ontario Institute of Education Leadership.

256 De Grauwe, Anton. 2009. "School monitoring systems and their impact on disparities." *Paper commissioned for the EFA Global Monitoring Report 2009: Overcoming Inequality: why governance matters*. Paris: UNESCO.

257 Eddy-Spicer, David, Melanie Ehren, Mukdarut Bangpan, Meena Khatwa, and Frank Perrone. 2016. *Under what conditions do inspection, monitoring and assessment improve system efficiency, service delivery and learning outcomes for the poorest and most marginalised? A realistic synthesis of school accountability in low- and middle-income countries*. London: EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London.

258 Leithwood, Kenneth. 2013. "Strong Districts & Their Leadership". Toronto: Ontario Institute of Education Leadership.

259 IDinsight. 2018. "Impact of STIR's programming on teacher motivation and student learning: Endline report." IDinsight

260 English in Action. 2015. "English Proficiency Assessments of Primary and Secondary Teachers and Students Participating in English in Action: Third Cohort (2014)." Dhaka: English in Action.

261 Piper, Benjamin, Joseph Destefano, Esther M. Kinyanjui, and Salome Ong'ele. 2018. "Scaling up successfully: Lessons from Kenya's Tusome national literacy program." *Journal of Educational Change 19* (3): 293–321.

262 UNESCO IIEP. 2018. *"Decentralization of education management." Issue Brief 2.* Paris: UNESCO IIEP.

263 Elwick, Alex and Tony McAleavy. 2015. *Interesting cities: five approaches to urban school reform.* Reading: EDT (Education Development Trust).

264 Elwick, Alex and Tony McAleavy. 2015. *Interesting cities: five approaches to urban school reform.* Reading: EDT (Education Development Trust).

265 OECD. 2016. "What makes a school a learning organization? A guide for policy makers, school leaders and teachers." Paris: OECD Publishing.

266 ODI. 2011. "Taking responsibility for complexity: When is a policy problem complex, why does it matter, and how can it be tackled?" ODI Briefing Paper 68. London: ODI (Overseas Development Institute).

267 McAleavy, Tony, Tran Thai Ha, and Rachael Fitzpatrick. 2018. *Promising Practice: government schools in Vietnam*. Reading: Education Development Trust.

268 Custer, Samantha, Elizabeth King, Tamar Manuelyan Atinc, Lindsay Read and Tanya Sethi. 2018. *Toward Data-Driven Education Systems: Insights into using information to measure results and manage change*. Washington, DC: Center for Universal Education at the Brookings Institution.

269 Toledo Figueroa, Diana, Nóra Révai and Sonia Guerriero. 2017. "Teacher professionalism and knowledge in qualifications frameworks and professional standards" in Sonia Guerriero (ed.) *Pedagogical Knowledge and the Changing Nature of the Teaching Profession*. Paris: OECD Publishing.

270 Patterson, Rose. 2014. No School is an Island: Fostering Collaboration in a Competitive System. Wellington: The New Zealand Initiative.

271 Vangrieken, Katrien, Filip Dochy, Elisabeth Raes, Eva Kyndt. 2015. "Teacher collaboration: A systematic review." *Educational Research Review* (15):17-40.

272 Vescio, Vicki, Dorene Ross, and Alyson Adams. 2008. "A review of research on the impact of professional learning communities on teaching practice and student learning." *Teaching and Teacher Education 24*: 80–91; Dogan, Selcuk, Rose Pringle, and Jennifer Mesa. 2015. "The impacts of professional learning communities on science teachers' knowledge, practice and student learning: a review." *Professional Development in Education 42* (4):569–88; Ratts, Rebecca, James Pate, James Archibald, Shirley Andrews, Chester Ballard, and Katherine Lowney. 2015. "The influence of professional learning communities on student achievement in elementary schools." *Journal of Education & Social Policy 2* (4): 51-61; Darling-Hammond, Linda, Maria E. Hyler, and Madelyn Gardner. 2017. *Effective Teacher Professional Development* Palo Alto: Learning Policy Institute.

273 Attias-Delattre, Veronique. 2018. "Governance of the teaching profession: Requirements for entry into teaching, teacher standards, and teacher tasks, evidence from 25 countries." Presentation at CIES 2018. Mexico City: CIES (Comparative and International Education Society).

274   Darling-Hammond, Linda, Maria E. Hyler, and Madelyn Gardner. 2017. *Effective Teacher Professional Development* Palo Alto: Learning Policy Institute.

275   Jenny Perlman Robinson and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

276   STIR and ID insight. 2018. "Impact of STIR's programming on teacher motivation and student learning: Endline report." IDinsight

277   Naylor, Ruth, Charlotte Jones, and Pearl Boateng (Education Development Trust). 2019. "Strengthening the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation*. New York: Education Commission.

278   Coffey. 2017. "Endline Evaluation Report: Step change window." Coffey. Education Development Trust (EDT).

279   Crehan, Lucy. 2016. *Exploring the impact of career models on teacher motivation*. Paris: UNESCO IIEP.

280   Navarro, F. Masdeu. 2015. "Learning support staff: A literature review." *OECD Education Working Papers*, No. 125. Paris: OECD Publishing.

281   Johnston, Jamie and Christopher Ksoll. 2017. "Effectiveness of Interactive Satellite-Transmitted Instruction: Experimental Evidence from Ghanaian Primary Schools." CEPA Working Paper No.17-08. Available at: Retrieved from Stanford Center for Education Policy Analysis: http://cepa.stanford.edu/wp17-08.

282   GiZ (2016) Education in Conflict and Crisis: How Can Technology Make a Difference? A Landscape Review; War Child Holland. 2016. "Research Report: e-Learning Sudan Phases I and II." War Child Holland and Ahfad University for Women and TNO.

283   Educate! "Always Learning: Educate!'s lessons from an at-scale impact evaluation." Available at: chrome-extension://oemmndcbldboiebfnladdacbdfmadadm/https://static1.squarespace.com/static/520111afe4b0748af59ffc18/t/5b1065f6f950b70548c384cd/1527801341728/PSM+End+of+Course+Report+-+with+Preface.pdf

284   IPA (Innovations for Poverty Action). 2015. "Evaluating the Teacher Community Assistant Initiative in Ghana." Available at: https://www.poverty-action.org/about/randomized-control-trials; Brendan Lehan. 2018. "Teacher Community Assistant Initiative: A national pilot for remedial education shows the value of proactive negotiation of evidence-based projects." New Haven: Evidence in Practice at Yale School of Management, Yale University.

285   Winthrop, Rebecca, Timothy P. Williams, and Eileen McGivney. 2016. "Innovating to unburden teachers." Washington, DC: Center for Universal Education at the Brookings Institution.

286   Shrayber, Mark. 2017. "Is the African School for Excellence the Future of Education?" Available at: https://uproxx.com/life/african-school-for-excellence-affordable-education/

287   Muralidharan, Karthik, Abhijeet Singh and Alejandro J. Ganimian. 2019. "Disrupting Education? Experimental Evidence on Technology-Aided Instruction in India." *American Economic Review 109* (4): 1426-60.

288   Pathways for Prosperity Commission on Technology and Inclusive Development. 2019. *Positive disruption: Health and education in a digital age*. Oxford: Blavatnik School of Government, University of Oxford.

289   Hargreaves, David. 2010. "Creating a self-improving school system." Nottingham: National College for Leadership of Schools and Children's Services.

290   UNESCO. 2016.

291   Thacker, Simon with Abdo Said Abdo and Nicoleto Nichifor. 2019. "Collaboration Road: Dubai's Journey towards Improved School Quality." Washington, DC: World Bank.

292   Elwick, Alex and Tony McAleavy. 2015. *Interesting cities: five approaches to urban school reform*. Reading: EDT (Education Development Trust).

293   Louis, Karen Seashore, Kenneth Leithwood, Kyla L. Wahlstrom and Stephen E. Anderson. 2010. "Investigating the Links to Improved Student Learning." The Center for Applied Research and Educational Improvement (CAREI) at the University of Minnesota and the Ontario Institute for Studies in Education (OISE) at the University of Toronto.

294   Jensen, Ben, Julie Sonnemann, Katie Roberts-Hull and Amélie Hunter. 2016. "Beyond PD: Teacher Professional Learning in High-Performing Systems." Washington, DC: National Center on Education and the Economy.

295   Rudd, P., H. Poet, G. Featherstone, E. Lamont, B. Durbin, C. Bergeron, G. Bramley, K. Kettlewell and R. Hart. 2011. "Evaluation of City Challenge Leadership Strategies: overview report. Slough: NFER (National Foundation for Education Research).

296   Elwick, Alex and Tony McAleavy. 2015. *Interesting cities: five approaches to urban school reform*. Reading: EDT (Education Development Trust).

297   EDT (Education Development Trust). 2017." System Leadership in Developing Country Contexts (NLE Playbook Parts 1, 2 & 3)." PowerPoint presentation. Accessed 5 December 2018.

298   Perlman Robinson, Jenny and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

299   Maheen, Fasi Zaka. 2018. "Five Years of Education Reforms: Wins, losses and challenges for 2018-2023." Islamabad: Alif Ailaan.

300   Education Commission. 2016. *The Learning Generation*: *Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

301   Leithwood, Kenneth. 2013. "Strong Districts & Their Leadership." Toronto: Ontario Institute of Education Leadership.

302   OECD. 2016. "What makes a school a learning organization? A guide for policy makers, school leaders and teachers." Paris: OECD Publishing.

303   Kools,M. and L. Stoll. 2016. "What Makes a School a Learning Organisation?" *OECD Education Working Papers No.137*. Paris: OECD Publishing.

304   OECD. 2015. *Schooling Redesigned: Towards Innovative Learning Systems*. Paris: Educational Research and Innovation, OECD.

305   DLP. 2018. "Developmental Leadership: What it is, why it matters, and how it can be supported." Available at: https://res.cloudinary.com/dlprog/image/upload/dqnba0YGWfCrO4GneJipxrdTJeTcLh7gX8wi49qU.pdf

306   Education Commission. 2016. *The Learning Generation: Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

307   Perlman Robinson, Jenny and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

308 Perlman Robinson, Jenny and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

309 Educate! "Always Learning: Educate!'s lessons from an at-scale impact evaluation." Available at: chrome-extension://oemmndcbldboiebfnladdacbdfmadadm/https://static1.squarespace.com/static/520111afe4b0748af59ffc18/t/5b1065f6f950b70548c384cd/1527801341728/PSM+End+of+Course+Report+-+with+Preface.pdf

310 Leana, Carrie. 2011. "The Missing Link in School Reform." *Stanford Social Innovation Review*.

311 Leana, Carrie. 2011. "The Missing Link in School Reform." *Stanford Social Innovation Review*.

312 Collins, Mandy. 2015. *Partners for Possibility: How Business Leaders and Principals are Igniting Radical Change in South African Schools.* Johannesburg: Knowledge Resources.

313 Collins, Mandy. 2015. *Partners for Possibility: How Business Leaders and Principals are Igniting Radical Change in South African Schools.* Johannesburg: Knowledge Resources.

314 Hollenweger, Judith and Andrea Martinuzzi. 2015. "Towards a cross-sectoral approach to inclusion of children with disabilities." Skopje: UNICEF.

315 Bryk, Anthony, Louis Gomez, and Alicia Grunow. 2011. "Getting Ideas into Action: Building Networked Improvement Communities in Education." Stanford: Carnegie Foundation for the Advancement of Teaching.

316 Custer, Samantha, Elizabeth King, Tamar Manuelyan Atinc, Lindsay Read and Tanya Sethi. 2018. *Toward Data-Driven Education Systems: Insights into using information to measure results and manage change*. Washington, DC: Center for Univresal Education at the Brookings Institution.

317 OECD. 2017. *Skills for a High-Performing Civil Service*. Paris: OECD Publishing; OECD. 2017. "Core Skills for Public Sector Innovation." Paris: OECD Publishing.

318 ODI. 2011. "Taking responsibility for complexity: When is a policy problem complex, why does it matter, and how can it be tackled?" ODI Briefing Paper 68. London: ODI (Overseas Development Institute).

319 McAleavy, Tony, Tran Thai Ha, and Rachael Fitzpatrick. 2018. *Promising Practice: government schools in Vietnam*. Reading: Education Development Trust.

320 Perlman Robinson, Jenny and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institution.

321 Dommett, Eleanor, Ian Devonshire, and Richard Churches. 2018. "Bridging the gap between evidence and classroom 'clinical practice' – The potential of teacher-led randomised controlled trials to advance the science of learning." *Impact Journal of the Chartered College of Teaching*.

322 Bautista, A., J. Wong and S. Gopinathan. 2015. "Teacher professional development in Singapore: Depicting the landscape." *Psychology, Society and Education* 7 (3): 311-26.

323 OECD. 2019. *A Flying Start: Improving Initial Teacher Preparation Systems*. Paris: OECD Publishing.

324 World Bank. 2008. "The Political Economy of Policy Reform: Issues and Implications for Policy Dialogue and Development Operations." Washington, DC: World Bank.

325 World Bank. 2018. *World Development Report: Learning to Realize Education's Promise*. Washington DC: World Bank.

326 Wales, Joseph, Arran Magee, and Susan Nicolai. 2016. "How does political context shape education reforms and their success? Lessons from the Development Progress project. *ODI Dimension Paper 6*. London: ODI (Overseas Development Institute).

327 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

328 Wales, Joseph, Arran Magee, and Susan Nicolai. 2016. "How does political context shape education reforms and their success? Lessons from the Development Progress project. *ODI Dimension Paper 6*. London: ODI (Overseas Development Institute); Harding, Robin, and David Stasavage. 2013. "What democracy does (and doesn't do) for basic services: School fees, school inputs, and African elections." *The Journal of Politics 76* (1): 229-245.

329 Wales, Joseph, Arran Magee, and Susan Nicolai. 2016. "How does political context shape education reforms and their success? Lessons from the Development Progress project. *ODI Dimension Paper 6*. London: ODI (Overseas Development Institute).

330 Jenny Perlman Robinson and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institute.

331 Shaxson, Louise. 2005. "Is your evidence robust enough? Questions for policy makers and practitioners." *Evidence & Policy: A Journal of Research, Debate and Practice* 1 (1): 101-112.

332 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

333 Piper, Benjamin, Joseph Destefano, Esther Kinyanjui, and Salome Ong'ele. 2018. "Scaling up successfully: Lessons from Kenya's Tusome national literacy program." *Journal of Educational Change 19* (3): 293-321.

334 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

335 Schleicher, Andreas. 2018. *World Class: How to build a 21st century school system*. Paris: OECD Publishing.

336 Elmore, R. F. 1979. "Backward mapping: Implementation research and policy decisions." *Political Science Quarterly 94* (4): 601-616.

337 Kleintjes, Sharon, Crick Lund, Leslie Swartz, and Alan Flisher, Alan. 2010. "Mental health care user participation in mental health development and implementation in South Africa." *International Review of Psychiatry* 22 (6): 568-77.

338 Mizala, Alejandra and Ben Ross Schneider. 2014. "Negotiating Education Reform: Teacher Evaluations and Incentives in Chile (1990-2010)." *Governance: An International Journal of Policy, Administration and Institutions* 27 (1): 87-109.

339 Cornett, Lynn and Gale Gaines. 2002. "Quality Teachers: Can Incentive Policies Make a Difference?" Atlanta, GA: Southern Regional Education Board; Crehan, Lucy. 2016. *Exploring the impact of career models on teacher motivation*. Paris: UNESCO IIEP.

340 STIR and ID insight. 2018. "Impact of STIR's programming on teacher motivation and student learning: Endline report." IDinsight.

341 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

342 Grindle, Merilee Serrill. 2004. *Despite the Odds: The Contentious Politics of Education Reform*. Princeton: Princeton University Press.

343 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

344 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

345 Aslam, Monazza and Shenila Rawal. 2019. "Political Economy of the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

346 Rasanathan, Kumanan, Sara Bennett, Vincent Atkins, Robert Beschel, Gabriel Carrasquilla, Jodi Charles, Rajib Dasgupta, Kirk Emerson, Douglas Glandon, Churnrurtai Kanchanachitra, Pete Kingsley, Don Matheson, Rees Murithi Mbabu, Charles Mwansambo, Michael Myers, Jeremias Paul, Jr., Thulisile Radebe, James Smith, Orielle Solar, Agnès Soucat, Aloysius Ssennyonjo, Matthias Wismar, Shehla Zaidi. 2017. "Governing multisectoral action for health in low-and middle-income countries."PLoS Med 14 (4).

347 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

348 Kingdon GG, Little A, Aslam M, Rawal S, Moe T, Patrinos H, Beteille T, Banerji R, Parton B and Sharma SK. 2014. "A rigorous review of the political economy of education systems in developing countries." *Education Rigorous Literature Review*. London: DFID (Department for International Development).

349 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institute.

350 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

351 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

352 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institute.

353 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institute.

354 The Education Commission is leading research on delivery approaches to better understand whether and how they are effective.

355 Todd, Robin, and Ian Attfield. 2017. "Big Results Now! In Tanzanian Education: Has the Delivery Approach Delivered?" London: U.K. Department for International Development (DFID).

356 Bernbaum, Marcia and Kurt Moses. 2011. *EQUIP2 Lessons Learned in Education: Education Management Information Systems*. Durham, NC: FHI 360 Education Policy Data Center.

357 Bruns, Barbara and Javier Luque. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

358 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

359 Wales, Joseph, Ahmed Ali and Susan Nicolai with Francisca Morales and Daniel Contreras. 2014. "Improvements in the Quality of Basic Education: Chile's experience." London: Overseas Development Institute (ODI).

360 Bruns, Barbara and Ben Schneider. 2016. "Managing the Politics of Quality Reforms in Education: Policy Lessons from Global Experience." *Background paper for The Learning Generation: Investing in education for a changing world*. Classroom Associates and the Center for Global Development.

361 Piper, Benjamin, Joseph Destefano, Esther Kinyanjui, and Salome Ong'ele. 2018. "Scaling up successfully: Lessons from Kenya's Tusome national literacy program." *Journal of Educational Change 19* (3): 293-321.

362 Grindle, Merilee Serrill. 2004. *Despite the Odds: The Contentious Politics of Education Reform*. Princeton: Princeton University Press; David Cohen and Jal Mehta. 2017. "Why reform sometimes succeeds: Understanding the conditions that produce reforms that last." *American Educational Research Journal 54* (4): 644-690.

363 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institute.

364 Robinson, Jenny Perlman and Rebecca Winthrop with Eileen McGivney. 2016. *Millions Learning: Scaling Up Quality Education in Developing Countries*. Center for Universal Education. Washington, DC: Brookings Institute.

365 Aslam, Monazza and Shenila Rawal. 2019. "Political Economy of the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

366 Piper, Benjamin, Joseph Destefano, Esther Kinyanjui, and Salome Ong'ele. 2018. "Scaling up successfully: Lessons from Kenya's Tusome national literacy program." *Journal of Educational Change 19* (3): 293-321.

367 Aslam, Monazza and Shenila Rawal. 2019. "Political Economy of the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

368 Aslam, Monazza and Shenila Rawal. 2019. "Political Economy of the Education Workforce." Forthcoming *Background Paper for Transforming the Education Workforce: Learning Teams for a Learning Generation.* New York: Education Commission.

369 World Bank. 2018. *World Development Report: Learning to Realize Education's Promise*. Washington DC: World Bank.

370 Education Commission. 2019. Estimates developed using the Education Commission Costing and Projections Model with updated 2018 data.

371   While technically possible, any assessment of reform requires detailed knowledge of the current status of the system being reformed to benchmark changes against. We have developed an indicative model to assess changes.

372   The National Residency Matching Program in the US (and Ethiopia) won a Nobel prize for its algorithm solving allocation issues in health workers. In education, some research exists on matching children to schools (Parthag 2011) but there is little discussion of allocating the education workforce to schools in developing countries.

373   Education Commission. 2019. Estimates developed using the Education Commission Costing and Projections Model with updated 2018 data.

374   While household expenditure on education is significant, we do not go into details due to equity concerns around reliance on household expenditures for teachers (which is very common in low-income countries).

375   Costing models that were reviewed include: Kenya, Malawi, Rwanda (2012 and 2018), Sierra Leone, South Sudan, Puntland, IIEP/UNESCO EPSSim, Education Commission Global Costing Model, Education for All Global Costing Model.

376   GPE. 2019. "Results Report 2019." Washington, DC: Global Partnership for Education (GPE).

377   The International Institute of Education Planning (IIEP) first published guidance on cost analysis in 1972, alongside Coombs and Hallak in 1987, Levin and McEwan in 2001. In more recent years, IIEP has led the way on the development of costing models, which are now a core part of the Global Partnership for Education's (GPE) planning work.

378   This is being led by the Learning Metrics Task Force in terms of learning measurement, but also through other exercises such as Equivalent Years of Schooling (EYOS) and Learning Adjusted Years of Schooling (LAYS).

379   See the WHO-CHOICE work for examples. Available at: https://www.who.int/choice/en/

380   This would also touch on issues around "ghost teachers," which have been observed on the payroll in many countries.

381   Is it important to note that while in the short to medium term there are teacher shortages and cost pressures, demographic transition means that this will eventually turn back (as has already happened in East Asia), eventually leading to an oversupply of teachers at current targeted rates – the challenge is to allow this forthcoming reduction in pressure of numbers to create space to improve quality.

382   Namit, Kabira and Thanh Thi Mai. 2019. "Digital School Census in 10 Weeks? How it was done in Sierra Leone." World Bank Blogs. Washington, DC: World Bank. Available at: https://blogs.worldbank.org/education/digital-school-census-10-weeks-how-it-was-done-sierra-leone

383   Independent Commission for Aid Impact. 2018. "DFID's approach to value for money in programme and portfolio management: A performance review." London: ICAI.

384   Dolton, Peter, Oscar D. Marcenaro-Gutierrez, Luigi Pistaferri, and Yann Algan. 2011. "If you pay peanuts do you get monkeys? A cross-country analysis of teacher pay and pupil performance." *Economic Policy* 26 (65): 7-65.

385   Rosa, Leonardo. 2017. "Teacher Preferences in Developing Countries: Evidence from the City of Sao Paolo, Brazil." Presentation at the Annual Meeting of the Latin American and Caribbean Economic Association.

386   Mulkeen, Aiden. 2010. *Teachers in Anglophone Africa: Issues in Teacher Supply, Training and Management.* Washington, DC: World Bank.

387   Crehan, Lucy. 2016. *Exploring the impact of career models on teacher motivation*. Paris: UNESCO IIEP.

388   Mulkeen, A. 2009. Teachers in Anglophone Africa: issues in teacher supply, training, and management. Washington, DC: World Bank.

389   Bruns, Barbara and Luque, Javier. 2015. *Great Teachers: How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank.

390   Crehan, Lucy. 2016. *Exploring the impact of career models on teacher motivation*. Paris: UNESCO IIEP.

391   UNESCO. 2017. *Global Education Monitoring Report: Accountability in education: meeting our commitments.* Paris: UNESCO.

392   Lockheed, Marlaine and Adriaan Verspoor. 1991. "Improving primary education in developing countries." Washington, DC: World Bank.

393   Turrent, Victoria. 2012. "The teacher salary system in Sierra Leone: Case study." Education Development Trust and Center for Universal Education at the Brookings Institution.

394   Bold, Tessa, Deon Filmer, Gayle Martin, Ezequiel Molina, Brian Stacy, Christophe Rockmore, Brian Stacy, Jakob Svensson, and Waly Wane. 2017. "What Do Teachers Know and Do? Does It Matter? Evidence from Primary Schools in Africa." *Background paper to the World Development Report 2018.* Washington, DC: World Bank.

395   Winthrop, Rebecca, Timothy P. Williams, and Eileen McGivney. 2016. "Innovating to unburden teachers." Washington, DC: Center for Universal Education at the Brookings Institution.

396   Lavy, Victor. 2015. "Do differences in schools' instruction time explain international achievement gaps? Evidence from developed and developing countries." *The Economic Journal 125* (588) F397–F424.

397   UNESCO. 2016. "If you don't understand, how can you learn?" *Global Education Monitoring Report Policy Paper 24.* Paris: UNESCO.

398   Banerjee, Abhijit, Shawn Cole, Esther Duflo, Leigh Linden. 2005. "Remedying Education: Evidence from Two Randomized Experiments in India." *NBER Working Paper No. 11904.* Cambridge, MA: National Bureau of Economic Research (NBER).; Abhijit Banerjee, Rukmini Banerji, James Berry, Esther Duflo, Harini Kannan, Shobhini Mukerji, Marc Shotland, and Michael Walton. 2017. "From Proof of Concept to Scalable Policies: Challenges and Solutions, with an Application, *NBER Working Paper No. 22931.* Cambridge, MA: National Bureau of Economic Research (NBER).

399   Data on percentage improvements from Education Commission Secretariat analysis (2016) using data provided as background material to the Learning Generation report. Conn, Katherine. 2016. "The Effectiveness of Education Programs Worldwide: Evidence from a Meta-Analytic Dataset." Background Paper for the Education Commission. For further information, see the Education Commission Analytical Background Paper available at http://report.educationcommission.org/resources.

400   See Evans and Yuan (2019) – which includes just fourteen studies so far, of which only a handful look at workforce reforms.

401   Rose, Pauline, Ricardo Sabates, Ben Alcott, and Sonia Ilie. 2016. "Overcoming Inequalities within Countries to Achieve Global Convergence in Learning." *Background paper for The Learning Generation: Investing in education for a changing world*. Research for Equitable Access and Learning Centre (REAL), University of Cambridge

402 For example, in Rwanda, the least educated 10% of students get 0.8% of funding, compared to 41% for the top 10%. UNICEF. 2015. "Investment Case for Education and Equity." New York: UNICEF.

403 Zubairi, Asma and Pauline Rose. 2019. "Equitable Financing of Secondary Education in sub-Saharan Africa." Research for Equitable Access and Learning Centre (REAL), University of Cambridge. Background paper for *Secondary Education in Africa: Preparing Youth for the Future of Work*. Toronto: Mastercard Foundation.

404 ODI. 2016. "Leaving no one behind: A critical path for the first 1,000 days of the SDGs." London: Overseas Development Institute (ODI); In one study in Ghana, UNICEF found that building kindergartens specifically for poor children in poor districts had a four-fold greater impact on primary completion than providing kindergartens to the population generally. Available at: http://www.unicef.org/education/bege_SEE.html

405 Zubairi, Asma and Pauline Rose. 2019. "Equitable Financing of Secondary Education in sub-Saharan Africa." Research for Equitable Access and Learning Centre (REAL), University of Cambridge. Background paper for *Secondary Education in Africa: Preparing Youth for the Future of Work*. Toronto: Mastercard Foundation.

406 Education Commission. 2016. *The Learning Generation: Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity; Mustaoha, Shakira and Philipp Krause. 2016. "Financing education: domestic resource mobilization and allocation." Background Paper for the Education Commission. Overseas Development Institute (ODI).

407 Education Commission. 2019. Estimates developed using the Education Commission Costing and Projections Model with updated 2018 data.

408 Education Commission. 2016. *The Learning Generation: Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

409 UNICEF. 2010. "Child Poverty and Disparities in Mozambique." New York: UNICEF.

410 This is usually measured as the share of education expenditure in total government spending.

411 This contrasts with the growing share for health rising from 15 to 18 percent, which now stands at USD $21 billion annually, not including large contributions from private philanthropists.

412 Education Commission. 2016. *The Learning Generation: Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

413 Schäferhoff, Marco and Nicholas Burnett. 2016. "Rethinking the Financing and Architecture of Global Education." *Background paper for The Learning Generation: Investing in education for a changing world*. SEEK and Results for Development (R4D).

414 Education Commission. 2016. *The Learning Generation: Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

415 For example, the GPE's inclusion of a review of funding to basic education in its eligibility matrix ensures domestic dialogue around resources to education.

416 Education Commission. 2016. *The Learning Generation: Investing in Education for a Changing World*. New York: International Commission on Financing Global Education Opportunity.

417 The input costs can be further decomposed as much as necessary. For example, a line item "consultation" can be split into its underlying costs – room hire, transport of attendees, honorarium, refreshments, stationary. Even attendance registers have their own cost (the register and the pen). These can all be considered, or the aggregated cost used, dependent on the use of the information.

418 Often procurement or financial accounting systems need to be reengineered to do so.

Abbreviations

ASU	Arizona State University
CAL	Computer Assisted Learning
CoE	Colleges of Education
CPD	Continued Professional Development
DFID	Department for International Development (United Kingdom)
ECD	Early Childhood Development
EMIS	Education Management Information Systems
EWI	Education Workforce Initiative
EYOS	Equivalent Years of Schooling
GDP	Gross Domestic Product
GES	Ghana Education Services
GPE	Global Partnership for Education
ICT	Information and Communications Technology
IDA	International Development Assistance (World Bank)
ITT	Initial Teacher Training
LAYS	Learning Adjusted Years of Schooling
MDB	Multilateral Development Bank
MoET	Ministry of Education and Training
MOOC	Massive Open Online Course
MTEF	Medium-Term Expenditure Framework
ODA	Overseas Development Aid
OECD	Organisation for Economic Cooperation and Development
OER	Open Educational Resources
PTA	Parent Teacher Association
PTR	Pupil-Teacher Ratio
RCT	Randomized Control Trial
SD	Standard Deviation
SDG	Sustainable Development Goal
STEM	Science, Technology, Engineering, and Math
TCAI	Teacher Community Assistant Initiative
TSC	Teaching Service Commission
TTC	Teacher Training Colleges
T-TEL	Transforming Teacher Education and Learning
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations Children's Emergency Fund
WISE	World Innovation Summit for Education

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