The Roles of Standards in Education and Training

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Abstract

This study examines the role of standards in strengthening the quality, equity, and relevance of education systems. The first section provides context for standards-based education reforms and the transitions countries make from the absence to adoption and authorship of standards. Anchored in the conceptual framework of compatibility, measurement, and quality standards, the study explores how standards operate across education inputs, processes, and outcomes—outlined in detail in the second section. The discussion highlights how standards shape curriculum design, teacher qualifications, physical infrastructure, school leadership, accountability mechanisms, and learning assessments, using global case studies to illustrate their influence on system performance. The third section distills policy lessons on national priorities with global frameworks, embedding standards in strategies to integrate digital technologies into teaching and learning, and ensuring inclusive, participatory design and implementation of standards. The study concludes with recommendations for using standards as adaptive instruments for continuous improvement, rather than rigid compliance tools.

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Introduction

Standards are essential in the education sector because they establish expectations for what students should learn at each level of an education system. Standards also guide who can be teachers, what teachers should know and how they should conduct their practice, define the competencies and responsibilities expected of school principals and management teams, and specify the overall elements of quality of education services delivered by the government and other service providers. Within the realm of education and training in relevant workplace skills, these standards serve multiple purposes, from establishing baseline requirements to facilitating international comparability and enhancing educational quality. At the same time, standards provide policy makers, educators, and communities with a shared understanding and vision for educational quality and outcomes.

The International Organization for Standardization (ISO) indicates that standards represent the optimal means for executing particular tasks, reflecting expert consensus while also being shaped by interests such as businesses, trade associations, government, or regulators. This study categorizes standards into three primary types:

- *Compatibility standards.* Standards that are agreed-upon specifications that ensure interoperability and compatibility between different systems, devices, or components. Examples of compatibility standards in education may include standards for teaching and learning materials, student assessments, and teacher training to align with national curricula; equivalence and certification of credentials nationally and internationally; and format, protocols, semantic, and organizational standards for education management information systems (EMIS) to be interoperable with other information systems.
- *Measurement standards.* Standards that are agreed-upon methods to ensure consistency, accuracy, and reliability in measurement. Examples of measurement standards in education may include defining benchmarks for student learning assessments, and on collecting, managing, and reporting school administrative data.
- *Quality standards.* Standards that define requirements for products, services, processes, or systems, such as management systems. Examples of quality standards in education may include defining minimum standards in school infrastructure quality, school safety requirements, student-teacher ratios, teacher qualifications for entry into the profession, quality of teaching practices, minimum standards in curriculum development, and expected learning outcomes at different levels of education and training.

This study also discusses the idea of economic development (as linked to standards) as the transition in three different states:

- *Absence.* In this state, there is no standard or a myriad of local standards that can guide society or specific sector. In education, the state of absence could be represented by a country with fragmented education policies and no common learning assessment framework (as is the case in some post-conflict states). In these contexts, it should be a priority to establish a baseline of educational standards that countries can adhere to and build on with their current capacity levels.
- *Adoption.* In this state, international standards are adopted by countries, either by taking them as-is or by adapting them to local economic contexts and capabilities. In education, this state could be represented by a country like Ghana that has updated its higher education standards for initial teacher education standards building in international practices and local context. Likewise, the

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state of adoption could be represented by a country that has adopted international learning standards, such as the Global Proficiency Framework for Foundational Learning developed by the United States Agency for International Development (USAID) and the United Nations Educations, Cultural, and Scientific Organization (UNESCO).

- *Authoring.* In this stage, countries set new international standards, often reflecting a country's political priorities and ambitions. In education, this stage is represented by a country that has produced its own standards, influencing global education discussions, such as Finland's education model and its influence in teacher training globally, Singapore's mathematics curriculum shaping international practices in numeracy, or Germany's dual training as a golden standard for vocational training.

While standards are a central organizing principle, it is important to distinguish them from related but distinct concepts such as guidelines and benchmarks, which play complementary roles in education systems. *Standards* are formal, binding criteria established through laws, regulations, or official policies, specifying the minimum or aspirational requirements that must be met—such as a legal mandate that no classroom exceeds a 40:1 student-teacher ratio. *Guidelines*, by contrast, are nonbinding recommendations that suggest best practices without the force of law; for example, technical experts may recommend to public and private education service providers maintaining a 25:1 student-teacher ratio to enhance learning conditions, but providers are not legally obligated to comply with this guideline. *Benchmarks* serve as reference points or targets against which performance can be measured and improved over time, such as setting a national goal to reduce student-teacher ratios from 45:1 to 30:1 by 2027. While standards establish enforceable expectations, guidelines offer flexibility based on context, and benchmarks focus attention on continuous improvement relative to desired outcomes.

The case of standard-based education reforms

The experience of countries adopting standards-based education reforms illustrates the importance of standards in the sector and the ways in which effective standards can significantly improve educational outcomes and equity. These reforms are policy initiatives designed to improve educational outcomes by aligning curriculum content, teaching practices, assessment systems, and resource allocation with explicit standards. These standards start by articulating the knowledge and skills students are expected to attain at specific stages of their educational trajectory, creating a common framework for expectations and accountability. These reforms typically include assessments of student achievement to monitor progress, inform the attainment of targets linked to standards, and ensure equitable distribution of educational resources and opportunities. These reforms emerged prominently during the late 20th century, gaining substantial momentum in response to concerns about educational quality, equity, and low student achievement (Hamilton, Stecher, and Yuan 2008).

For instance, the "PISA shocks" experienced by countries such as Germany and Brazil following their lower-than-expected performance in the Programme for International Student Assessment (PISA) have driven substantial national reforms. Germany's experience in the early 2000s triggered comprehensive reforms in curriculum standards, assessment practices, and teacher training, resulting in notable improvements in subsequent PISA cycles (Ertl 2006). Similarly, Brazil responded to its PISA results by implementing national and subnational assessment systems, creating minimum education quality benchmarks, and targeting support to underperforming schools, leading to measurable improvements in student achievement and reductions in educational inequalities (Bruns, Evans and Luque 2012).

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Standards-based education reforms have been a central policy approach in the United States, gaining momentum through landmark legislation such as the No Child Left Behind (NCLB) Act of 2001 and the subsequent Common Core State Standards (CCSS) initiative launched in 2010 (National Governors Association Center for Best Practices and Council of Chief State School Officers 2010a and 2020b; United States Congress 2002). These policies aimed to establish clear, rigorous, and measurable standards for student learning, ensuring consistency across states and school districts. A primary goal was to provide transparency about educational expectations and improve equity by identifying and reducing performance gaps among diverse student populations.

The implementation of these standards-based reforms at the national and state levels in the United States led to noteworthy successes (Dee and Jacob 2011). For instance, the NCLB Act underscored accountability by mandating regular assessments and disaggregated data reporting, bringing unprecedented attention to underserved student groups, including those from minority, low-income, and special education backgrounds. These efforts promoted significant policy dialogue and initiatives around educational equity, prompting schools and districts to address long-standing achievement disparities.

At the same time, the standards-based approach also yielded several unintended consequences—not because of the standards per se, but due to the high-stakes consequences attached to them. A major critique is the narrowing of the curriculum, often described as "teaching to the test." Learning assessments under NCLB and CCSS led teachers to focus disproportionately on tested subjects, typically mathematics and literacy, sometimes at the expense of a broader educational experience that included social studies, science, arts, and physical education. Another unintended consequence was the disproportionate pressure and punitive measures placed upon schools labeled as underperforming; schools serving disadvantaged communities frequently faced sanctions and increased scrutiny, often without sufficient resources or support for improvement. As a result, instead of closing educational gaps, these measures sometimes inadvertently deepened inequities.

These experiences underline a critical lesson for policy makers interested in the use of standards in education: while standards-based reforms can effectively establish clear educational goals and accountability frameworks, policy makers must carefully balance and complement these initiatives with comprehensive support systems for school districts, schools, teachers, and students.

Purpose and scope of this study

With this history in mind, the purpose of this study is to provide a comprehensive analysis of the role of standards in education. This study expands the understanding of how standards shape educational inputs, processes, and outcomes across diverse global contexts. The study also portrays the interplay of different types of standards—compatibility, measurement, and quality standards—to clarify how educational standards shape the quality, equity, and efficiency of education systems.

To achieve this objective, the sections that follow provide an analysis of the various roles that standards play within education and training systems to achieve learning outcomes and align with labor market needs. The focus of this study is on standards for formal education systems. For emergency response and contexts that are in crisis and conflict, the Interagency Network for Education in Emergencies (INEE) offers a comprehensive toolkit defining minimum standards for education (2024).

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The next section delves into the application of standards across three critical domains: education inputs (including learning environments, teacher qualifications, and curriculum frameworks); education processes (such as school leadership, governance, accountability, and quality monitoring systems); and education outcomes (covering student learning assessments, skills development, and alignment with labor market needs).

The third and final section discusses the policy implications arising from these analyses, identifying key lessons learned from country experiences, risks associated with rigid standardization, and strategies for balancing global standards with national priorities. It concludes by offering forward-looking recommendations, particularly on adapting educational standards in response to emerging trends and challenges.

The role of standards in education and training systems

Education standards are commonly embedded in the design and planning, implementation, and outcomes of education and training services. Understanding the role of standards in education requires distinguishing between three main sequential components: inputs, processes, and outcomes.

- *Inputs* encompass all foundational resources required for delivering quality education, including elements of the physical learning environments, human resources (such as teacher qualifications), and conceptual frameworks (such as curriculum).
- *Processes* involve the mechanisms and practices through which education is delivered, including governance, leadership, pedagogy, accountability, and monitoring systems.
- *Outcomes* represent measurable results, including student enrollment, attendance, learning achievements, skills development, and transition to the labor market.

Effective standard-setting in these three areas increases the chance of delivering education services with quality, facilitates comparability, and enables coherent policy making and targeted improvements in the sector.

Standards in education inputs

Curriculum standards and learning expectations

Curriculum standards articulate learning objectives and expected competencies students should achieve at each educational level and by each subject. These standards establish learning trajectories clarifying what students should learn, and the depth and breadth of knowledge and skills required across subjects and grades. These standards are essential for aligning instructional materials, teacher practices and professional development programs, and assessment activities. Thus, curriculum standards enhance transparency and coherence within educational systems by setting explicit performance benchmarks that students are expected to meet.

International learning standards, such as the Global Proficiency Framework developed collaboratively by the UNESCO Institute of Statistics (UIS) and other international development organizations, help to inform countries about clear and measurable benchmarks in literacy and numeracy for Grades 1 to 9. Such frameworks facilitate the establishment of global benchmarks linked to student learning, allowing

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countries to compare their learning standards relative to international expectations, and guide national curricular reforms (UNESCO UIS and USAID 2023).

Curriculum standards are particularly relevant for foundational learning because they explicitly define core competencies and expected learning trajectories in literacy, numeracy, and other subjects that are essential for later student success. Clear foundational learning standards help teachers and other stakeholders understand what knowledge and skills children should acquire in the early grades of primary school. Curriculum standards of foundational learning guide the development of appropriate teaching strategies, materials, and formative assessments that target foundational skills, allowing for early identification and remediation of learning gaps.

Furthermore, well-defined curriculum standards have direct implications for teacher professional development programs. By explicitly detailing expected student outcomes and competencies, curriculum standards inform teacher preparation and professional development, ensuring that teachers are equipped with subject matter knowledge and other competencies (refer to the next subsection).

Diverse country experiences can provide lessons in the use of curriculum standards for guiding improvements to education systems. In France, curriculum standards are used to define grade-level benchmarks and learning milestones for students, which in turn can help teachers determine what students know and should be able to do. In Singapore, curriculum reforms are coupled with initial teacher education program updates and in-service training to ensure teachers are prepared to deliver the updated and expected content. Curriculum reforms in Viet Nam introduced a focus on core competencies, shifting national assessments away from testing rote memorization of facts toward evaluating students' abilities to acquire and apply knowledge and skills to solve real-life problems; these assessments are now aligned with grade-level competencies, reflecting the broader goals of the new curriculum. Finally, countries with decentralized education systems, such as Brazil and India, demonstrate that national standards can be used as a common framework that allows local adaptations to reflect the linguistic and cultural diversity of subnational divisions and local contexts.

In the United States, curriculum standards were key elements of the NCLB and CCSS standards-based education reforms. In the case of NCLB, while the reform did not mandate national curriculum standards, it required states to develop their own academic standards in language arts and mathematics, align state-level assessments to learning standards, and set learning targets and report on student progress annually. At the core of the reform, the logic was that clear state-level curriculum standards, when combined with regular assessment and consequences for underperformance, would drive school improvement. However, the variability in state-defined curriculum standards led to inconsistent expectations across the country. To address the fragmentation left by NCLB, CCSS aimed to create nationally consistent learning standards in English language arts and mathematics. CCSS also sought to support resource development, such as aligned textbooks, digital tools, and teacher training materials; in addition, CCSS linked the core standards with college and career readiness by aligning learning goals with expectations for student knowledge and skills at the postsecondary level.

Curriculum reforms should track student and school capacity and be complemented with measures to support schools identified as low performing. For example, by prompting states to adopt more demanding curricula and raise performance benchmarks with support for school improvement, the CCSS reform may have contributed to stagnant or declining achievement, particularly among students already struggling to meet grade-level expectations (Loveless 2020) A similar situation has been observed in India, Pakistan, and Tanzania, where curriculum standards are not accompanied with school improvement programs, resulting in low observed achievement levels (Liang et al. 2023; World Bank 2023).

Interventions aimed at closing the gap between curricula standards and student achievements have generally had positive results. In India, related interventions based on learning camps resulted in improvements in language scores of between 0.15 and 0.70 standard deviations, Banerjee et al. (2016) find. Similar programs find sizeable improvements in student outcomes in different developing and developed settings, such as Chile (Cabezas, Cuesta, and Gallego 2011) and the United States (Nickow, Oreopoulos, and Quan 2020), prompting the adoption of similar interventions covering at least one million students across 12 African countries (J-PAL 2023).

Standards for the teaching profession

The teaching profession requires qualification standards to guide teacher recruitment and to ensure teachers possess necessary competencies for their practice. Professional teaching standards are reflected in the competencies to be acquired in initial or pre-service teacher education programs, pathways for initial entry, ongoing professional development, and expectations for instructional quality and professional growth. In general, these standards often emphasize competencies linked to:

- *Subject matter knowledge.* Understanding and mastery of the content and concepts within the subject area taught.
- *Pedagogical knowledge and practice.* Competence in instructional strategies, lesson planning, student-centered teaching methods, and classroom management techniques.
- *Assessment competencies.* Ability to design, implement, interpret, and effectively use assessment results to inform instruction, monitor student learning, and support student growth.
- *Professionalism and ethics.* Commitment to ethical practice, equitable treatment of students, and professionalism in relationships with students, colleagues, and the broader community.
- *Commitment to continuous professional development.* Ongoing effort to improve professional skills, reflect on practice, and engage in lifelong learning activities with a community of peers and experts.
- *Inclusive and equitable practices.* Ability to recognize and respect student diversity, apply inclusive pedagogical strategies, and create learning environments that support all students.
- *Collaboration and communication.* Skills in effectively working with colleagues, parents, and community stakeholders to enhance student learning, along with clear communication of educational objectives and student progress.
- *Reflective practice.* Regular self-assessment, reflection, and engagement with others' input to support evidence-informed improvements in teaching practices.

These standards are intended to guide teachers' career and professionalization, improve everyday practice, and support professional growth in many countries around the world. For example, in Latin America, formal teaching credentials are mandated in countries such as Chile, Jamaica, and Panama. Brazil and Colombia implement standardized testing for teacher selection, assessing content knowledge, pedagogy, and reasoning skills (Mateo-Berganza Díaz et al. 2022). In the United States, states including California and Massachusetts have developed teacher certification frameworks that incorporate comprehensive coursework and performance-based assessments (Fischer et al. 2022).

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Some European countries emphasize the importance of mentoring and structured induction programs within teacher preparation and entry into the profession. Finland and the Netherlands incorporate mentoring into broader professional development strategies, fostering teacher retention and improving instructional effectiveness (European Commission/EACEA/Eurydice 2015). In Asia, Singapore maintains rigorous selection processes and comprehensive initial training, ensuring teachers meet high professional standards (Evans and Béteille 2021). In Shanghai (China), new teachers complete a one-year induction and probation period before receiving their formal appointment. The system includes clear standards for teacher evaluation and career advancement (Liang, Kidwai, and Zhang 2016). Africa, through the Continental Teacher Qualification Framework (CTQF), promotes harmonization of qualifications, though resource limitations challenge consistent implementation across the continent (African Union Commission 2019).

Minimum standards for physical learning environments

Physical learning environments are core elements critical to effective education delivery, encompassing buildings, classrooms, digital resources, and sanitation facilities. These environments directly influence safety, comfort, and ability to teach and learn (Barret et al. 2019). Ensuring that schools meet minimum infrastructure standards is essential to reduce inequities and provide all students with safe and enabling environments (Cuesta, Glewwe, and Krause 2016; Espinosa Andrade, Padilla, and Carrington 2024). For example, accessible features such as ramps support the inclusion of students with physical disabilities, and secure school buildings with functional doors and roofs protect students and staff during extreme weather conditions, while adequate water, sanitation, and hygiene facilities are essential for student health, particularly for girls.

Minimum standards are necessary for governments and education authorities interested in conducting systematic inspections, monitoring compliance, and guiding resource allocation based on infrastructure gaps. Many countries are institutionalizing these standards within their national education policies, leveraging data systems to track and improve school infrastructure.

Globally recognized frameworks, such as the RIGHT+ Framework developed by the World Bank, establish essential benchmarks for physical learning conditions. These include appropriate classroom size, adequate lighting and ventilation, access to clean drinking water and hygienic toilets, disability-friendly infrastructure, and age-appropriate furniture and learning materials. The framework also highlights the growing importance of digital readiness—such as reliable internet access and availability of digital devices—to ensure that all students, particularly in marginalized and remote areas, can benefit from 21st-century learning opportunities (Alasino et al. 2025).

Chile has established a robust mechanism to evaluate physical learning conditions through its national assessment agency. School infrastructure is monitored along with national assessments of student learning, which include dimensions such as classroom safety, digital infrastructure, and learning materials. Assessment findings are published as part of public performance reports and directly inform resource allocation and school improvement strategies (Béland and Vegas 2023).

In Rwanda, the Education Management Information System (EMIS) plays a key role in infrastructure monitoring. The Rwanda Basic Education Board conducts regular school inspections that capture information about the status of school physical conditions, sanitation, and instructional resources. The

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data gathered in the EMIS help inform interventions in areas with the greatest infrastructure needs (Harerimana and Ng'umbi 2019).

Similarly, Mauritius has invested in EMIS platforms to track key indicators such as student-teacher ratios, electricity access, and technology infrastructure. These systems support national planning and help uphold minimum standards for school facilities across public schools (ADEA 2020).

Kenya's Basic Education Regulations outline infrastructure requirements for school registration, including classroom size, ratios of sanitary facilities to pupils, and facilities for students with disabilities. These are enforced through periodic school audits conducted by quality assurance and standards officers, and linked to school capitation grants (Kenya, Ministry of Education 2022).

India includes minimum physical infrastructure standards in its unified district information system for education. These standards cover aspects such as the number of functional toilets, handwashing facilities, electricity, boundary walls, and playgrounds available in school facilities. The system informs annual planning at the state and district levels, and its use became particularly vital during the COVID-19 pandemic to assess schools' readiness for reopening (India, Ministry of Education 2024).

In Indonesia, the government uses a school zoning system combined with infrastructure mapping to prioritize investments in underserved areas. The basic education data system aggregates school-level data, including on classroom conditions and access to electricity and internet, guiding equitable distribution of resources (World Bank 2020).

Standards in education processes

School leadership and governance standards

Effective school leadership involves clearly defined roles, competencies, and responsibilities for school principals and management teams. Standards for leadership and governance aim to promote strategic vision, efficient management, and improved educational outcomes.

National education systems increasingly adopt principal competency frameworks to guide the professional development, selection, evaluation, and ongoing support of school leaders. These frameworks provide a structured understanding of what constitutes effective leadership, enabling coherence in leadership preparation programs and school governance reforms.

Similar to standards of practice for teachers, standards for school principals articulate what effective leadership looks like in daily practice. In general, these standards often emphasize professional competencies linked to:

- *Instructional leadership.* Principals are expected to lead the improvement of teaching and learning by setting clear instructional goals, supporting teacher professional development, and using student assessment data to inform instruction and school-level plans.
- *Organizational management*. Principals manage school operations efficiently, including budgeting, staffing, scheduling, and compliance with policies and regulations.

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- *Human resource development.* School leaders are responsible for building effective teams, mentoring staff, conducting performance evaluations, and creating a supportive environment for teacher professional growth and collaboration.
- *Community engagement and stakeholder collaboration.* Principals work with parents, community leaders, and education authorities to build partnerships that support student learning and wellbeing.
- *Equity and inclusiveness.* Principals uphold equity by fostering a safe, inclusive, and respectful school climate. They are expected to identify and address barriers to learning and ensure all students have equal opportunities to succeed.
- *Ethical leadership and professional integrity.* Principals demonstrate integrity, fairness, and ethical behavior in all aspects of their work. They model professionalism and hold themselves and others accountable to high standards.

While school leadership frameworks differ across countries, many are guided by international models such as the criteria for effective school leadership of the Organisation for Economic Co-operation and Development (OECD) or the leadership frameworks of the United Nations Educational, Cultural, and Scientific Organization International Institute for Educational Planning (UNESCO IIEP). The OECD highlights that effective leadership goes beyond administrative duties—it should center on improving teaching and learning. This includes promoting strong instructional practices and using data to guide classroom decisions and school improvement. The model suggested by UNESCO IIEP emphasizes the role of school leaders as levers for equity, quality, and school improvement.

Countries around the world have pursued different approaches to set standards linked to school leadership practices. In Chile, a strong institutional framework for school accountability includes leadership evaluation as a core component. The national assessment agency in Chile conducts external school reviews that explicitly assess school leadership and management quality. This is supported by a national standards framework that outlines the expected competencies of effective school leaders—ranging from instructional guidance to community engagement (OECD 2020).

European systems tend to include school leadership standards within national inspection and support frameworks. In Scotland, the standards for leadership and management guide the professional expectations for school leaders, forming the basis for leadership certification and appraisal. These standards are embedded in self-evaluation tools that help link leadership quality to whole-school improvement (Scottish Government 2020).

Kenya's education reforms, including the implementation of a competency-based curriculum, have been accompanied by efforts to strengthen school leadership. Kenya's Teacher Service Commission has introduced leadership competency frameworks and training for head teachers, particularly in instructional supervision and change management. By focusing on these areas, the commission aims to equip school leaders with the skills to manage change effectively and improve learning outcomes. However, challenges remain in implementing these standards uniformly across all schools. Studies have highlighted issues such as inadequate training for head teachers and difficulties in supervising curriculum implementation (UNESCO IIEP 2023a).

In Singapore, leadership is central to the education system's success. There is a formal career pathway for school principals that is informed by a leadership competency framework. This framework defines the qualities of effective school heads, including strategic thinking, curriculum leadership, and staff

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development. Singapore's Academy of Principals and the National Institute of Education provide training aligned with these standards, ensuring that leadership development is systemic and sustained (UNESCO IIEP 2023b).

The study of the effects of principal quality on student outcomes is an emerging field in the literature but is currently mostly focused on the United States (Grissom, Egalite, and Lindsay 2021). For example, Bartanen, Husain, and Liebowitz (2024) find that an increase of 1 standard deviation in principal quality, measured via value added metrics, increases students' test scores by 0.03 standard deviations. However, Cullen et al. (2024) find that ratings of principal quality do not meaningfully separate the distributions of principal value added, implying that any incentives based on principal rankings or ratings may not be effective.

Accountability and monitoring systems

Accountability systems track adherence to educational standards and provide feedback at different levels of the education system for continuous improvement. Effective monitoring and quality assurance frameworks play a crucial role in aligning educational processes—both inputs and outputs—with policy goals. By systematically collecting and analyzing data on elements such as school infrastructure, teacher deployment, instructional quality, and student learning outcomes, these systems help identify gaps, inform resource allocation, and support evidence-based decision-making. In doing so, they serve as vital mechanisms for ensuring that day-to-day practices within schools contribute meaningfully to broader educational objectives.

Across regions, countries are institutionalizing monitoring and evaluation mechanisms to assess compliance with standards and guide continuous improvement. These systems vary in structure and scope but share a common purpose: to promote transparency, inform decision-making, and ensure that students receive quality education.

In the United States, school accountability frameworks are shaped by federal mandates and state-specific standards. Some states monitor and categorize schools using quality ratings including information on student achievement, graduation rates, chronic absenteeism, teacher and staff qualifications, and leader effectiveness scores, among other metrics. Many states also require improvement plans for underperforming schools. Notably, a growing number of states now integrate accountability with capacity-building plans and strategies for schools. Some have established regional support networks and leadership coaching models that use accountability data to tailor school support, demonstrating a shift from punitive measures to formative, data-informed strategies (ECS 2024).

Ireland has developed an accountability and monitoring system centered on its school self-evaluation framework, which serves as both a quality assurance tool and a mechanism for continuous school improvement. Under this model, schools are required to engage in ongoing self-review against nationally defined quality standards, including teaching and learning, leadership and management, and student learning outcomes. The self-evaluation involves schools collecting and analyzing data from various sources, including student achievement results, classroom observations, and stakeholder feedback. Schools then publish self-evaluation reports and develop improvement plans outlining specific actions to address identified priorities. These plans are publicly available, enhancing transparency and enabling stakeholder engagement. External inspectors assess the quality of the self-evaluation process itself and consider its findings during external evaluations, thereby reinforcing accountability. This two-way relationship ensures that schools are both supported and held responsible for meeting national standards while maintaining ownership of their development paths (European Commission/EACEA/Eurydice 2023a).

Rwanda has developed an accountability and monitoring system that reinforces adherence to national education standards while promoting data-informed decision-making. The Rwanda Basic Education Board (REB), which conducts regular school audits in collaboration with district education officials, assesses key aspects of school performance, including teacher deployment, classroom conditions, and student achievement. As part of this effort, Rwanda has produced an education management information system to capture school-level data across a range of indicators aligned with the country's education sector strategic plans and quality standards. These indicators include metrics related to physical infrastructure (for instance, classroom availability, water and sanitation), human resources (for instance, teacher qualifications and absenteeism), and learning outcomes (for instance, national exam performance and literacy and numeracy assessments in the early grades of primary school). The data are disaggregated by region and school type, allowing policy makers to track compliance with standards and identify disparities in service delivery. Schools identified as underperforming or lacking compliance with minimum standards may be prioritized for teacher redeployment, infrastructure investment, or targeted capacity-building interventions. This approach creates a feedback loop between data, standards, and improvement planning. The REB also provides technical guidance and support to schools and districts to use EMIS data for planning and school improvement initiatives at the local level, further institutionalizing a culture of data use.

Research on the effects of school accountability focuses on two main types—government-led accountability and market-based accountability. In the case of government-led accountability, governments rank schools and tie their resource allocation to the ranking. In the United States, Hanushek, Saenz-Armstrong, and Salazar (2024) find that decentralizing school accountability led to decreased student performance, due to a retreat from the use of output-based policy toward teachers. Furthermore, Dizon-Ross (2020) finds that lower accountability grades decrease teacher turnover and increase newly hired teachers' quality for the lowest performing schools. In Chile, Elacqua, Jaimovich, and Román (2019) find that schools rated as underperforming are more likely to invest in teacher training, and Elacqua, Hincapié, and Martínez (2024) find that teachers are generally more likely to leave low-performing schools. Market-based accountability relies on making school quality information public and allowing families to choose schools, thereby encouraging schools to respond to parental preferences. For example, Andrabi, Das, and Khwaja (2017) and Barrera-Osorio et al. (2020) find that providing families with information on school quality improves test scores in Pakistan and Colombia, respectively, due to increased competition and demand for quality.

Standards in education outcomes

Student learning outcomes

Monitoring student learning outcomes through learning assessment is essential for understanding how well education systems deliver on their goals and tracking factors linked to student achievement. Two distinct but interrelated types of standards underpin efforts to assess learning meaningfully and effectively: first, *technical standards* for assessment tools; second, *curriculum standards* to inform assessment content that specify what students are expected to learn at each stage of education. The association between the curriculum learning standards and the contents of learning assessments can inform the progress of students in attaining the learning outcomes described in the curriculum

Technical standards for learning assessments ensure that student assessment tools generate valid, reliable, and comparable results across populations and over time. These standards define the principles and best practices for developing, administering, scoring, and interpreting learning assessments, and they are essential for the credibility of education data used in policy making and classroom practice. Well-established technical standards include:

- The Standards for Educational and Psychological Testing, developed jointly by the American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, which provide detailed guidelines on validity, reliability, fairness, and assessment use (AERA, APA, and NCME 2014).
- Standards developed by the International Test Commission, which emphasize cross-cultural assessment practices, assessment adaptation, and responsible assessment use in international contexts (International Test Commission 2001).
- Educational Testing Service (ETS) Standards, which guide large-scale standardized test development and have influenced quality assurance for assessment and examination programs globally (ETS 2014).
- UNESCO UIS assessment frameworks and data quality standards, which support cross-national comparability of learning outcomes and reporting for Sustainable Development Goal 4 (SDG 4) indicators.

These technical standards are critical for national and international assessments programs. They ensure that results are psychometrically sound and usable for learning monitoring, benchmarking, and system improvement.

Alongside technical standards for assessment design are curriculum standards embedded in national or subnational curricula and are typically organized by subject and grade level, defining the knowledge and skills students should acquire. Realizing these standards in practice requires alignment across three critical dimensions of curriculum:

- *Intended curriculum.* The formal learning goals defined by the government or education authority and reflected in the national curriculum framework.
- *Implemented curriculum.* The actual learning content taught by teachers in the classroom, influenced by instructional materials, teacher training, and school conditions.
- *Attained curriculum.* The knowledge and skills students ultimately acquire and demonstrate, typically measured through learning assessments.

Understanding this relationship helps education systems identify where breakdowns occur in the teaching and learning chain. If the attained curriculum is far below expectations despite well-designed learning standards, the issue may lie in the implemented curriculum in the classrooms. Alternatively, if assessments are not aligned to the intended curriculum, they may not accurately capture what students were taught, undermining their usefulness for monitoring progress or guiding instruction.

Well-functioning accountability systems use this three-part framework for curriculum standards to diagnose challenges and support improvement. They triangulate assessment results with classroom observations, curriculum audits, and teacher development data to build a comprehensive understanding of how learning standards are enacted and implemented. In this relationship, effective student assessments are a key tool to evaluate how closely the attained curriculum aligns with what was intended, and to what extent it was implemented. When assessments are aligned with national or subnational learning standards, they can serve multiple functions: tracking system performance, informing instructional adjustments, and identifying equity gaps in learning opportunities.

In India, the national assessment program is designed to reflect grade-level learning outcomes from the national curriculum framework. Assessment findings often reveal a disconnect between intended and attained learning, pointing to gaps in the implementation phase—such as uneven teacher preparation or limited instructional time. India operates a federal system where education is a concurrent responsibility shared between central and state governments. Therefore, while national assessment content is aligned with national-level learning outcomes, Indian states often analyze the results against their own curriculum and policy frameworks; some states rely on the national assessment data to update their textbooks, prioritize foundational learning, and adjust teacher professional development programs. Moreover, under the national education policy enacted in 2020, India aims to strengthen the link between national assessments and a performance index to evaluates state-level progress on multiple education indicators, including learning outcomes (NCERT 2023).

In Brazil, the content alignment of the national assessment program to the common core learning standards enables the Ministry of Education to analyze the gap between what students are expected to learn and what they achieve. Because of the autonomy of Brazil's 27 states and more than 5,000 municipalities, the national assessment results are used by subnational governments to identify achievement gaps, inform local curriculum adaptations, and support teacher training aligned with national standards. States and municipalities retain the authority to develop their own curricula, provided they are aligned with the common core learning standards; therefore, the national assessment findings can provide evidence to support alignment, revealing whether students are achieving expected competencies and highlighting regional disparities. Finally, some Brazilian states have used the national assessment results to build state-level education plans, allocate resources more equitably, and introduce incentives tied to performance improvement (OECD 2021) (refer to box 1).

Box 1. Education standards in action: The case of Ceara, Brazil

One illustrative example of how systemwide standards, benchmarking, and monitoring of student learning outcomes have driven substantial improvements in the education sector comes from the state of Ceara in Brazil. In the early 2000s, Ceara had historically low literacy rates. Ceara's education authorities embarked on a reform strategy grounded in clear standards for foundational learning. The state set ambitious benchmarks requiring that all students be literate by the end of Grade 2, aligning this goal with both the curriculum standards and teacher expectations. These learning benchmarks were codified into performance targets for municipalities, backed by legal instruments and funding mechanisms.

Ceara combined these targets with updates to systemwide standards, including curricular reforms that emphasized foundational literacy and numeracy, teacher professional development aligned to new instructional practices, and periodic state-level assessment to monitor student progress. Municipalities were given both autonomy and accountability: while local adaptation of implementation strategies was

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encouraged, achieving state benchmarks for literacy and numeracy became a condition for accessing additional financial resources through the tax transfer incentive scheme.

Monitoring was rigorous and systematic. The state introduced the SPAECE (Sistema Permanente de Avaliação da Educação Básica do Ceará), a state-level large-scale assessment program administered annually, to monitor student performance against the established standards. Results were published, allowing for public recognition of progress and peer benchmarking across municipalities. High-performing municipalities received financial rewards and public recognition, creating strong positive incentives for continuous improvement.

The results have had a long-lasting impact. Over two decades, Ceara has achieved near-universal literacy by the end of Grade 2 across the state, outpacing national averages and serving as a model for other Brazilian states. Loureiro et al. (2020) attribute Ceara's success to the coherent alignment between standards (defining what students must learn), guidelines (providing municipalities with technical support and recommended strategies backed by evidence), and benchmarks (setting measurable goals and targets). This experience underscores the role of clear learning standards, continuous monitoring, and targeted support in driving foundational learning improvements, particularly in decentralized systems.

Source: Based on Loureiro et al. 2020.

In addition to national assessment programs, regional and international large-scale assessments offer education systems another source of information on student learning by providing a basis for cross-country comparisons. Unlike national assessments, these international programs do not rely on individual countries' national learning standards. Instead, they are built around shared assessment frameworks that define the learning domains and proficiency levels to be assessed. These frameworks are developed through technical consultations with participating countries, coordinated by the international assessment agencies. The assessment frameworks reflect a consensus on what students should know and be able to do to meet globally relevant competencies. As such, these assessments provide a common reference point for evaluating student performance across diverse education systems, independent of the specific content of national curricula.

One of the most influential international assessments is the Programme for International Student Assessment (PISA), coordinated by the OECD since 2000. Administered every three years to 15-year-olds, PISA measures students' ability to apply knowledge and skills in reading, mathematics, and science to real-world contexts. Because it is not based on any single national curriculum, PISA serves as a powerful tool for assessing whether education systems are cultivating the types of competencies needed for participation in modern economies and societies. In many countries, PISA results have acted as a catalyst for reviewing and updating education standards across multiple domains—not only in curriculum content, but also in teacher professional development, student assessment frameworks, and system-level accountability. For instance, the significant performance gaps revealed in early PISA cycles led Germany to reform teacher training and early childhood education policies, while in countries like Brazil, PISA data contributed to revisions to the national curriculum.

Other international assessments, such as the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS), are more explicitly aligned with curriculum-based learning and provide insight into how well students have mastered content typically taught in school. Since 1995, TIMSS has assessed mathematics and science in Grades 4 and 8 every five years. PIRLS, initiated in 2001, focuses on reading comprehension in Grade 4 and is administered every four years. These assessments are used widely to monitor learning outcomes and to inform curriculum review processes, textbook revisions, and instructional guidance for teachers. In 2021, 57 countries participated in PIRLS, while in 2023, 64 countries administered TIMSS. In countries such as Japan, the Republic of Korea, and Singapore, results from TIMSS and PIRLS have led to targeted adjustments in curriculum pacing and sequence, and refinements in teacher education standards.

Across regions, a variety of regional assessment programs have emerged to complement global assessments and provide context-sensitive measures of student learning. In Latin America, the Regional Comparative and Explanatory Study (ERCE) assesses foundational skills using regionally developed benchmarks. Its findings have informed curriculum alignment and equity discussions in the region. In Sub-Saharan Africa, assessments such as the Programme d'Analyse des Systèmes Éducatifs de la CONFEMEN (PASEC) and the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) offer valuable information on literacy and numeracy in primary education. Assessment results have been used to raise awareness about foundational learning and factors linked to student learning. In Asia and the Pacific, the Southeast Asia Primary Learning Metrics (SEA-PLM) and the Pacific Islands Literacy and Numeracy Assessment (PILNA) support cross-country benchmarking and help align national frameworks with shared regional learning goals.

Regional and international assessments offer a powerful tool for driving standards-based reforms. When integrated into broader monitoring and curriculum frameworks, and supported by teacher development and institutional capacity-building, they can help countries improve the quality of their education systems. However, despite their growing use, regional and international assessments are not without challenges. In many countries, especially in lower-income regions, participation is limited by technical and financial constraints. Even for participating countries, many education systems struggle to translate findings into classroom-level changes, in part due to weak data-use capacity among educators and a lack of supportive professional development. Moreover, aligning national curricula with the competencies covered in international assessments requires careful consideration, particularly where cultural, linguistic, or contextual differences may affect interpretation and relevance (Clarke and Luna-Bazaldua 2021; Gove et al. 2015).

In addition to overall assessments, international learning indicators can help promote progress. Some examples are discussed in box 2.

Box 2. Are international learning indicators a type of standard?

International learning indicators have become important tools for helping countries track progress in education and set clear targets for improvement. Two key examples are Sustainable Development Goal (SDG) 4.1.1 indicators and the Learning Poverty indicator.

SDG 4.1.1 monitors the percentage of children and young people achieving minimum proficiency in reading and mathematics at three stages: early primary (Grades 2/3); end of primary; and end of lower secondary education. These indicators are part of the global framework to monitor progress toward SDG 4, which commits countries to ensure inclusive and equitable quality education for all. The UNESCO Institute for Statistics (UIS) serves as the custodian agency for SDG 4.1.1 (UNESCO UIS 2019).

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While SDG 4.1.1 is not a binding standard, it acts as a global benchmark that allows countries to monitor student learning and compare progress across education systems. To report on SDG 4.1.1, many countries use results from national, regional, or international assessments. These assessments must meet specific technical criteria to ensure that the reported data are valid, reliable, and aligned with the minimum proficiency frameworks developed by UIS. As a result, SDG 4.1.1 has helped harmonize assessment practices and strengthen technical capacity for learning assessment in many countries.

The Learning Poverty indicator, developed by the World Bank, complements SDG 4.1.1 by offering a clear and powerful message: it defines a child as "learning poor" if they cannot read and understand a simple text by age 10. The Learning Poverty indicator combines schooling data with proficiency data from SDG 4 indicators, helping policy makers and society to easily grasp the scale of the foundational learning crisis. This indicator has proven highly effective in raising awareness, prioritizing early reading reforms, and guiding resource allocation, especially in low- and middle-income countries (World Bank 2019).

Both indicators serve primarily as benchmarks, not binding standards. They give countries reference points to guide national reforms, set learning goals, and strengthen monitoring systems. The use of international learning indicators alongside national standards can help countries create a more coherent, transparent, and results-oriented education system.

Skills development and alignment with labor market needs

Unlike general education, job-oriented skills development—particularly through Technical and Vocational Education and Training (TVET) and higher education (HE) pathways—places greater emphasis on practical and employable skills. To better align TVET with labor market demands, standards have been established to ensure that learners acquire the knowledge and competencies necessary for workforce entry and effective job performance.

In the context of TVET, these standards—often referred to as *occupational standards*—are tailored to specific job profiles. Occupational standards define the knowledge, skills, and attitudes required to perform job roles within a given industry. They are typically developed in consultation with employers and industry associations to ensure alignment with current workplace requirements. For example, South Africa's Organising Framework for Occupations (OFO) is used to classify and update occupational competency standards, which guide curriculum development and certification (South Africa, DHET 2018). Similarly, the United Kingdom's National Occupational Standards (NOS) provide detailed competency benchmarks used to structure apprenticeships and vocational qualifications (Skills Development Scotland 2024).

Occupational standards influence curriculum design by ensuring that training programs reflect industry trends and workforce needs. Based on these standards, TVET systems develop *curriculum standards* that translate occupational profiles into structured content, delivery processes, and defined learning outcomes. Curriculum standards typically specify requirements for instructors, core and technical subject areas, credit hours, minimum facilities and equipment, and mandatory hours of hands-on or workplace-based training. They often include criteria for trainer qualifications, such as prior industry experience or participation in ongoing professional development through industry attachments. These curriculum standards define what should be taught and how learning outcomes—commonly referred to as "skills"—should be assessed.

Standards also play a central role in qualification frameworks, including national qualification frameworks (NQFs) and regional qualification frameworks (RQFs), which map skills and knowledge across different education levels. These frameworks serve as reference points for evaluating the relevance and comparability of degrees, certificates, and other credentials. In some countries, employer associations or sectoral bodies help define and periodically update occupational standards, promoting a more demand-driven approach to skills development. These standards also establish a common language among educators, employers, training providers, and policymakers, thereby supporting the alignment of education outcomes with economic development priorities.

Moreover, occupational and curriculum standards underpin quality assurance systems. They guide the accreditation of training institutions, evaluation of training effectiveness, and certification of learners. When integrated with labor market information systems, standards also inform career guidance, internships, and apprenticeship programs, supporting smoother school-to-work transitions through real-world learning experiences.

At the international level, institutions such as the International Labour Organization (ILO), the European Centre for the Development of Vocational Training (CEDEFOP), and the ASEAN Qualifications Reference Framework (AQRF) have played a pivotal role in supporting the design of competency-based TVET systems. These organizations promote standards that define the knowledge, skills, and attitudes needed for successful employment.

The ILO has developed international standards for training and qualifications, including guidance on the development of NQFs, recognition of prior learning, and integration of core work skills into curricula. Through its Skills for Employment program, the ILO promotes demand-driven training systems based on labor market analysis and social dialogue with stakeholders. It also supports the development of occupational standards across sectors (ILO 2021).

CEDEFOP, serving primarily European Union member states, has been instrumental in advancing the European Qualifications Framework (EQF) and harmonizing national qualification frameworks across Europe. It has developed tools to map and compare learning outcomes-based qualifications, enhancing transparency, mobility, and mutual recognition of skills. CEDEFOP also produces in-depth studies on lifelong learning, skills forecasting, and vocational excellence (CEDEFOP 2020).

The ASEAN Qualifications Reference Framework (AQRF) fosters alignment of national education and training systems with labor market needs across ASEAN countries. It establishes shared benchmarks for skills and competencies, encourages competency-based education, and facilitates mutual recognition of qualifications through a voluntary referencing process. The AQRF supports workforce mobility, strengthens quality assurance systems, and helps reduce skills mismatches (UNESCO-UNEVOC 2023).

NQFs provide overarching structures for organizing and recognizing qualifications based on learning outcomes. They promote consistency in certification, enable movement between academic and vocational tracks, and improve credential transparency for employers. In Ghana, for example, the Commission for TVET has integrated NQF reforms to harmonize qualifications across various education and training providers (CTVET 2021).

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TVET systems use a combination of formative and summative assessments to evaluate both theoretical knowledge and practical skills. Practical competencies are often measured through performance-based tasks, including simulations, skills demonstrations, project assignments, and real-world workplace evaluations. Many systems adopt competency-based assessment models, which require learners to demonstrate mastery of specific tasks rather than relying solely on written exams. These assessments are aligned with national or sectoral qualification frameworks and, in some countries, verified by external quality assurance bodies or industry-recognized certification agencies.

Countries such as Germany and Switzerland implement dual vocational training systems where curricula are co-developed by education authorities and employer associations (European Commission/EACEA/Eurydice 2023b). In Malaysia, national skills standards are routinely updated by industry working groups and embedded in the Malaysian Skills Certification framework, ensuring responsiveness to labor market changes (ASEAN 2020).

In Ethiopia, the Ministry of Labour and Skills is collaborating with employers to develop occupational standards in priority sectors like construction, tourism, and agriculture. Donor-funded programs are helping integrate labor market intelligence into the standard-setting process to align education, training, and employment policy (Ethiopia, Ministry of Science and Higher Education 2020).

Assessment standards are also critical for certifying that TVET graduates meet expected competency levels. They specify the performance benchmarks, methods, and criteria for evaluating occupational skills. For instance, Chile's *Chile Valora* agency certifies worker competencies through independent assessments aligned with nationally validated occupational profiles—regardless of how or where the skills were acquired (Chile, Ministry of Education 2022).

The standardization of skills and credentials improves labor market outcomes by reducing information asymmetries between job seekers and employers. In South Africa, providing standardized assessment results to job seekers shortened job search durations and increased income (Carranza et al. 2022). In Uganda, certifying noncognitive skills led to higher worker evaluations by managers and improved wages (Bassi & Nansamba 2022). In Colombia, recognition of top scorers on national exit exams raised wages by 7–10 percent, particularly among disadvantaged groups with weaker signaling power (Busso, Montaño, and Muñoz-Morales et al. 2023).

However, occupational standards must remain dynamic. Technological advances, automation, and the emergence of the digital economy are continually reshaping job profiles and skill requirements. To stay relevant, TVET and skills development systems must adapt and innovate in response to changing labor market conditions.

A growing number of TVET institutions are addressing this challenge by adopting international quality management standards, such as ISO 21001 (Educational Organizations Management Systems). For example, Malaysia's Ministry of Education promotes ISO 21001 implementation in TVET under the Malaysia Education Blueprint. In East Africa, a World Bank-financed initiative supports flagship TVET colleges—many of which have attained ISO 9001 accreditation for quality management systems. In Singapore, the Institute of Technical Education (ITE) has developed its own adaptive quality assurance framework known as GEMSET, the Global Excellence Model for Skills Education and Training (GEMSET) which is a holistic system of Quality Assurance for continuous improvements towards *excellence in* *training*. GEMSET integrates strategic planning, performance measurement, and continuous improvement processes, enabling ITE to remain agile and responsive to evolving industry needs while maintaining high standards of institutional performance. This localized, data-driven approach reflects Singapore's broader emphasis on institutional autonomy, innovation, and workforce alignment within its TVET ecosystem.

Policy implications and recommendations

Educational standards can serve as useful instruments to drive improvement across education systems, yet their adoption and effectiveness depend on how they are designed, implemented, monitored, and sustained. This final section distills key insights from the literature and country experiences highlighted in the previous sections and provides actionable recommendations for policy makers seeking to leverage standards to improve education quality, equity, and relevance in a rapidly changing world.

Key lessons from country transitions

Transitions from the absence of standards to their adoption—and eventually to authoring standards—require deliberate planning, broad-based consensus, and institutional capacity. Country experiences show that several enabling factors are consistently associated with successful transitions:

- *Coherent governance and policy alignment.* Systems that achieve progress in standard adoption tend to have aligned purpose and policies across education levels and institutions. For example, Ghana's reform of initial teacher education standards was supported by curriculum redesign, assessment changes, and teacher training upgrades—all within a unified policy framework. The education transformations of both Japan and Korea focused on making sure that all students met minimum standards for learning and ensured results through rigorously enforced quality assurance mechanisms. Both countries also considered the purpose of education to be central to national development (Crouch and Spindelman 2023).
- *Investment in capacity and information systems.* Effective implementation of standards relies on the availability and effective use of timely, reliable data. Korea's education quality assurance and school evaluation systems have enabled data-informed adjustments and widespread compliance with national education goals.
- *Stakeholder buy-in and local relevance*. Countries that embed standards in participatory processes involving educators, local communities, and sectoral institutions achieve better compliance and sustainability. Conversely, top-down reforms that disregard contextual realities may face resistance or implementation failures. For example, in Kenya, the development of the competency-based curriculum involved extensive consultations with teachers, parents, curriculum experts, and civil society organizations, which helped foster a sense of ownership and improved the legitimacy of the reform despite initial implementation challenges (Njeng'ere and Li 2017).

However, country experiences also underscore risks when standardization becomes overly rigid. One-size-fits-all models may overlook diverse needs of students, teachers, and other stakeholders, or create perverse incentives, as seen in some US states under the NCLB Act. Likewise, minimum standards, if treated as ceilings rather than floors, may stifle innovation or drive systems toward compliance without quality.

Recommendation: Policy makers should treat standards as evolving instruments—to be revisited periodically, informed by data, and refined through feedback loops—not as static prescriptions. They should also ensure there is alignment of purpose between standards and the various components of the education system; purpose-driven systems tend to lead to better outcomes for all (Kaffenberger 2022). Evidence from Finland's education reforms shows that curriculum reviews, undertaken every decade, have enabled the system to remain responsive to societal and labor market changes while maintaining coherence and high performance (Sahlberg 2015). Similarly, Chile's gradual adjustments to its El Sistema de Medición de la Calidad de la Educación (SIMCE) national assessment program demonstrate how iterative feedback mechanisms can enhance both technical quality and policy relevance over time (Mizala Salcés and Schneider 2019).

Balancing global standards with national priorities

While global standards offer useful reference points and support comparability, local adaptation is critical for relevance and legitimacy. The adoption of international benchmarks—such as the Global Proficiency Framework or regional qualification frameworks like the AQRF—has helped many countries align educational goals with broader development and labor market needs. However, adopting these benchmarks without adaptation to the local or regional context can risk undermining national ownership or overlooking system-level constraints such as infrastructure gaps, teacher preparedness, or linguistic diversity.

Striking the right balance requires deliberate efforts to localize global frameworks. This includes aligning international benchmarks with national curricula, involving multiple stakeholder groups (such as teachers, students, parents, employers, and local education officers) in adapting standards to classroom realities, and adjusting learning targets to reflect learners' starting points and learning needs.

Governance structures also play a central role. In some contexts, ministries of education lead standard-setting directly through curriculum units or statutory bodies. In others, the process is shaped by assessment agencies and examination boards, teacher professional councils, or higher-order academic institutions and professional groups. For instance, Finland's model stands out for its high-trust approach: teacher education institutions and practitioners are closely involved in shaping curriculum and pedagogical standards, reinforcing both quality and ownership. Meanwhile, the AQRF in ASEAN serves as a meta-framework, enabling mutual recognition of qualifications across countries while allowing national authorities to define content and implementation in line with domestic priorities.

Recommendation: Governments should clearly define who sets the standards, to what end, and under what oversight mechanisms. These arrangements should be designed to foster inclusive consultation, ensure technical soundness, and encourage iterative feedback loops. Creating space for adaptation—while using global benchmarks as scaffolding—can help national education systems remain both ambitious and grounded, setting a foundation for sustainable progress toward broader education and development goals.

Future directions: Standard-setting in the digital age

The rapid expansion of technologies in education, including the use of Artificial Intelligence (AI), remote learning, and digital credentials, presents both opportunities and challenges for standard-setting. Policy makers must now address emerging areas such as:

- *Digital infrastructure standards.* As digital technologies become integral to teaching and learning, setting clear and equitable standards for infrastructure is critical to ensure all students and teachers have meaningful access to devices, internet connectivity, and digital platforms. These standards guide national investments, support interoperability across systems, and help align infrastructure development with pedagogical goals. Without such benchmarks, digital divides risk reinforcing existing educational inequalities.
- *Digital literacy and competency standards.* Frameworks such as UNESCO's ICT Competency Framework for Teachers (ICT CFT) and the European Digital Competence Framework (DigComp) offer structured guidance on the digital skills teachers and learners should acquire at various stages. These standards help countries embed digital competencies into curricula, assessment frameworks, and teacher professional development. When contextualized appropriately, they support lifelong learning and labor market readiness in an increasingly global digital economy.
- *Technology-enhanced assessments and credentials.* As learning increasingly occurs in blended, online, or informal settings, traditional qualifications alone may no longer capture the full range of learning students may need or experience. Standards for micro-credentials and other alternative forms of certification are essential to ensure quality, portability, and recognition across institutions and international borders. These emerging standards also help link education and training systems to evolving labor market needs, facilitating smoother transitions for learners into work or further study.
- *Data privacy and security.* Prioritizing safety in education technology and digital access is critical to building trust, protecting users, and preventing cyber threats. Estonia has been a leader in digital governance and education, embedding privacy protections into digital infrastructure and ensuring education and government systems prioritize security (Estonia, Ministry of Education and Research 2021; World Bank Group ID4D 2016). Yet, the pace of innovation often outstrips regulation. The design and enforcement of standards must be agile and responsive to technological change. Countries should consider periodic review mechanisms and establish units within ministries to anticipate and adapt to emerging trends. The experience of Uruguay's Ceibal program has helped to position the country as a global leader in digital learning. As an independent agency with its own budget and governance structure, Ceibal has had the freedom and flexibility to quickly identify and test promising innovations (Molina et al. 2024a).

Recommendation: Policy makers should embed standard-setting mechanisms within broader digital transformation strategies, ensuring alignment with pedagogical goals, system equity, and workforce demands. Proactive adaptation to ensure education systems can leverage the transformative power of the AI revolution is key to ensuring such tools increase learning opportunities for all, rather than widen already significant gaps in outcomes (Molina et al. 2024b).

Cross-cutting considerations for effective standards

A number of cross-cutting lessons have emerged across all types of standards—whether related to curriculum content, teacher competencies, learning environments, or student assessment. These lessons emphasize how standards are framed, implemented, communicated, and sustained:

- *Aspirational standards versus minimum benchmarks.* Standards frameworks often distinguish between basic performance thresholds and more ambitious targets. While minimum standards ensure a foundational level of quality and safety—such as basic reading proficiency or minimum ICT infrastructure—aspirational standards may serve as a compass for long-term improvement of the education and training systems. Countries such as Finland and Singapore have become reference points for aspirational standards in teaching and learning. Finland emphasizes deep professional autonomy, high expectations for initial teacher education, and a trust-based approach to curriculum implementation, while Singapore's system sets rigorous standards for teacher recruitment, training, and career progression, paired with high expectations for student performance and innovation in pedagogy.

Recommendation: Governments should develop a dual-track standards framework: one that sets minimum quality benchmarks to ensure basic functionality and equity across all schools, and another that defines aspirational standards to drive long-term improvement and innovation in the education and training systems. This approach allows for targeted interventions where needed, while empowering more capable institutions to lead transformation. For example, Chile sets both minimum teacher performance standards via the *Docentemás* program and incentivizes promotions based on the *Carrera Docente* (CPEIP 2024).

- *Link standards to support mechanisms.* Standards are only meaningful if teachers, school principals and management teams, and institutions are supported in achieving them. This means accompanying standards with clear implementation frameworks, including targeted teacher training, funding allocations, curriculum-aligned materials, and communities of practice. For instance, teacher professional standards that outline expectations for assessment literacy or inclusive pedagogy are more likely to translate into improved classroom practice when supported by continuous professional development programs and practical toolkits. Without such scaffolding, even well-crafted standards may remain aspirational in name only.

Recommendation: To ensure that educational standards lead to tangible improvements in teaching and learning, governments should systematically link these standards to robust support mechanisms. Standards alone are insufficient if educators and institutions lack the capacity and resources to meet them. This means embedding standards within a broader implementation framework that includes aligned teacher training, teaching and learning materials, sustained professional development opportunities, and targeted funding. Notably, financial support should be structured to reflect both the costs of achieving basic educational conditions and the incentives needed to motivate continuous improvement. For example, India implemented the NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement), providing teachers and schools with resources for continuous professional development aimed at improving their effectiveness by covering recent advances in pedagogy, assessment, and competency-based learning (NCERT 2024).

- *Embed equity and inclusion.* Standards must go beyond uniform expectations and acknowledge the diverse starting points and learning needs of different populations. This requires incorporating explicit equity dimensions—such as provisions for learners with disabilities, indigenous languages, or gender parity—into the formulation of standards. For example, infrastructure standards might include requirements for accessible learning spaces, while curriculum standards can mandate the inclusion of culturally relevant content. Making equity central to standards design ensures they promote fairness rather than unintentionally reinforce existing inequalities.

Recommendation: Standards frameworks should be designed with equity and inclusion embedded at their core, not treated as afterthoughts. This means recognizing that uniform benchmarks alone may inadvertently reinforce existing disparities if they ignore the diverse starting points, backgrounds, and needs of students. Equity-conscious standards should include explicit accommodations for learners with

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disabilities, culturally relevant curriculum content, multilingual provision (including indigenous languages), and gender-sensitive infrastructure and pedagogy. For example, Bolivia's 2010 educational reform explicitly included multilingual instruction encompassing indigenous languages, incorporated culturally relevant content, and explicitly discusses the right to education of nontraditional students and people with disabilities, learning difficulties, and extraordinary talents (UNESCO UIL 2023).

- *Ensure transparency and public awareness:* Well-designed standards should be widely disseminated and accessible to nonspecialist audiences, including parents, communities, and students themselves. Public-facing formats—such as learner-friendly rubrics, teacher self-assessment checklists, or infographics for school report cards—can help demystify technical content and foster a culture of accountability and shared ownership.

Recommendation: Ministries of education should develop a national communication strategy that translates standards into user-friendly materials tailored to different audiences. This strategy should include regular dissemination through school events, mass media, and digital platforms, and integrate training for school leaders and teachers on how to engage communities in interpreting and using standards-related information.

- *Recognize political economy dimensions:* Standard setting is not a purely technical endeavor; it involves negotiations over values, priorities, and power. Questions such as who defines the standards, whose knowledge counts, and what interests are being served shape both the substance and legitimacy of standards. Governments must therefore invest in inclusive consultation processes that bring in teachers, civil society, and marginalized groups to mitigate resistance and ensure that standards reflect collective aspirations rather than narrow policy agendas.

Recommendation: Standard-setting processes should be guided by a formal stakeholder engagement framework that mandates multiphase consultations with educators, unions, parent associations, and community leaders. These consultations should be transparently documented, and their feedback visibly integrated into draft revisions to strengthen legitimacy, buy-in, and long-term sustainability of the reforms.

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