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Ecosystems approach to curriculum change

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Ecosystems Approach to Curriculum Change

No 135

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Abstract

An ecosystems approach means designing and implementing a curriculum using principles of quality curriculum design, while navigating and responding to the complex dynamics of a variety of concerned and influential parties, to the benefit of student outcomes. Curriculum reform is among the most politically and institutionally demanding forms of education change. This paper argues that reform outcomes depend not only on high-quality and responsible design in the interest of students, but also to a significant extent on the ecosystem in which they are interpreted and enacted. This ecosystem – a living web of actors, relationships, routines, resources and infrastructures spanning multiple levels – is always present, whether or not it is acknowledged. Synthesising principles of effective curriculum design, country cases and insights from the OECD Future of Education and Skills 2040 initiative, the paper details ecosystem strategies that improve the odds of success: nonpartisan multi-stakeholder dialogue to build legitimacy; strengthening agency; using collective impact; and aligning pedagogies, assessment and teacher standards with curriculum intent. An ecosystems approach does not simplify reform, but it illuminates interdependencies and strengthens coherence, rigour, focus, trust and adaptive capacity, increasing the likelihood that curriculum designs translate into meaningful learning outcomes.

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Executive summary

An ecosystems approach means designing and implementing a curriculum using principles of quality curriculum design, while also navigating and responding to the complex dynamics of a variety of concerned and influential parties, to the benefit of student outcomes.

Curriculum reform is one of the most politically and institutionally demanding forms of education change. Across OECD systems, implementation often falls short—not because visions are weak or designs are flawed, but because reforms unfold in complex ecosystems where actors, incentives, routines and resources interact in unpredictable ways. As aims broaden (e.g. digital literacy, global competence, social-emotional skills), many systems report perceptions of overload and a time lag between future-ready aspirations and change on the ground.

An ecosystems approach does not replace curriculum design and implementation; it aids effectiveness. The approach recognises that relationships across micro, meso, exo, macro and chrono levels continuously shape how curriculum is interpreted, negotiated, taught, experienced and evaluated, and that reform depends on alignment, trust and feedback across the system.

Governments' roles are shifting from central control toward stewardship: setting direction, equity goals and standards while enabling local flexibility. In parallel, curriculum objectives are evolving — transformative competencies and student agency are more explicit, values and culture are deliberately embedded, and well-being is treated as both an outcome and an enabler of learning.

Policymakers pursuing curriculum change already have a theory of change, whether conscious or unconscious. Logic models make these theories concrete by mapping inputs, activities, outputs and outcomes, clarifying roles, surfacing assumptions and supporting monitoring and evaluation. Used well, they focus implementation and help explain how frameworks, guidance, professional learning, assessment and infrastructure are expected to improve teaching and learning.

Stakeholder engagement and partnerships are core system functions. Legitimacy and durability depend on non-partisan dialogue, transparent framing and meaningful roles for teachers and students as co-creators. Collective impact offers one practical way to mobilise co-agency at scale. Public-private collaboration (e.g. with EdTech and publishers) can accelerate alignment when governed for public value, interoperability and ethical data use; misaligned incentives can pull practice toward what is easiest to implement or measure.

Reforms increasingly imply pedagogical shifts towards student-centred, inquiry-oriented and competency-based approaches. Common frictions create misalignment: pedagogical lag (reversion to familiar routines when time/support are limited), assessment tension (high-stakes regimes rewarding recall despite competency goals) and structural silos (teacher education, professional learning and standards evolving apart from curriculum). Addressing these requires deliberate alignment of pedagogy, assessment, teacher education and standards, and materials and infrastructure.

Pointers for action include:

- Framing reform as iterative and evidence-informed
- Engaging strategically to accelerate implementation
- Pairing inclusive processes with strong design discipline
- Embracing student and teacher agency
- Creating coherence so that signals across curriculum, assessment, teacher education, professional standards, materials and accountability reinforce one another.

Further inquiry is needed on ecosystem impacts over time, how to bridge life stages (early years to higher/adult learning), how to balance demand-driven pressures, and how to convert broad participation into design quality at scale.

Overall, curriculum change is both a design challenge and a systemic, relational, adaptive process; an ecosystems approach can improve the odds that ambitions translate into better learning, well-being and equity.

1 Introduction

Curriculum reform is one of the most politically and institutionally demanding forms of education change. Across OECD systems, redesign and implementation efforts often fall short of expectations, not because of weak vision or technical design, but because of the complex dynamics of the ecosystems in which reforms are implemented.

Pressures from societal, economic and technological change have expanded the demands on curricula (for example, to include components such as digital literacy, global competence and social-emotional skills), but adding new content has led to a perception of overloaded curricula without necessarily improving outcomes (OECD, 2020[1]). Many countries have articulated future-ready visions, including digital, personalised, interdisciplinary and flexible curricula, but implementation challenges persist, resulting in a "time lag" in updating curricula to reflect future needs (OECD, 2020[2]). While 21st-century competencies like critical thinking are now common in curriculum goals, change on the ground is slower than desired.

1.1. Curriculum reform is challenging

Policies and curricula are not self-implementing. Producing a well-designed curriculum document is only part of the challenge. Achieving desired outcomes depends also on how that curriculum is expected, perceived, negotiated, taught, experienced and evaluated.

Governments undertaking curriculum design and implementation have a set of explicit and possibly implicit objectives, or the "intended curriculum". The extent to which curriculum design and implementation result in achievement of those objectives can be considered a measure of effectiveness. Several governments that have conducted such activities in recent years went on to produce evaluations to determine how effective curriculum design and implementation were in their systems.

Reflecting on published evaluations and related documents measuring effectiveness, as well as feedback gathered through a survey of government officials participating in the OECD Future of Education and Skills 2040 project (OECD, 2024[3]), some important findings stand out.

Some curriculum changes fall short of the desired effectiveness. It cannot be assumed that curriculum redesign alone will directly result in the intended impacts. This has been evident where curriculum reforms were not followed by gains in student achievement. For example, in Ireland, an evaluation of the secondary mathematics curriculum reform "Project Maths" found "limited effects on performance, with no significant differences" in student achievement in key areas shortly after implementation (Shiel, 2017[4]). Another example is Sweden, which introduced multiple large-scale education reforms around 2011, including a new curriculum and grading system. A few years on, the Swedish National Agency for Education reported "a continuing decline in educational results" in core subjects (Skolverket, 2015[5]). Reforms can also fall short when curriculum intent does not translate into classroom practice, known as an "implementation gap" (OECD, 2024[6]). In such contexts, new priorities may be taught unevenly, or not at all.

Some curriculum changes have unintended consequences. For example, Scotland's Curriculum for Excellence (CfE), implemented from 2010, is a national 3-18 curriculum emphasising holistic, future-

oriented learning. An OECD-commissioned review (OECD, 2021[7]) found CfE's vision widely supported and its flexible design conducive to improving student learning. However, as the curriculum was being implemented, various factors such as the generation of a range of guidance and support material combined to create a perception of overload reported by practitioners (OECD, 2021[7]).

Some consequences of curriculum changes are challenging to evaluate. Many desired changes, such as what is taught in classrooms or impact on teacher workload, are difficult to measure reliably and accurately. Changes may take many years to produce effects. In addition, a vast array of other factors can affect the outcomes, including school resources, political changes, students' lives outside of school (including social media use), and disruptions such as pandemics or disasters.

1.2. Curriculum change requires informed and responsible design

Curriculum reform succeeds when design quality is explicit and accountable. Those responsible for curriculum design must anchor decisions in high-quality evidence about how students learn and keep students' interests at the centre of every choice. In practice, this means applying clear design principles — such as focus, rigour, coherence and transferability — to avoid overload and ensure well-sequenced learning; ensuring alignment so that pedagogy, assessment, teacher education and resources reinforce the curriculum's aims; and recognising student and teacher agency as enabling conditions for change, not just desired outcomes.

Stakeholder engagement is essential for legitimacy and feasibility, but it is a means to improve the product and gain legitimacy, not an end in itself. Ultimately, quality is judged by the taught, experienced and attained curriculum — not only the written framework — with success evidenced in better learning, well-being and equity for students.

1.3. Curriculum change happens in a complex ecosystem

Every education system operates as an ecosystem: a web of relationships between teachers, students, institutions, families, policymakers and societal actors. Whether or not policies acknowledge it, the ecosystem is constantly interacting, adapting and exerting influence on how curricula are interpreted and enacted.

The curriculum ecosystem extends well beyond formal curriculum documents (the "expected curriculum"). It encompasses the actors, institutions, cultures, resources and routines that collectively shape what is taught, how it is taught, and how learning is valued. The principles underpinning this interpretation – inter-dependence, co-agency, coherence, and adaptability – frame curriculum not as a standalone artefact, but within a living system that evolves through interaction.

Curriculum change and implementation processes are broader than any one organisation, policy or sector. This paper explores how curriculum change can be managed within a living system, not a linear technical process but a collective adaptation requiring alignment, trust and continuous feedback across all levels of the education system.

Teachers, students, parents and other stakeholders are not passive recipients of curriculum change, but active agents in development and implementation. Top-down reforms can falter if they provoke apprehension or resistance, or if they sideline teacher professionalism. Students and teachers actively working together can facilitate the success of a curriculum redesign (OECD, 2020[2]). A shared vision of students as capable co-creators can serve as a platform to shorten reform timelines by motivating stakeholder commitment. Misalignments can lead to unintended consequences. Anticipatory thinking, or identifying where stakeholders might misinterpret or resist changes, is part of a whole-system strategy.

1.4. Curriculum change implies a theory of change and a logic model

Ecosystems can be understood, navigated and harnessed to make curriculum reform more successful. This paper develops perspective and empowers the reader, wherever they fit into the education ecosystem, to exercise their agency and be part of positive change.

Policymakers undertaking curriculum change already have a theory of change, whether they realise it or not. A theory of change articulates how and why a desired change is expected to happen within a particular context; it connects intentions, actions and outcomes into a plausible pathway (Jones, 2022[8]). In curriculum reform, this means making explicit how curriculum goals are expected to translate into changes in teaching, learning and student outcomes, rather than assuming that redesign alone will deliver results.

Effective theories of change recognise that curriculum reform operates simultaneously at the individual and the broader contexts in which they work. Curriculum change therefore involves complex interactions between people, practices, institutional structures and enabling conditions, rather than a simple linear sequence from policy to classroom (Dudar, L., S. Scott and D.E. Scott, 2017[9]).

Evidence from education reform shows that efforts to implement change are more effective when they clarify what needs to happen across the system, not only what needs to change in classrooms. Synthesising research on school improvement, (Fullan, M., 2006[10]) identifies core elements of effective theories, including building professional capacity, supporting learning in context, engaging multiple system levels, and sustaining effort over time.

Theories of change are used to guide both the implementation and evaluation of curriculum reform. They have been applied to understand why specific curriculum initiatives succeed or falter (Jankvist, Gregersen and Lauridsen, 2021[11]) and to analyse broader reform efforts aimed at improving student outcomes (Dudar, L., S. Scott and D.E. Scott, 2017[9]); (Fullan, M., 2006[10]).

Logic models provide a practical way to make theories of change more concrete. As with theories of change, policymakers have an implicit understanding of the relationships between inputs, activities, outputs and outcomes involved in curriculum change. Logic models are structured tools that map those things out explicitly, offering greater specificity than narrative theories of change. They take the form of visual diagrams that illustrate inputs, activities, resources, outputs and outcomes. In curriculum reform, they can clarify how resources such as curriculum frameworks, professional learning, guidance materials and assessment changes are expected to contribute to outcomes.

Logic models allow policymakers to articulate expected pathways of change; for example, how teacher professional learning is expected to influence classroom practice, and how those changes are expected to improve student learning over time (McLaughlin and Jordan, 2015[12]); (Melle, 2016[13]). They also help identify indicators for monitoring progress and evaluating whether reforms are unfolding as intended (Chen et al., 2018[14]). Logic models can be particularly useful for stakeholders working together across different organisations, as it allows them to reach a consensus on shared aims and see how different stakeholders may be involved during different steps of the process (Fielden et al., 2007[15]).

1.5. An ecosystems approach sets curriculum reform up for success

Taken together, developing a theory of change and a logic model sets up the process of curriculum change for greater success. The following sections of this paper examine what the theory of change and logic model should contain.

This is the sixth and culminating paper in a series of publications on curriculum redesign and implementation. Together, they view curriculum design and implementation efforts as systemic,

transformational and intentional. They argue for curriculum reform and implementation to be guided by a future-oriented vision, scoped to avoid overload and to focus on essential competencies, carried out with multi-level stakeholder engagement, and managed through strategies that build trust and capacity.

Section 2 of this paper considers **why** an ecosystems approach matters and **what** is at stake. It situates curriculum reform within the direction of travel across OECD systems, drawing on the Learning Compass schools (OECD, 2019[16]) and Teaching Compass (OECD, 2025[17]). It maps how countries are responding to emerging demands and introduces the curriculum ecosystem as a framing device to support dialogue about complexity, trade-offs and shared responsibility, setting the foundation for a common language for curriculum change.

Section 3 examines **who** is involved, focusing on engaging stakeholders as agents of change. It examines how curriculum change is shaped by the actions and interactions of multiple stakeholders across the system. It focuses on understanding the system: who does what, where influence sits, and how stakeholders can be engaged effectively. It also explores collective impact as a practical approach to co-ordinating action across actors and levels, highlighting how agency and co-agency can be developed to support sustained change.

Section 4 is about **how** creating coherence across the system contributes to success. It addresses alignment challenges that commonly undermine curriculum reform, including between curriculum, pedagogy, assessment and teacher education. It examines how misalignment across these elements can dilute reform intent and identifies strategies that countries use to create reinforcing signals across the system, enabling curriculum change to translate into consistent practice.

Section 5 turns to the **"so-what"**, offering lessons learnt and implications for policy and practice. It synthesises knowledge from across the paper, focusing on what has been shown to work, the barriers that persist, and how policymakers can address them. It distils practical insights about how an ecosystems approach to curriculum change can improve the alignment and effectiveness of curriculum change for better educational outcomes and better futures.

This paper is supplemented by an Annex 'Case Studies of Ecosystems in Action', showcasing examples of effective mobilisations of multiple actors in curriculum reform contexts, as well as reflecting the stakeholder engagement process that supporting developing the content and analysis in the paper itself.

2 Curriculum ecosystem and transformational change

An ecosystems approach means designing the curriculum with the ecosystem in mind. It does not replace curriculum design and implementation; it aids effectiveness. While dialogue and negotiation across stakeholders are essential to ensure legitimacy and responsiveness to learners' needs, they must also inform the development of a coherent and high-quality curriculum. In this sense, inclusive processes and clear design principles should work together to guide decision makers in transforming curriculum content and improving the overall quality of teaching and learning. Final decisions on what goes into the curriculum must take into account not only stakeholder perspectives, but also the evidence base on effective teaching and learning and, most importantly of all, the interests of students.

2.1. What is an ecosystems approach to curriculum change?

An ecosystems approach means designing and implementing a curriculum using principles of quality curriculum design, while also navigating and responding to the complex dynamics of a variety of concerned and influential parties, to the benefit of student outcomes.

2.1.1. Curriculum design is always the responsibility of a curriculum designer

Curriculum change implies a curriculum designer—the entity or entities who lead and take responsibility for curriculum design. Their role is to lead the creation of a coherent, legitimate and effective curriculum according to the intended outcomes for the curriculum's beneficiary: students.

Curriculum designers are responsible for informing their judgements with high-quality evidence, and for engaging with concerned and influential parties. Effective leadership also includes stewarding alignment across standards, pedagogy, assessment and teacher learning so that intentions can be realised in classrooms.

To make "quality" explicit and testable, the OECD has shed light on 12 curriculum design principles. They function as public guardrails for content choices and as criteria against which engagement with the ecosystem should be judged:

- **Focus:** prioritise a small number of fundamental ideas per stage to enable depth and reduce overload
- **Rigour:** include content justified by evidence of its contribution to student development and future readiness
- **Coherence:** structure clear, developmentally appropriate progressions (including spiral approaches) that manage cognitive load
- **Transferability:** emphasise big ideas and practices that can apply across disciplines and contexts

- **Interdisciplinarity:** enable meaningful connections across subjects and to life beyond school
- **Choice:** create space for informed student pathways and local contextualisation within clear standards
- **Authenticity:** link learning to real issues, uses and audiences to strengthen relevance and motivation
- **Flexibility:** allow timely adaptation to evolving needs while protecting core expectations
- **Alignment:** ensure assessment, pedagogy, resources and professional learning reinforce the curriculum's aims
- **Engagement:** involve relevant stakeholders to build understanding, ownership and readiness to implement
- **Student agency:** design for students' capacity to act with purpose in their learning and lives
- **Teacher agency:** empower teachers as professional co-designers and interpreters of the curriculum in context

The first nine of these principles deal primarily with curriculum design. They outline a vision of a curriculum that has a clear vision of the type of learner it aims to produce, is grounded in evidence on what promotes student learning, and is designed to be implementable, without overloading students or teachers.

The last three principles, engagement, student agency and teacher agency, are particularly relevant to this report because they extend curriculum design beyond questions of content and structure to the processes through which curriculum is developed and enacted. As part of the broader set of curriculum design principles, they show that quality curriculum design is not only about what is included in the curriculum, but also about how change is shaped, understood and implemented. In this sense, these three principles can be seen as **design principles for processes**: they call for the meaningful engagement of relevant stakeholders, for designing with students' capacity to act purposefully in their learning and lives in mind, and for recognising teachers as professional co-designers and interpreters of the curriculum in context. Together, they help ensure that curriculum design is both high quality and implementable within a complex ecosystem.

2.1.2. An ecosystem is always present

Whether they realise it or not, a curriculum designer's work is connected to a network of actors and institutions whose mutual interactions shape the ways and extent to which the curriculum as intended becomes taught, experienced and attained. These actors and institutions include policy and assessment bodies, teacher education and professional development, school leadership and collaboration, publishers and EdTech, parents, communities and employers, and students themselves. The ecosystem can be thought of as a 'transactional environment' — the set of actors and interactions with which the curriculum designer must engage to advance their objectives (Van der Heijden, 2011[18]).

2.1.3. Why take an ecosystems approach?

An ecosystems approach means involving the ecosystem in parts of the design processes, with the intention to:

- **Increase legitimacy** by ensuring that the process is perceived as democratic, and that it produces effective outcomes.
- **Improve design quality** by identifying various needs, and by benefiting from a variety knowledge and viewpoints.
- **Strengthen implementation** by gaining buy-in, and by aligning interests, assessments, materials and professional learning.

The ecosystem acts whether invited or not. Even if designers proceed without an ecosystems approach, ecosystem dynamics continue to operate — and can thwart even strong designs. For example:

- **Implementation gaps** arise when teacher workload, assessment signals or resource constraints are not considered, leading to divergence between intended and taught/attained curricula.
- **Informal and "shadow" curricula** shape what students actually learn; ignoring these layers overlooks forces that may reinforce or counter formal intentions.

Avoiding these pitfalls is the subject of later sections of this paper.

2.1.4. What an ecosystems approach is not

While an ecosystems approach emphasises the need to engage all stakeholders, it does not take the responsibility for decision making away from curriculum designers or those responsible for implementation. Acknowledging the interests of different stakeholders in the curriculum does not mean that the outcome has to be a negotiated solution or a 'lowest common denominator' approach. The final outcome, whether in curriculum design or implementation, must be based on the genuine needs of students, and the best evidence on how to meet these needs.

For those responsible for curriculum design and implementation, operating effectively in an ecosystem means continually returning stakeholders to the ultimate question of what is best for students. Understanding the ecosystem is critical to mobilising all stakeholders towards this goal. An ecosystems approach must be used to help overcome narrow interests and fragmentation in the system, not to reinforce them.

2.2. The ecosystem is part of a broader context shaping education

Beyond the ecosystem, education itself is shaped by a rapidly changing world. Today's students live in an era of unprecedented social, economic and environmental challenges, coupled with fast-moving opportunities. Global megatrends like technological innovation, globalisation and climate change are fundamentally altering what societies expect from education systems (OECD, 2025[19]). In this shifting contextual landscape, education systems must continuously adapt to remain relevant and effective.

2.2.1. Governments are changing their role in education

Governments across OECD education systems are rethinking their role in curriculum design and implementation. There is a clear trend towards granting more curriculum flexibility and autonomy to local authorities, schools and teachers, while still ensuring national quality standards. This shift reflects a move away from highly centralised control, as policymakers seek a balance between nationwide consistency and local adaptability. Education governance is thus evolving into a more collaborative model, where the state sets broad goals and frameworks but empowers local actors, including students themselves, to tailor learning to students' needs.

Central governments are shifting from taking control to granting autonomy: Policy priorities may oscillate in a "pendulum swing" between centralised curriculum control and school autonomy as governments respond to new challenges (OECD, 2024[20]). These swings highlight the tension: too much top-down control can stifle innovation, whereas too much autonomy can risk inconsistent quality across schools. Many countries now aim to find the right balance of allowing flexibility in teaching and content while maintaining equity through clear goals and accountability measures. Different degrees of autonomy have significant implications for students' learning outcomes, well-being, and teachers' professional identity (OECD, 2024[20]).

Decisions are becoming decentralised: In practice, many governments are decentralising certain curriculum decisions. OECD analysis shows that countries frequently delegate decisions on curriculum content, pedagogy, assessment and time allocation to lower levels (regions, schools or teachers) to varying degrees (OECD, 2024[20]). This reflects a broader vision among governments to find "common language to articulate a broader vision of education to inform future curricula" (OECD, 2024[20]), a vision often aligned with international frameworks like the OECD's Future of Education and Skills 2040.

In summary, governments are transforming from sole authorities into **stewards of an education ecosystem**, setting broad directions and goals while enabling schools and communities to co-create the learning experience based on local student needs and armed with evidence on what works in promoting learning.

2.2.2. Objectives of curriculum reform are changing

Curriculum reform must consider the extent to which the content meets the current educational standards and addresses the needs of society. It may be necessary to regularly update the curriculum to reflect new scientific discoveries, technological advancements and evolving societal needs.

Questions of "what to learn" and "how to teach" are being redefined to meet the demands of the 21st century and beyond schools (OECD, 2019[16]). There is a common recognition across many OECD countries that learners need a mix of cognitive, social and emotional skills to thrive. Analytical abilities like critical thinking and problem-solving feature prominently in nearly all new curricula. The OECD Future of Education and Skills 2030 Policy Questionnaire on Curriculum Redesign (PQC) and Curriculum Content Mapping (CCM) exercise found these skills mapped in over 60% of curricular documents on average (OECD, 2020[2]). Creative thinking, communication, collaboration and digital literacy are also widely promoted. The study *What Students Learn Matters* (OECD, 2020[2]) highlights that many countries have made significant shifts towards "21st century curriculum" models; for example, introducing digital curricula, personalised learning pathways, cross-curricular projects and competency-based frameworks. These reforms reflect a shared objective of reducing the "time lag" between what schools teach and the rapidly changing skill needs in society.

Student agency and transformative competencies are increasingly prized. A hallmark of the new educational objectives is the focus on empowering students as active, engaged learners. The OECD Learning Compass, a guiding framework co-created with countries, sets an "aspirational vision for the future of education" centred on student agency, co-agency, and well-being schools (OECD, 2019[16]). Student agency refers to the ability and mindset of learners to influence their own learning and shape their futures, rather than passively receiving knowledge. Closely related is co-agency, which highlights the collaborative role of teachers, peers, parents and communities in supporting student-driven learning (OECD, 2025[17]). Many curricula now explicitly reference building student agency; in fact, OECD analysis of curriculum documents found student agency is included in 33% of content items in the overall mapped curricula (OECD, 2020[2]).

Student agency should not only be understood as a capacity that education systems seek to nurture in learners. It can also play a meaningful role in the process of curriculum development and renewal. Involving students in discussions and reflections about curriculum priorities allows education systems to benefit from their lived learning experiences and perspectives. In this way, students are not only recipients of curricular reforms but active contributors who can help inform, refine and strengthen the relevance and quality of curricula as key actors within the education ecosystem. A curriculum that grants students agency creates a carefully designed space for them to participate in both curriculum design and implementation, helping to ensure that learning remains meaningful and relevant to their needs, aspirations and futures. By motivating students and building on their prior knowledge, skills, attitudes and values, such a curriculum fosters a sense of ownership over learning and supports learners in shaping what, when and how they learn. It also promotes more self-directed forms of learning over time, enabling students to grow in

confidence, evaluate their own progress, and develop the capacity to monitor, review and reflect on their learning. In this sense, student agency is not only important for effective implementation and equity, but also for embedding values in curricula through learning experiences that connect with what students find personally meaningful.

Teacher agency is increasingly recognised as a key objective of curriculum reform. This involves equipping educators with the autonomy, confidence and capabilities to lead and sustain meaningful innovation and transformation in education. In a world marked by complexity, rapid change and uncertainty, the role of teachers has become more important than ever. As education systems seek to nurture students who can act as creative, resilient and collaborative agents of change, they must also ensure that teachers are empowered to do the same (OECD, 2025[17]).

Values and culture are being explicitly incorporated into objectives. Schools have always played a role in transmitting societal values – often implicitly through school culture – but there is now a more deliberate move to define and embed values explicitly within curricula (OECD, 2021[21]). This shift reflects changing societal expectations, growing social polarisation and recognition that competencies such as collaboration, responsible citizenship and respect cannot be developed in value-neutral or culturally blind ways. Rather than relying on a "hidden curriculum," many systems now explicitly incorporate values and attitudes into curriculum standards and competency frameworks, alongside efforts to ensure cultural relevance and inclusivity. This includes adapting content and pedagogy to reflect diverse backgrounds, promote equity and provide all students with meaningful and relevant learning opportunities (OECD, 2021[21]).

2.2.3. Expectations on the education system are higher than ever

Even as governments' roles are changing and the content of curricula evolves, the demands placed on the education system are broadening.

Beyond knowledge needed for jobs, a new purpose for education is emerging. Underpinning these shifts is a deeper re-examination of why we educate. The discussions presented so far reflect a growing consensus that the purpose of schooling is not only to impart knowledge for economic productivity, but also to nurture informed, responsible and engaged citizens capable of shaping a better future. In today's world, students indeed need more than job-specific skills; they need social and environmental awareness, the ability to co-operate with others, to think critically about global issues, and to act on their values.

Well-being – including physical, mental, social and environmental well-being – **is increasingly seen as both an outcome and enabler of learning**. The OECD Learning Compass explicitly positions individual, societal and planetary well-being as the north-star goal for 2030, implying that education should equip students to lead happy, healthy lives and contribute to their communities and the sustainability of the planet schools (OECD, 2019[16]).

2.2.4. The curriculum ecosystem can be defined in layers

Drawing upon Bronfenbrenner's (1981[22]) ecological systems theory – which illustrates how multiple interconnected nested systems directly and indirectly influence a child's development throughout their life – the curriculum ecosystem includes "multiple nested systems within the broader environment that influences teaching, learning, and student outcomes" in direct and indirect ways (Tichnor-Wagner, 2019[23]).

The student sits in the centre of these nested systems, as they are the intended beneficiary of the curriculum, and it is their experience of the curriculum that shapes whether they develop the specific knowledge, skills, attitudes and values that a curriculum seeks to inspire.

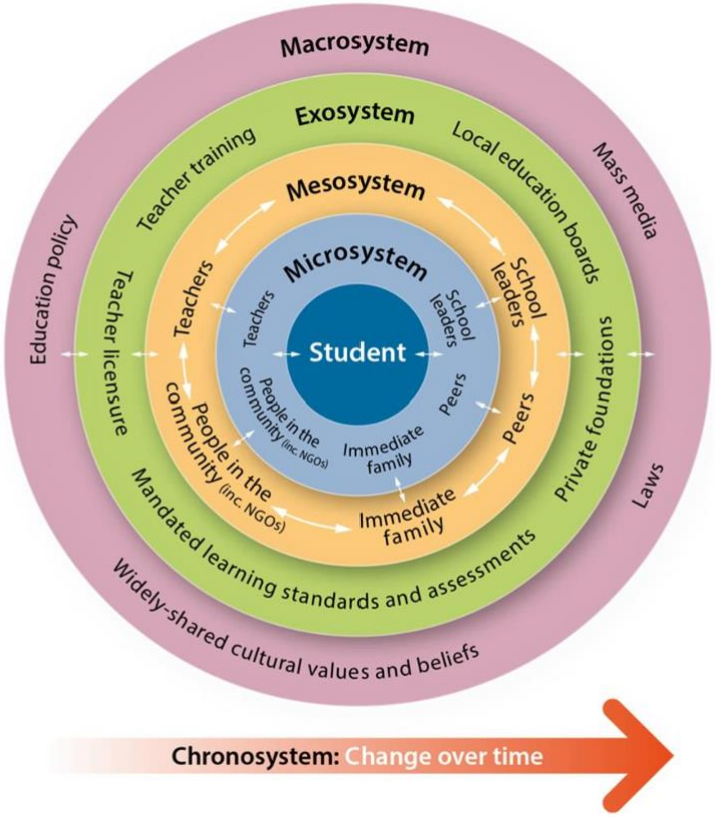
The microsystem includes those who directly interact with students in the teaching and learning of an intended curriculum. These interactions take place within schools at the individual relational or classroom level, often through ways that teachers, school leaders and other educators within the school structure learning activities, materials, assessments, and other conduits through which students engage with the curriculum. The microsystem also includes interactions with families, caregivers, peers and other community actors.

The mesosystem includes the interactions between actors in the microsystem, often at the school level. This includes, for example, how teachers in different classrooms communicate and collaborate with one another, how school leadership facilitates interactions with teachers, families and the broader school community, and how teachers connect with families.

The exosystem indirectly engages with students, involving policy actors within local, state, provincial, regional and national governments and government agencies that provide laws, rules, regulations, and resources that shape how teachers are prepared and what is taught in schools and classrooms. Activities of non-governmental organisations such as universities, non-profits, private companies and foundations also occur in the exosystem, as these non-governmental exosystem actors indirectly impact how students engage with curriculum by providing teacher training, instructional materials, grants and technical support to assist in implementation. The macrosystem reflects broader societal and cultural beliefs about the purpose and goals of education, which can shape and are shaped by education and social policy, laws and popular opinion.

Finally, **the chronosystem** addresses changes that take place in curriculum development, implementation and outcomes over time (Tichnor-Wagner, 2019[23]) . As multiple studies confirm, curriculum change often occurs over several years, as it can take years for teachers to develop a deep understanding of the new curriculum and the requisite pedagogical skills, see its value and implement it as intended (Cheung and Man Wong, 2011[24]); (Coburn, 2003[25]).

Figure 2.1. Multiple nested systems



Source: OECD (2020[26]), Curriculum (re)design: A series of thematic reports from the OECD Education 2030 project, adapted from (Bronfenbrenner, 1981[22]), The Ecology of Human Development: Experiments by Nature and Design. Harvard University Press. https://doi.org/10.2307/j.ctv26071r6.

These nested systems interact with each other (Neal and Neal, 2013[27]), and the ways in which these different levels influence one another can be multi-directional (Datnow, Hubbard and Mehan, 2005[28]). For example, teacher experience at the mesosystem level can shape a provincial policy made at the exosystem level; and an exosystem policy mandating a particular curriculum can influence what a teacher teaches within their classroom at the micro-level. At the same time, power dynamics play a role in the influence that stakeholders at different system levels have on one other, and whether change travels "top-down" (e.g. curriculum implementers are expected to follow a curriculum policy directive with fidelity), "bottom-up" (e.g. curriculum implementers are able to design and adapt curriculum based on organisational needs and constraints), or "top-and-bottom" (e.g. an iterative approach wherein implementers adapt curriculum to fit local contexts and policymakers or design teams adapt curriculum based on the contexts of implementers) (Tichnor-Wagner et al., 2018[29]). For example, in highly centralised governments, policy change often follows a top-down model, wherein the exosystem (i.e. curriculum policy set by government agencies) exerts power over the mesosystem, and the mesosystem (e.g. professional learning focused on set curriculum) exerts power over the microsystem (e.g. the content and pedagogies teachers are expected to enact in their classrooms). Conversely, a decentralised government that promotes local autonomy may have educators in the microsystem and mesosystem that shape curriculum content and policy instruments, which can then inform government laws and regulations (Tichnor-Wagner, 2019[23]).

Taken together, these levels and the ways in which they interact shape how curriculum is written, taught, perceived, negotiated and experienced (OECD, 2020[26]). As such, the curriculum ecosystem model is

foundational for understanding the planning, implementation and evaluation of curriculum change, particularly as it relates to the impact on students and educators.

To plan and implement curriculum changes, the ecosystem model can be used to map out the intended actions of stakeholders at each system level, along with the resources needed for stakeholders to effectively implement such actions.

As an evaluation tool, the ecosystem model can help illuminate whether stakeholders implemented the curriculum as intended at different systems levels, and where in the ecosystem curriculum transformation ran into challenges (e.g. insufficient professional learning opportunities in the mesosystem, a clash of beliefs/values in the macrosystem).

In other words, an ecosystems approach illuminates the multi-faceted mechanisms that help explain how educators and students experienced the curriculum and whether desired curricular aims were achieved.

3 Engaging stakeholders for effective curriculum change

This section revisits the actors involved within the ecosystem analysed in detail in the previous section, and explores some of the main ways in which they can be involved – individually or in concert – in curriculum change. This analysis demonstrates that curriculum change rarely follows a linear, sequential process, but instead consist of multiple actors influencing multiple outcomes with moments of co-ordination, feedback, and mutual causality. The section also explores the implied strategies of dialogue, fostering agency and collective impact.

3.1. Who is involved?

Microsystem and mesosystem stakeholders: The microsystem and mesosystem represent those who directly interact with students, and the ways in which those individuals interact with one another. At these two systems levels, curriculum stakeholders include teachers, instructional support staff such as aides, instructional coaches and school leaders. Importantly, teachers and students themselves are not only participants in the curriculum but also active agents who shape, interpret, and contribute to its ongoing transformation through their practices, feedback, and engagement in learning. Outside of school, families and caregivers play a role in supporting students with the curriculum, and can contribute to curriculum advocacy as well. Both within school and outside of school, peers can also play a role in shaping how fellow students perceive the curriculum and engage in curriculum activities.

Exosystem stakeholders: The exosystem refers to entities that indirectly impact students; in the case of curriculum transformation, exosystem actors include those in official government roles such as local education boards, provincial, state and national governments, and associated departments or ministries of education. Non-government actors include public and privately funded institutions that provide pre-service and in-service teacher training, researchers along with actors from NGOs, business, private foundations and philanthropy, all of whom operate outside of “official” public government but are often a part of education governance (Ball, 2012[30]).

Macrosystem stakeholders: The macrosystem refers to broader cultural and social beliefs. These can be promoted through mass media (e.g. established news organisations) and social media. Actors within social policy subsystems outside of education, for example, poverty, child welfare, health, food insecurity, housing, employment and immigration policies, can also influence beliefs about education-specific issues. For example, rapid changes in technology or changes in available jobs in the economy can spark discussion around what skills and knowledge schools should emphasise to prepare students for the future and for the labour market.

3.2. Stakeholders play many different roles in curriculum transformation

Curriculum change does not happen in sequence, but occurs among different actors and interactions between them: setting laws, rules and regulations around what should be taught in schools; designing curricular materials; implementing curriculum; monitoring curriculum implementation; evaluating curriculum impact; and renewing/revising curriculum.

3.2.1. Setting laws, rules and regulations

Laws related to curriculum are often set by exosystem policy actors at the national, state/provincial, or local government level, with rules and regulations being created by government education agencies. Though not operating as official policy actors, actors from NGOs, business and philanthropy can influence policy as well. In Finland, the Finnish National Board of Education held total responsibility in preparing the core curriculum reform work as decision makers and central overseers of the reforms (Pietarinen, Pyhältö and Soini, 2017[31]). As Pietarinen and colleagues (2017[31]) note, putting decision making in the hands of officials rather than elected politicians "possibly enabl[es] a more sustainable development that could be less vulnerable to changing political influences and interests." Decision makers must have the capacity to engage stakeholders, but also to assess the evidence, and the authority to make decisions that will improve student outcomes.

Likewise, in the Swedish Boost for Mathematics reform, the Swedish Ministry of Education determined the focus on improving mathematics teaching, and delegated responsibility to *Skolverket*, Sweden's central administrative authority of the public school system (Jankvist, Gregersen and Lauridsen, 2021[11]). Japan's Integrated Studies programme took hold as part of a "relaxed education" that emphasised decentralisation and local autonomy, although the Ministry of Education still held the power to determine the national curriculum (Bjork, 2009[32]). These examples demonstrate that government does not necessarily act alone, even in matters typically associated solely with official authorities, such as rules and regulations.

The macrosystem also operates through media and social media, which shape public opinion about what should, or should not be taught in schools. A recent example from the United States is the *Sold a Story* podcast, which examined the gap between widely used reading curricula and research on how children learn to read. By translating cognitive science into an accessible and emotionally compelling narrative, and amplified through national media coverage and online networks, the podcast generated public pressure on policymakers. As a result, more than 15 states passed laws requiring schools to adopt a science of reading approach (Peak, 2025[33]). Media reports on international test scores can also influence actors in the ecosystem to focus efforts on specific subject areas in which the country underperformed or in broader curriculum reform (Jankvist, Gregersen and Lauridsen, 2021[11]); (Takayama, 2007[34]).

3.2.2. Designing curriculum and related materials

Curriculum design often takes place at the exosystem level. Although curriculum development processes may involve extensive engagement across the ecosystem, the effectiveness of reforms also depends on how well these inputs are translated into a coherent and well structured curriculum and instructional system that supports student learning. Curriculum materials must also be based on sound evidence about how students learn.

In some countries, Ministries of Education or related government education agencies will create curriculum. In the Swedish Boost for Mathematics, *Skolverket* developed and implemented the programme, including determining module topics and creating relevant support materials on an online open-access resource platform (Jankvist, Gregersen and Lauridsen, 2021[11]).

In countries that take a "bottom-up", decentralised approach to curriculum change, curriculum may be designed at the mesosystem level with educators central to the process. In Wales, over multiple years of

curriculum development, “Pioneer Schools” were established wherein educators in those schools designed and developed new curriculum, then provided expertise and training support to other schools (Jones, 2022[8]).

3.2.3. Implementing curriculum

Curriculum implementation occurs at the microsystem and mesosystem levels, with teachers ultimately responsible for and the main stakeholders of implementing new curriculum (Dudar, L., S. Scott and D.E. Scott, 2017[9]); (Jankvist, Gregersen and Lauridsen, 2021[11]). Teachers are “street-level bureaucrats” within the walls of their classroom, who have discretion in determining the depth to which they will engage in the change initiative (Hall, 2013[35]); (Weatherley, 1977[36]). Implementation, therefore, depends on teachers’ changing classroom practices to align with the content and pedagogical principles that a new curriculum espouses. Challenges relating to such alignment are discussed in the next chapter. As Hall (2013[35]) outlines, teachers can range from “non-users” (e.g. doing nothing about an innovation, seeking information or planning for future use) to “users” (e.g. testing out, establishing a routine of use or making refinements to enhance student outcomes).

Whether, and the depth in which, teachers implement new curriculum often depends on factors at the mesosystem level, through formal professional learning opportunities and informal interactions with fellow teachers and school leaders. Teachers make sense of new initiatives through their own individual prior experiences, beliefs and knowledge and through the situated contexts in which they are engaged (Spillane, Reiser and Reimer, 2002[37]). Indeed, many theories of change incorporate professional development as a crucial success factor (Dudar, L., S. Scott and D.E. Scott, 2017[9]). These mesosystem supports for teacher learning can take varied forms, and be led by different stakeholders. For example, teachers can naturally form and lead their own professional learning communities focused on improving student outcomes aligned with curriculum goals; professional learning communities can also be created by school leaders and be mandatory for teachers to attend, or school leaders can play an indirect role by structuring schedules that allow teacher collaboration around curricular aims to take place. Instructional coaches can support teachers in instructional reforms as well by working with classroom teachers to develop shared understandings across school staff, model practices and broker ideas (Woulfin and Rigby, 2017[38]). Families and caregivers may also lend support in the form of practicing certain knowledge and skills at home (e.g. homework or projects). While research points to the importance of home-school collaboration to help student learning, family involvement in curriculum implementation is not well documented in the literature, and when it is, it mostly points to barriers that families face in having active engagement (Ahmadi, H. and A. Mohabie, 2022[39]); (Mwarari, C.N., P. Githui and M. Mwenje, 2020[40]).

Exosystem stakeholders can also play a role in supporting schools and educators with curriculum implementation. This can take the form of government agencies creating professional development obligations, such as required modules or courses that educators must take (Jankvist, Gregersen and Lauridsen, 2021[11]) or outlining the parameters of what must be included in mandated courses and then outsourcing those courses to universities or other teacher training institutes (Chang-Bacon, 2020[41]). Local, state or national governments can also provide funding for professional learning or instructional coaches with expertise in the curriculum change (Woulfin and Spitzer, 2023[42]).

Non-profit and for-profit organisations can serve as intermediatory organisations to step in when schools lack capacity to train teachers in new curriculum initiatives or to provide ongoing professional learning support to implement new reforms (Honig, 2004[43]). These varied organisations – including, but not limited to, a range of technical assistant providers, professional development organisations, design teams or universities – often sit between two systems (e.g. school district and school; state department of education and school district) to manage change across both systems (Honig, 2004[43]).

The exosystem can also constrain implementation, particularly if teachers are navigating competing policy demands. As (Bjork, 2009[32]) found in his survey of students and teachers on Japan’s Integrated Studies

curriculum, teachers felt as though the new curriculum displaced other core subjects, whose teaching time had been reduced by the Ministry of Education. Teachers ended up using the Integrated Studies time to teach subject areas instead. Teachers also expressed challenges in implementing China's New Curriculum Reform due to exosystem policies that continued to reify exams-focused evaluation systems (Guo, 2013[44]); (Yan, 2014[45]).

3.2.4. Monitoring and evaluating curriculum implementation

Curriculum implementation monitoring – the process of gathering information to determine to what extent the intended, implemented and attained curriculum are aligned – occurs at the mesosystem and exosystem levels (Okoti, D. and E.M. Makhanu, 2022[46]). Curriculum monitoring may be an internal school endeavour at the mesosystem level, wherein school staff, including school leaders and teachers, are involved in collecting and reviewing pupil and teacher level data; or at the exosystem level, in which monitoring is done by external national government education agencies through standardised measures (Okoti, D. and E.M. Makhanu, 2022[46]); (Ndihokubwayo, K. et al., 2020[47]) describe the monitoring and evaluation of Rwanda's new competence-based curriculum, with the monitoring system being set at the national level and requiring stakeholders at the school, sector, district and national levels to contribute. Evaluation, i.e. determining whether a curriculum has been effective at achieving its aims, is often done at the exosystem level through government agencies or through external third-party evaluators.

3.2.5. Revising/renewing curriculum

As with the previous stages, revising and renewing curriculum can take place through microsystem, mesosystem, or exosystem actors. Individual teachers in their classroom may adapt curriculum based on their contextual constraints and in ways that are responsive to student needs. At the mesosystem level, school-based teams of educators may work together to iteratively revise curriculum throughout the implementation process. At the ecosystem level, government agencies may systematically review outcomes of evaluations, along with public pressures coming from macrosystem actors that may push changes to what a curriculum focuses on.

3.2.6. Promoting partnerships in curriculum change

Evidence suggests that technology and public-private partnerships can strengthen curriculum transformation when they are treated as part of the ecosystem – anchored in curriculum alignment, public-value safeguards and coherent governance – rather than as add-ons or isolated pilots.

Digital technologies are not neutral "delivery channels" for curriculum; they are part of the ecosystem that shapes how curriculum intent is translated into resources, classroom routines and expectations of learning. This emphasises the importance of considering the human dimension when examining the role and impact of technology in education. In this framing, EdTech providers, publishers, platforms and infrastructure partners become involved at multiple points in curriculum transformation: they influence what teachers can access and use, the kinds of learning tasks students encounter, and the data that systems can generate to steer implementation. At the same time, the OECD cautions that partnerships must be governed to protect public purposes; ethical guidelines are crucial to ensure that these partnerships prioritise public educational goals and do not place excessive demands on teachers (OECD, 2025[17]); (Zhao, 2018[48]).

Evidence suggests that well designed public-private partnerships can help close the gap between curriculum design and enactment by accelerating the creation and dissemination of curriculum-aligned materials and tools. For example, in 2016, a public tender resulted in the development of several Banks of Educational Digital Resources for School (BRNE) by French publishers and EdTech companies. The BRNE provide access to thousands of digital teaching and learning resources, tools for creation, and services for dissemination and interaction between teachers and students. Thanks to the strong

relationships developed between the Ministry and contractors during the procurement phase, publishers were able to fully align the BRNE's pedagogical content with the French national curriculum in all disciplines and grades. The BRNE were instrumental in ensuring education continuity during the COVID-19 pandemic as they were made available to everyone, for free, in less than a fortnight (OECD, 2023[49]).

However, EdTech involvement can also create new vulnerabilities for curriculum ecosystems when incentives, evidence and accountability are misaligned. The introduction of private partners into the curriculum delivery process may raise other dilemmas, such as the dependency on specific digital service providers or escalating costs after trial versions of services expire (OECD, 2021[50]). Studies have revealed that both EdTech companies and schools often lack an understanding of, and access to, existing relevant research to adopt an evidence-informed approach to the use of digital technologies and platforms in educational settings (Cukurova, Luckin and Clark-Wilson, 2018[51]). This means that teachers and schools face difficulties evaluating and choosing from a wide variety of EdTech products available (Batty, 2019[52]). It also means that EdTech is often accused of being insufficiently connected to the needs of school systems, teachers and learners (Baker, T., E. Tricarico and S. Bielli, 2019[53]). For curriculum change, the implication is that unless public ecosystems actively articulate requirements, procurement criteria and evaluation expectations, EdTech can unintentionally pull teaching and assessment toward what is easy to implement or measure rather than what curricula intend.

Effective involvement of private actors often depends on system-level co-ordination around data governance and interoperability, areas where public and private roles are tightly interdependent. In the Netherlands, a public-private partnership involving providers of digital educational resources, distributors and educational publishers was able to create a unique identifier in the "educational content chain" (Kerssens and Dijck, 2021[54])https://www.oecd.org/en/publications/oecd-digital-education-outlook-2023_c74f03de-en/full-report/the-role-of-support-organisations-in-implementing-digital-education-policies_3bbd88bb.html - Ker21_86a1745621. Such arrangements matter for curriculum ecosystems because they determine whether digital tools can work together across schools and whether learning data can be used responsibly to support improvement.

Research further draws attention to the importance of equity and inclusion in public-private partnerships, particularly where co-ordination across domains and levels of government is otherwise difficult. Conscious effort is needed to ensure that the involvement of private sector actors does not undermine efforts to advance equity and inclusion in education (Gottschalk and Weise, 2023[55]).

3.3. Key strategies

From the above analysis, a few approaches emerge as promising strategies for an ecosystems approach to curriculum change. These include promoting nonpartisan dialogue, fostering co-agency and mobilising collective impact

3.3.1. Dialogue is essential for curriculum change to gain legitimacy

Mapping stakeholders and their roles is necessary but not sufficient for effective curriculum change. Curriculum reform ultimately requires the sustained commitment of actors who operate under different mandates, incentives and sources of authority, and whose co-operation cannot be assumed. Engaging stakeholders in the policymaking process supports better policy outcomes, better implementation and greater trust (Burns, Köster and Fuster, 2016[56]).

From a political legitimacy perspective, reforms are more likely to endure when they are perceived as both legitimate and justified by those involved in enacting them. Legitimacy depends not only on outcomes ("what" reforms deliver) but also on processes ("how" decisions are made) and discourse ("how" reforms

are framed and explained) (Schmidt, 2020[57]). In this sense, getting consent and buy-in for reforms is essential:

> *There are a lot of stakeholders in education who have a vested interest in maintaining the status quo. Even small reforms can involve massive reallocations of resources and touch the lives of millions on both the client and provider sides. This rules out "reform by stealth" and makes it essential to have consensus, or at least broad political support, for any proposed reform. In essence, education reform will not happen unless educators endorse and implement it. (Schleicher, 2016[58]).*

Nonpartisan framing of curriculum change is particularly important in creating deliberative contexts where indispensable actors, such as teachers, school leaders, assessment bodies and intermediary organisations, can contribute to a shared understanding of goals, trade-offs and pathways forward without being positioned as winners or losers. Such dialogue supports collective sense-making, reduces resistance rooted in mistrust or misinterpretation, and strengthens the legitimacy on which successful curriculum ecosystems depend. Stakeholder engagement should build a shared vision for reform, based on student needs, providing legitimacy for the trade-offs and difficult decisions that are inevitably required to create a balanced, implementable curriculum.

Student and teacher agency can make or break curriculum change

Empowering both learners and educators with a sense of agency is another crucial strategy derived from the analysis. This perspective aligns closely with the OECD Learning Compass emphasis on integrating knowledge, skills, values and student agency in education schools (OECD, 2019[16]). In this sense, students are not just passive recipients of a curriculum, but participants in how it is created and implemented.

Teacher agency and ownership are equally important for sustainable curriculum innovation. Teachers are more likely to embrace and effectively implement changes when they have autonomy, professional trust and a voice in the process. Agency is a professional disposition; it is an active stance shaped by self-efficacy, ethical responsibility and a commitment to change. Research indicates that policy frameworks that nourish teacher agency yield richer learning experiences and more resilient school cultures (OECD, 2025[17]). A growing sense of agency and ownership for teachers is not only empowering for the profession but essential for the quality and relevance of their work (Suarez and McGrath, 2022[59]). When teachers are treated as co-designers or active contributors (for instance, as in curriculum "Pioneer Schools" in Wales or through professional learning communities), they develop a vested interest in the reform's success.

Equally important is the concept of *co-agency*, the idea that students' and teachers' agency are interconnected. In practice, this means creating learning environments where teachers and students co-create the learning process, each contributing ideas and taking responsibility. Programmes that support co-agency show positive outcomes (see Box 3.1); teachers in that programme reported greater well-being and collaborative efficacy, while students showed gains in curiosity, creativity and socio-emotional skills.

3.3.2. Collective impact is a way to harness co-agency for effective reform

Collective impact is a systemic, collaborative approach to tackling complex social problems by bringing diverse stakeholders with similar aspiration together to achieve a common goal (Kania, J. & M. Kramer, 2011[60]). Kania and Kramer outline five conditions for collective impact initiatives, including: 1) a common agenda, wherein all stakeholders collectively define a problem and create a shared vision on how to address it; 2) shared measurement, wherein there is a shared system to collect and analyse data to track progress in continuous improvement efforts; 3) mutually reinforcing activities, wherein organisations co-ordinate collective efforts to maximise the end result and avoid duplication of efforts; 4) continuous communication, which involves the building of trust and relationships among all participants through

consistent communication; and 5) a backbone organisation dedicated to co-ordination and communication, and also serving as a hub for ongoing data collection and analysis.

Principles of practice for collective impact include (Collective Impact Forum, 2026[61]):

1. Design and implement the initiative with a priority placed on equity.
2. Include community members in the collaboration.
3. Recruit and co-create with cross-sector partners.
4. Use data to continuously learn, adapt and improve.
5. Cultivate leaders with unique system leadership skills to achieve transformational change, which include strong facilitation, management and convening skills.
6. Focus on programme and system strategies.
7. Build a culture that fosters relationships, trust and respect across participants.
8. Customise for local context.

Benefits of the approach include the innovation towards effective solutions that can come from bringing together diverse stakeholder perspectives, the pooling of resources across multiple organisations together in order to leverage different strengths, the inclusion of community stakeholders that helps to ensure that initiatives are responsive to the needs of the users who they are intended to serve, increased impact, and the mobilisation of stakeholders to advocate for systemic policy change.

Risks include challenges regarding co-ordination across multiple groups, disproportional allocation of resources and sustainability. Groups may also come in with different approaches and resources available for measurement, which would have to be reconciled. Furthermore, the work of building a shared common agenda within a respectful, learning-centred collaborative space takes time. As Zuckerman and colleagues (2020[62]) noted in their study of the first year of a collective impact initiative focused on early childhood and care in one US state, the work of developing a common agenda was still ongoing after one year as the backbone organisation committed itself to organising and facilitating meetings as a safe space for dialogue, forging interpersonal relationships, and for following through on a collaborative agenda.

4 Alignment challenges

This section explores how curriculum reform translates into classroom practice and why alignment across the education ecosystem is essential for meaningful and sustained change. Contemporary curriculum reforms increasingly extend beyond defining *what* students should learn to shaping *how* learning should occur, often implying pedagogical shifts towards student-centred, inquiry-based and competency-oriented approaches. However, these ambitions frequently encounter an alignment challenge, the implementation gap (OECD, 2024[6]) that arises when curriculum intent does not match classroom realities or achieved learning outcomes.

4.1. What is an alignment challenge?

In an ideal ecosystem, curriculum, pedagogy and assessment function as a coherent unit, yet misalignment commonly emerges from three systemic frictions:

- Pedagogical lag, where limited time or training leads teachers to revert to traditional practices
- Assessment tension, when high-stakes examinations continue to reward rote memorisation despite competency-based curricular goals
- Structural silos, as teacher education and professional development often prioritise theory over the diverse practical demands of modern classrooms.

These frictions also illustrate that alignment challenges often emerge when curriculum frameworks do not provide sufficiently clear signals for teaching, learning and assessment, leaving educators to interpret reform goals in ways that may diverge from their intended outcomes. Designing a clear, high-quality curriculum in the first place is one way to minimise alignment challenges, but still leaves communication and implementation challenges.

Together, these frictions can generate innovation fatigue; exacerbate inequities, particularly in disadvantaged schools; and erode trust in education systems when visionary reforms fail to reach learners. Against this backdrop, this section highlights strategies and system-level conditions that support successful implementation, arguing that overcoming alignment challenges requires an ecosystems approach in which curriculum reform is deliberately matched with adjustments in pedagogy, assessment, teacher education and professional standards, fostering coherence about education systems' capacity to adapt.

4.2. Aligning pedagogies with curriculum change

Curriculum change increasingly implies pedagogical change. Across many education systems, contemporary curricula no longer define learning solely in terms of content to be covered, but also implicitly (and sometimes explicitly), articulate expectations about how learning should take place. Competency-based, inquiry-oriented and interdisciplinary curricular frameworks assume pedagogical approaches that emphasise student agency, active learning, collaboration and formative feedback. In this sense, curriculum

reform is rarely neutral with respect to pedagogy: while new content can sometimes be integrated into existing instructional routines, shifts towards competencies, transversal skills and complex learning outcomes often require changes in teaching practices themselves (OECD, 2020[26]). When curriculum frameworks articulate ambitious competencies without clearly linking them to pedagogical expectations, teachers may struggle to translate reform intentions into everyday classroom practice.

Internationally, curriculum reforms increasingly promote student-centred pedagogies focused on problem-solving, critical thinking and real-world application, yet implementation remains uneven across and within OECD systems (Gouëdard et al., 2020[63]); (Paniagua and Istance, 2018[64]). At the same time, some jurisdictions have reinforced more prescriptive curricula and traditional approaches in response to attainment and accountability concerns, indicating that student-centred pedagogies remain a dominant but contested reform trajectory.

These tensions reflect the difficulty of changing pedagogical practice. While teachers can more readily integrate new content into established routines, adopting new instructional approaches challenges deeply held beliefs about teaching and classroom authority. Limited preparation, insufficient professional development, and reliance on familiar materials often lead teachers to revert to traditional practices, sustaining a gap between curricular intentions and classroom practice (Gouëdard et al., 2020[63]). OECD research notes that curriculum change often outpaces teachers' capacity to implement it, creating a gap between what the curriculum envisions and what happens in classrooms (OECD, 2020[2]), reinforced by assessment systems that prioritise recall and procedural mastery over deeper learning (Paniagua and Istance, 2018[64]).

Addressing these barriers requires deliberate strategies that support pedagogical change alongside curriculum reform. Evidence on effective professional learning underscores the importance of sustained, practice-based and collaborative approaches that are closely connected to teachers' classroom realities (OECD, 2020[26]). Professional development that models desired pedagogies, provides opportunities for experimentation, and incorporates feedback and peer learning has been shown to be particularly influential. In parallel, school leaders and education systems play a critical enabling role. Leadership that creates space for pedagogical innovation, aligns school-level assessment practices with curriculum intent, and protects time for collaboration can significantly reduce implementation gaps. At the system level, coherence across curriculum, assessment, teacher education and accountability frameworks is essential to ensure that pedagogical change is supported as a collective and sustained endeavour rather than left to individual teachers alone (OECD, 2020[26]).

4.2.1. Teachers must differentiate instruction and use formative assessment to support diverse learners

As classrooms become more diverse, adaptive teaching, or tailoring instruction to different learners' needs, is increasingly vital. OECD findings underscore that supporting all students' learning and well-being "requires teachers to have strong theoretical knowledge of differentiated instruction and the skills to put this into practice" (OECD, 2023[65]). In practice, this means varying tasks, content and pacing so that advanced learners are challenged and struggling learners receive additional support, all within the same class (OECD, 2019[66]). Teachers skilled in differentiation can adjust lessons on the fly, ensuring each student is challenged yet able to progress.

Formative assessment plays a complementary role in enabling such responsiveness. It refers to the continuous process of gathering evidence of student learning, providing feedback, and adapting instruction accordingly (OECD, 2013[67]). Rather than waiting for end-of-term exams, teachers use techniques like questioning, classroom discussions, or short quizzes to continually gauge understanding. Research shows this cycle of feedback and adjustment has a high impact on learning outcomes (Hattie, 2008[68]), (Black and Wiliam, 1998[69]). Used effectively, formative assessment helps teachers identify emerging learning needs and refine their teaching to better support diverse learners.

The capacity to teach in these ways, however, cannot rely on individual teachers alone. It depends on coherent system-level support that aligns curriculum expectations, assessment practices, professional development and school leadership (Gouëdard et al., 2020[63]); (OECD, 2020[2]). Teachers are better positioned to respond flexibly to students' needs when curricula explicitly value differentiation, assessments recognise formative and diagnostic uses, and teacher professional development is sustained and practice-oriented. Supportive school cultures, opportunities for collaboration, and access to appropriate pedagogical tools further enable teachers to exercise professional judgement. In this sense, an aligned education ecosystem creates the conditions for adaptive teaching to become a shared and sustainable practice rather than an individual burden (OECD, 2023[65]).

4.2.2. Pedagogical change: Barriers and enabling conditions

Pedagogical change is shaped not only by teachers' intentions but also by the structural and cultural conditions in which teaching occurs. While contemporary curricula increasingly promote student-centred and competency-oriented pedagogies, their enactment depends on how education systems address persistent constraints and create enabling conditions for change.

Time, school culture and leadership are key factors for pedagogical change. Heavy workloads and dense curricula constrain teachers' capacity to innovate, with around half of teachers across OECD countries reporting that time limits their participation in professional development opportunities (OECD, 2019[70]). Where protected time for planning, reflection and collaboration is available, alongside flexible curricula, teachers are better able to align practice with curricular intentions. School culture and leadership further determine whether innovation is seen as legitimate or risky; in unsupportive environments, teachers default to established routines (OECD, 2016[71]), and limited mentoring reduces reinforcement of new practices (Schleicher, 2011[72]). By contrast, leadership that encourages experimentation, professional dialogue and learning from setbacks supports the adoption and sustainability of new pedagogies.

Assessment and accountability arrangements can either constrain or enable change. High-stakes examinations often narrow teaching towards test-related content, discouraging innovation (OECD, 2023[73]). Broader assessment approaches that value higher-order skills reduce perceived risks and increase pedagogical autonomy, supporting closer alignment between curricular goals and classroom practice.

Collaboration plays a critical role in the pace and sustainability of pedagogical change, yet teaching in many systems remains largely individualised, with the OECD Teaching and Learning International Survey (TALIS) data showing that formal collaborative practices are often infrequent, limiting the spread of innovation (OECD, 2016[71]). When collaboration is embedded in school routines, pedagogical change becomes a shared endeavour grounded in collective learning. From an ecosystem perspective, these conditions are most effective when reinforced by connections to wider learning environments, as engagement with universities, cultural institutions, employers or digital platforms expands access to expertise, tools and authentic learning opportunities, helping convert structural constraints into enabling conditions for sustained classroom change (OECD, 2023[74]), (International Commission on the Futures of Education, 2021[75]).

4.2.3. Professional learning ecosystems for pedagogical innovation

Empowering teachers to adopt innovative pedagogies requires professional development that is sustained, collaborative and embedded in practice. Evidence consistently shows that one-off workshops or theory-driven lectures have limited impact on classroom change. Instead, professional learning is most effective when teachers actively engage in the kinds of student-centred approaches they are expected to implement themselves, such as collaborative planning, inquiry-based tasks and reflective practice (Darling-Hammond, Hyler and Gardner, 2017[76]). Programmes that involve teachers designing lessons together,

observing model practices and rehearsing new strategies are far more likely to translate into lasting pedagogical change compared to passive forms of training.

Teachers benefit from experiencing inquiry-based, differentiated or technology-enhanced learning first-hand, supported by lesson observations, peer coaching and iterative feedback cycles. Sustained, job-embedded approaches, wherein teachers trial strategies in their own classrooms, receive mentoring and refine their practice, help bridge the gap between understanding new pedagogies and using them confidently and consistently (Guskey, 2002[77]) Such approaches not only build instructional skill but also strengthen teachers' professional agency and willingness to innovate.

Professional development is most impactful when situated within a coherent ecosystem that aligns curriculum, assessment, leadership and accountability, as this alignment enables professional learning to directly support curriculum enactment in classrooms. When professional learning priorities reinforce curriculum intentions and assessment practices, and when schools allocate protected time for collaboration alongside leadership support for experimentation, pedagogical change becomes both feasible and meaningful, positioning professional development as a central mechanism for collective reflection and continuous improvement rather than an add-on (OECD, 2020[78]). International evidence illustrates how such coherence operates in practice: OECD case studies show that education systems embedding approaches such as project-based learning, interdisciplinary teaching, or social and emotional learning into daily routines – supported by aligned curriculum goals, flexible assessments and targeted professional learning – are more likely to see curriculum goals realised in classroom practice (OECD, 2021[79]); (Hattie, 2008[68]).

Aligning assessment with curriculum change

Assessment can be understood as the collection of evidence to inform judgement (Harlen, 2005[80]), using tools ranging from tests and examinations to portfolios and performance tasks. While assessment is often classified as formative, summative or diagnostic (Bloom et al., 1971[81]), such distinctions risk oversimplifying practice. Newton (2007[82]) argues that rigid categorisations obscure how assessment information is actually used and calls instead for transparency regarding appropriate and inappropriate uses. Reflecting this view, this paper treats assessment as a multi-faceted practice embedded within education ecosystems shaped by curriculum frameworks, governance arrangements and digital infrastructures.

Recent OECD analyses highlight that assessment systems increasingly rely on interoperable data environments and digital tools that enable multiple uses of assessment information, from formative feedback to system monitoring, provided that governance frameworks ensure trust, data protection and ethical use (OECD, 2023[74]).

4.2.4. Assessment systems are misaligned in many countries

Despite curriculum reforms that emphasise competencies and higher-order skills, assessment systems in many countries remain misaligned with these ambitions. Large-scale assessments continue to prioritise what is easiest to measure, while complex learning processes and performances remain difficult to capture (Looney, 2011[83]). In high-stakes contexts, accountability mechanisms further incentivise teaching to the test, narrowing curriculum enactment and pedagogical practice (Koretz, 2009[84]); (Linn, 2000[85]) .

From an ecosystems perspective, these challenges arise from interactions between, assessment, governance and educational culture. Accountability mechanisms have particularly strong washback effects: when assessment results are used for accountability or selection, their stakes amplify their impact on classroom practice (OECD, 2025[86]). Research on intelligent accountability highlights tensions between trust in professional judgement and demands for system-level information (O'Neill, 2013[87]). When

assessment systems are expected to serve pedagogical, communicative and governance functions simultaneously, they risk internal contradiction and disproportionate disadvantage for learners with lower social and cultural capital (Lillejord, 2020[88]). These tensions are evident in Denmark, where teachers report emotional and educational costs of high-stakes testing, while authorities stress the governance value of aggregated assessment data (Ydesen and Elfert, 2023[89]).

Ecosystem-oriented strategies for assessment and accountability

An ecosystems approach emphasises differentiating assessment functions rather than relying on single-purpose designs. Low-stakes, formative-rich assessments can support learning and student agency, while sampled or rotating assessments can generate system-level information without placing excessive pressure on teaching and learning (OECD, 2023[74]). Clear boundaries for the use of assessment data are essential to avoid misuse and unintended consequences (Newton, 2007[82]).

Professional trust and capacity are critical system conditions, as assessment quality depends on educators' ability to interpret and use evidence in local contexts, supported by professional learning, collaborative sense-making and enabling leadership rather than compliance-oriented control (OECD, 2024[90]). Generative artificial intelligence may further support adaptive, context-sensitive assessment if robust governance frameworks address ethical, legal and social considerations such as data protection, transparency and bias (OECD, 2023[74]).

Learning extends beyond schools to homes and communities, requiring assessment and accountability systems that recognise these environments and support collaboration. When used for dialogue and improvement rather than ranking, assessment information can strengthen shared responsibility and promote quality, equity and student agency (OECD, 2023[74]); (OECD, 2024[6]).

4.3. Aligning teacher education with curriculum change

A curriculum may be well designed, but without adequately prepared teachers, its impact on student learning remains limited. Ensuring that curriculum frameworks communicate clear expectations for teaching and learning is therefore essential so that teacher preparation and professional development can align effectively with reform goals. Effective curriculum change also requires alignment between curricular goals and teacher profiles, including competencies and beliefs (OECD, 2025[91]), (OECD, 2024[92]). Beyond subject knowledge, teachers need pedagogical, technological and socio-emotional competencies to deliver inclusive and future-oriented education (OECD, 2023[93]); (OECD, 2025[94]).

In a rapidly changing world shaped by technological advancement, globalisation, and complex societal challenges, teachers are expected to be able to:

- Teach in diverse and multicultural classrooms, adapting approaches to students' cultural, linguistic, and social backgrounds (OECD, 2025[95])
- Create inclusive learning environments that support students from varied socio-economic backgrounds, including those with special education needs (OECD, 2024[90])
- Integrate technology and AI into teaching to enhance learning and prepare students for a digital future (OECD, 2023[74])
- Apply innovative pedagogies, such as project-based and student-centred learning, to foster critical thinking and collaboration (OECD, 2023[93]); (OECD, 2025[94])
- Use assessment and evaluation methods aligned with competency-based curricula (OECD, 2024[90])
- Engage in continuous professional development to keep pace with evolving curriculum demands (OECD, 2025[95]).

However, many teachers report feeling underprepared to meet these expectations. Gaps persist between curriculum ambitions and teachers' confidence and capacity to implement new pedagogical, digital and inclusion-related demands, undermining effective implementation (OECD, 2025[95]). An ecosystems approach can help address this misalignment by aligning initial teacher education, professional development, school leadership and assessment frameworks with curriculum priorities, providing coherent and sustained support for teachers (OECD, 2024[90]). The following section explores how teacher preparedness varies across systems and profiles, and how this shapes curriculum implementation.

4.3.1. Teachers' unpreparedness as a systemic misalignment challenge

Teachers' unpreparedness to implement revised curricula reflects structural misalignment across the education ecosystem, rather than individual capacity deficits (OECD, 2020[78]), (OECD, 2016[96]). While curricula increasingly promote inclusive, student-centred and technology-enhanced approaches, teacher education, professional learning and assessment systems often evolve in isolation, creating an implementation gap between reform intentions and classroom practice (OECD, 2024[6]).

- **Key system-level challenges:** Several interrelated challenges underpin this implementation gap:
  - **Misalignment between curriculum reform and teacher education:** Initial teacher education (ITE) often prioritises theoretical knowledge and remains weakly aligned with curriculum reform priorities, despite mandatory teaching practicums in most systems (OECD, 2020[78]).
  - **A persistent theory–practice gap in initial teacher preparation:** Practicum experiences are frequently insufficiently integrated with academic coursework, leaving pre-service teachers underprepared to apply inclusive, innovative and digitally supported practices (Resch and Schrittesser, 2021[97]), (Tveitnes, Helgevold and Moen, 2025[98]).
  - **Fragmented professional learning and misaligned incentives:** Professional learning remains largely fragmented, while assessment and accountability frameworks continue to reward traditional knowledge transmission, discouraging pedagogical innovation (Darling-Hammond et al., 2019[99]).
  - **Limited ecosystem co-ordination:** Weak collaboration between higher education institutions, schools and education authorities constrains the integration of classroom feedback and reform demands into teacher preparation and development (OECD, 2025[94]).
- **Strategies and positive system-level responses:** International evidence suggests that addressing these challenges requires system-level coherence rather than isolated programme improvements. Several strategies have proven effective in reducing misalignment and strengthening teacher preparedness:
  - **Strengthened partnerships between ITE providers and schools**, including co-designed curricula and jointly supervised practicums, enhance the relevance of teacher preparation (OECD, 2024[6]).
  - **Practice-embedded professional development**, such as coaching, lesson study and collaborative inquiry, supports sustained pedagogical change more effectively than one-off training (Darling-Hammond et al., 2019[99]).
  - **System-wide alignment of curriculum, assessment and professional learning** reduces contradictory incentives and reinforces curriculum intentions (OECD, 2025[94]).
  - **Leadership for coherence**, with school leaders acting as curriculum leaders, supports safe experimentation, collective learning and teacher agency (OECD, 2024[6]).

Positive examples from systems such as Finland and Singapore illustrate how strong alignment between curriculum reform, teacher education and continuous professional learning can position teachers as co-

constructors of curriculum innovation rather than passive implementers (OECD, 2024[6]), (OECD, 2025[94]), (OECD, 2025[95]).

An ecosystems approach therefore reframes teacher preparedness as a shared responsibility. By aligning curriculum reform with teacher education, professional learning, leadership and assessment, systems can embed support within everyday practice and strengthen teachers' capacity to adapt curricula to diverse contexts, as illustrated in the Annex 'Case Studies of Ecosystems in Action'.

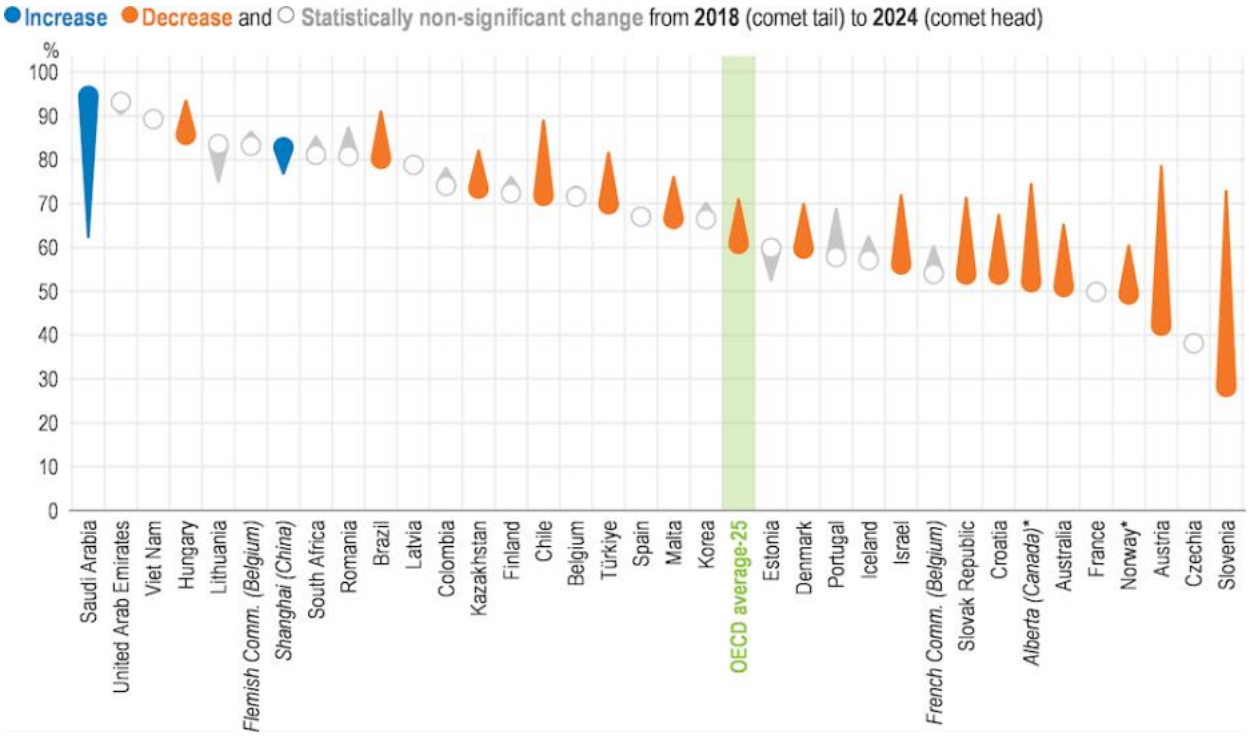
4.3.2. Misalignment between teacher preparedness and curriculum demands

Building on the challenges outlined above, recent evidence highlights how teacher preparedness varies across systems and profiles, shaping teachers' capacity to implement curriculum change effectively and respond to evolving classroom demands.

Newly graduated teachers, in particular, report feeling underprepared for key aspects of classroom practice. TALIS 2024 shows a decline in the share of recent graduates who feel well prepared in areas such as classroom management, inclusive teaching and subject-specific pedagogy (see Figure 4.1). While most feel confident teaching subject content, fewer feel equipped to manage diverse classrooms or support students with special needs, suggesting a growing misalignment between initial teacher education and the realities of modern classrooms (OECD, 2025[95]).

Figure 4.1. Change in recent graduates' sense of preparedness for classroom practice

Percentage of recently graduated lower secondary teachers who report that their formal education made them feel prepared "quite a bit" or "a lot" for classroom practice in some or all subject(s) they teach



Note: Estimates should be interpreted with caution due to higher risk of non-response bias. Recent graduates refer to teachers who completed their initial teacher education in the five years prior to the survey.
Source: (OECD, 2025[95]) *Results from TALIS 2024: The State of Teaching*, TALIS.. https://doi.org/10.1787/90df6235-en.

Teachers continue to face challenges in supporting students' social, emotional and inclusive learning. While around two-thirds feel confident promoting social and emotional learning, only four in ten feel able to adapt standardised assessments or navigate inclusion-related policies, signalling gaps in preparation and ongoing support (OECD, 2025[95]).

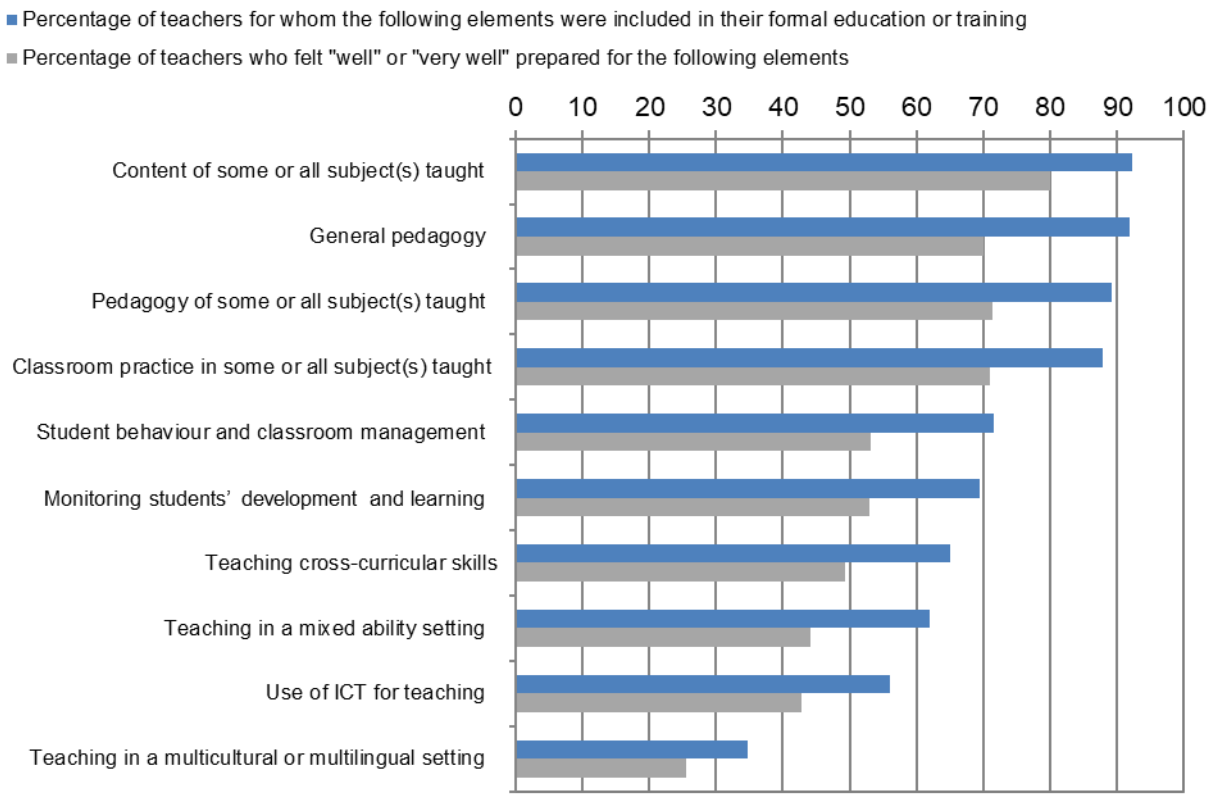
Digital competence poses a parallel challenge. Despite rising expectations around technology and AI, only about one in three teachers use AI in teaching, and a similar share report high professional learning needs in digital resources, particularly among more experienced teachers (OECD, (OECD, 2025[95]).

Content of teacher education and mentoring

Teacher education programmes increasingly reflect revised curricula, yet often fall short in preparing teachers to implement these expectations in practice (OECD, 2024[90]), (OECD, 2025[95]). Figure 4.1 highlights this gap by comparing the proportion of teachers trained in specific areas with those who feel well prepared to teach them, using TALIS 2018 data (OECD, 2020[78]).Training remains largely focused on subject content and general pedagogy, which are also the areas where teachers report the highest levels of preparedness.

Figure 4.2. Content of teacher education and sense of preparedness for teaching

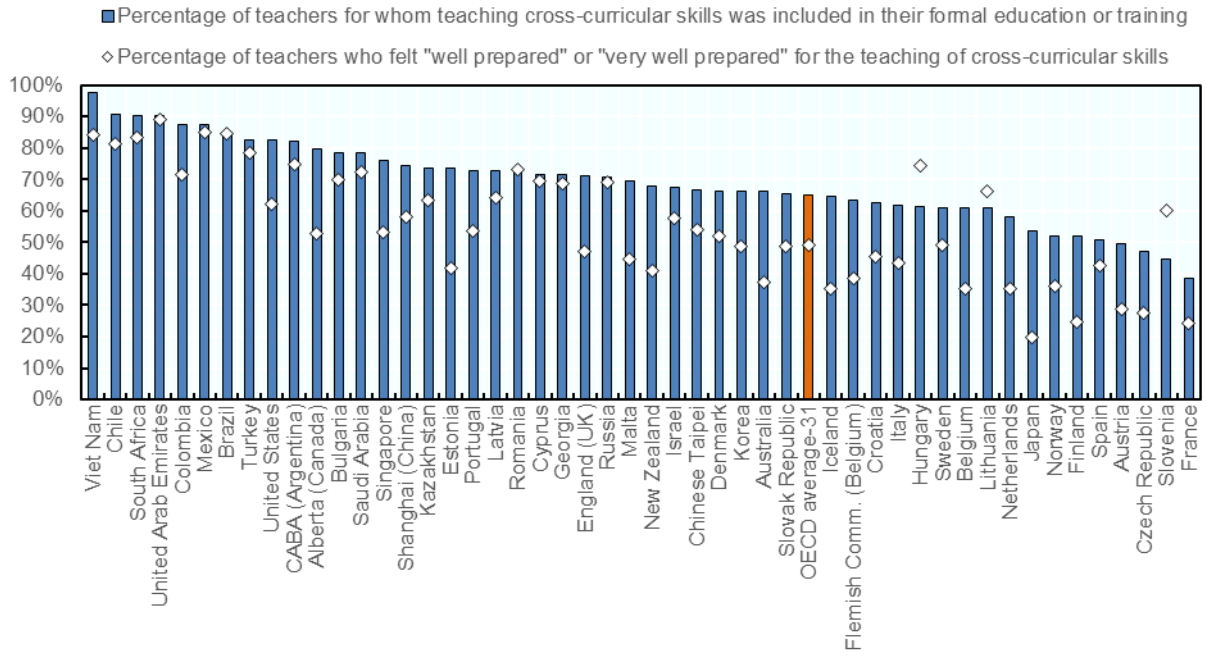
Results based on responses of lower secondary teachers



Notes: ICT = information and communications technology. Values are ranked in descending order of the percentage of lower secondary teachers for whom the following elements were included in their formal education or training.
Source: OECD (2019[70]) *TALIS 2018 Results (Volume I) Teachers and School Leaders as Lifelong Learners*, TALIS, https://doi.org/10.1787/1d0bc92a-en.

Preparedness declines markedly for classroom practices central to contemporary curricula. While many teachers report training in areas such as behaviour management and monitoring student development, only about half feel prepared to apply them in practice (OECD, 2020[78]). Even larger gaps appear in cross-curricular teaching, mixed-ability classrooms and technology integration, and are most pronounced in multicultural or multilingual contexts, despite growing curricular emphasis on inclusion and diversity

Figure 4.3. Coverage of teaching cross-curricular skills in teacher education and sense of preparedness to teach cross-curricular skills



Note: Results based on responses of lower secondary teachers. Countries and economies are ranked in descending order of the percentage of teachers for whom teaching cross-curricular skills was covered in their education. Examples of cross-curricular skills include creativity, critical thinking and problem-solving.
Source: (OECD, 2019[70]), *TALIS 2018 Results (Volume II): Teachers and School Leaders as Valued Professionals*, TALIS. https://doi.org/10.1787/19cf08df-en.

Figure 4.2 and Figure 4.3 highlight a systemic misalignment between curriculum ambitions and teacher preparedness, rooted in gaps across curriculum design, teacher education, professional learning and assessment systems rather than in teachers' motivation or effort (OECD, 2020[78]), (OECD, 2025[95]) . When curricula introduce new demands, such as competency-based learning, digital integration or inclusive pedagogies, without corresponding adjustments in preparation, mentoring and assessment, teachers experience uneven preparedness and pedagogical lag (OECD, 2025[94]).

Mentoring is central to addressing this gap by supporting the transition from formal preparation to classroom practice. Practice-based experiences embedded in teacher education, such as placements, internships and residency models, enable pre-service teachers to apply and adapt pedagogical knowledge in real classrooms, strengthening professional learning (Darling-Hammond et al., 2019[99]); (Levin and Rock, 2003[100]); (Zeichner and Liston, 2013[101]); (Wilson, Floden and Ferrini-Mundy, 2002[102]).

However, mentoring outcomes depend on the wider ecosystem. When mentoring is embedded in traditional teaching cultures, it may reinforce established practices and limit experimentation with inclusive, cross-curricular or digitally supported pedagogies (Orland-Barak and Wang, 2020[103]). Evidence shows

that professional learning is strongest when teachers are supported to develop, test and reflect on their own pedagogical approaches (Resch and Schrittesser, 2021[97]).

An ecosystems approach reframes mentoring as a networked process linking schools, teacher education institutions and professional learning communities. By aligning mentoring with curriculum reform priorities, systems can directly address the preparedness gaps identified in Figures 2 and 3, particularly in cross-curricular competencies, inclusion, ICT integration and teaching in diverse classrooms (OECD, 2020[78]), (OECD, 2023[74]).

4.4. Aligning teacher standards and licensing with curriculum change

Aligning teacher standards, preparation pathways and licensing with curriculum change is essential for effective reform. These elements are core components of the education ecosystem and interact closely with assessment, school organisation, professional learning and labour market conditions (OECD, 2019[66]), (OECD, 2024[90]). From an ecosystem perspective, curriculum reform depends not only on well designed frameworks but on the coherence of interconnected elements supporting classroom practice (Fullan, M., 2006[10]).

In most systems, entry into the teaching profession requires initial teacher education, often followed by additional qualification or licensing. The structure, duration, admissions criteria and content of these programmes shape early professional experiences and influence how effectively curricular intentions are translated into practice (Darling-Hammond et al., 2019[99]). Research shows that misalignment between preparation and instructional realities weakens coherence, while alignment supports smoother implementation of curriculum goals (Zhang et al., 2023[104]).

Teacher standards are central to alignment, defining what teachers are expected to know and do across career stages. They serve as a common reference for teacher education, certification, professional development and career progression (Guerriero, 2017[105]). Comparative analyses point to a global move towards more professionalised standards, despite variation in how systems operationalise domains such as pedagogy, ethics and lifelong learning (Aseery, 2025[106]). When aligned with curriculum objectives, standards clarify expectations, support consistent teaching quality, strengthen professional identity and improve transparency in career pathways.

Professional learning plays a central role in reinforcing coherence across the education ecosystem. Evidence indicates that systematic links between initial teacher preparation and ongoing professional development improve instructional quality and strengthen alignment with curriculum goals, particularly for complex competencies such as higher-order thinking skills (Kim, 2025[107]). Teachers' perspectives similarly emphasise the need to align curriculum expectations, professional development and classroom practice to support effective implementation (El-Annan and Hassoun, 2025[108]). When standards are misaligned or overly rigid, ecosystem coherence weakens, resulting in unclear expectations and uneven teaching quality.

5 Lessons learnt and what remains unknown

An ecosystems approach helps us to recognise the complexity of making meaningful, lasting change in school practices. Understanding, navigating and harnessing the ecosystem – including the challenges it creates – holds promise to make curriculum change more successful.

5.1. Pointers for action

An ecosystems perspective on curriculum reform can help identify and address persistent challenges, but recognising those challenges is only the first step. The following pointers for action highlight what has been learnt about making curriculum change more successful through a holistic approach to implementation.

5.1.1. Frame for dialogue

Curriculum reforms ought to be framed not a means for political or ideological debates, but rather as a collaborative effort grounded in evidence and requiring dialogue over time. Lessons from past reforms show the need to transform these dynamics. Rather than one-off, linear decision making followed by top-down implementation, an ecosystems approach favours ongoing dialogue and co-creation with stakeholders. In practice, this means moving from debating positions to deliberative dialogue where stakeholders jointly problem-solve and adjust reforms in an iterative way. Culturally, different education systems have various traditions of consultation, but a common lesson is that inclusive dialogue builds trust and ownership. This approach acknowledges that curriculum design and implementation will require adjustment and feedback over time, rather than assuming a perfect plan from the outset (OECD, 2020[2]). Returning to the needs of students, achievement data and evidence on effective pedagogy is essential for keeping discussions and outcomes focused on the ultimate goals of curriculum change.

Choose words and framing carefully. The terminology and narrative used in curriculum documents and communication can either smooth the path or create new hurdles. Policymakers have learnt to draft curriculum frameworks and guidelines with careful attention to wording, recognising the connotations and emotional responses certain terms may carry. For instance, introducing “competencies” or cross-curricular themes may unintentionally worry some teachers or parents if not clearly defined, as they might associate this with adding workload or diluting academic content. Reforms can fail if they are perceived as just trendy jargon or an ideological shift without substance. Building a broad understanding of the intended changes (through guides, glossaries and illustrative examples) helps stakeholders see themselves in the reform and reduces misinterpretation.

5.1.2. Understand the system and engage stakeholders strategically

Bring stakeholders on board early and strategically to accelerate change. Experience across OECD countries shows that *who* is involved in curriculum change, and *how*, significantly affects the pace and success of implementation. Strategic engagement means identifying the stakeholders who have influence

and will be most affected; and involving them in meaningful ways. Such inclusive processes can shorten downstream delays by building consensus on the rationale and content of reforms.

Define and drive the right drivers of curriculum change. Not all drivers of change are equally effective in bringing about deep, lasting improvement. Research on system reform (Fullan, M., 2011[109]) draws a distinction between "wrong drivers" (levers that might bring short-term results but often at the cost of capacity and morale) and "right drivers" (levers that foster genuine improvement). In the curriculum context, "right drivers" are those that foster intrinsic motivation of teachers and students: for example, investing in teacher professional development and collaboration, encouraging innovative pedagogy, fostering a culture of trust and continuous improvement (Fullan, M., 2011[109]). One lesson is that policymakers should explicitly identify the key drivers for their curriculum initiative and ensure they are aligned with positive educational values. For instance, if the goal is to implement an inquiry-based science curriculum, the drivers might include teacher training in inquiry methods, creation of teacher networks to share practices, and adjustments to assessments to value inquiry skills.

5.1.3. Ensure strong curriculum design alongside stakeholder engagement

Inclusive processes alone do not guarantee effective curriculum change. While broad participation helps build legitimacy and ownership, successful reforms also depend on whether these inputs are translated into a coherent and well designed curriculum and instructional system (OECD, 2019[110]) . When curriculum frameworks lack clear design principles, educators may struggle to interpret reform goals, leading to uneven implementation and diluted learning outcomes (Gouëdard et al., 2020[63]).

5.1.4. Embrace and develop agency and co-agency

Elevate the role of students from passive recipients to active change agents. A key tenet of modern curriculum thinking is that students are not just the recipients of education reform; their engagement and agency can drive the success of those reforms. The OECD Learning Compass recognises the crucial role of student agency in future-ready education, meaning that learners should be empowered to shape their own learning and contribute to improvements in their schools (OECD, 2019[16]).

In education systems that encourage student agency, learning involves not only instruction and evaluation but also co-construction. Co-agency is when teachers and students become co-creators in the teaching-and-learning process. The concept of co-agency recognises that students, teachers, parents and communities work together to help students progress towards their shared goals (Leadbeater, 2017[111]).

Shift perspective from "students ready for school" to "schools ready for students". Traditionally, education systems have focused on expecting students to adapt to the school's requirements. An ecosystems approach flips this: schools (and curricula) should adapt to students' needs and backgrounds, rather than the other way around (OECD, 2017[112]). Embracing this perspective has practical implications for curriculum change. It means designing curriculum and pedagogy that meet students where they are, accounting for differences in prior knowledge, culture, language and learning. For instance, curricula might build in more flexibility or choice, allowing students to pursue projects that connect with their interests or cultural identity. A concrete example is the practice of easing key transitions (such as from kindergarten to primary school) by aligning curriculum and pedagogy across levels and involving families, effectively making the school environment welcoming and ready to receive the child (OECD, 2017[112]).

5.1.5. Create coherence

Take a whole-of-society approach to cultivate the culture of "valuing learning". Education does not operate in a vacuum; societal priorities and signals influence what happens in schools. A recurring challenge is the mentality that "what gets measured gets treasured," meaning that test scores or league

tables often overshadow broader learning goals. Shifting this culture requires engaging society at large to broaden the definition of success in education.

Build coherence among groups. One of the foremost challenges is creating coherence across disparate groups. As research on collective impact and logic models suggest, this coherence takes time to achieve, particularly when it comes to building relational trust and getting aligned around shared agendas and aims. In addition, creating coherence across systems levels may require additional investment in resources for sustaining collaborative spaces and ongoing mixed-methods evaluation. Different actors each have their own perspectives and priorities. Research on collective impact initiatives shows that getting diverse stakeholders aligned around a *shared agenda* and building **relational trust** takes considerable time and deliberate effort (Kania, J. & M. Kramer, 2011[60]). Unlike a simple top-down reform, an ecosystems approach implies continuous negotiation and iteration to ensure everyone is pulling in the same direction.

Build coherence among policies. All layers of the system should reinforce the reform's objectives. That might mean aligning teacher training and standards, learning materials, and assessments with curriculum changes. For instance, a new curriculum emphasising deep learning alongside an assessment regime that rewards rote memorisation sends mixed signals.

Beware of the "textbook culture," including its digital evolution. In many education systems, there remains a strong culture of "what's in the textbook gets taught." Teachers often rely on approved textbooks to determine the taught curriculum. If new curricular content or competencies are not reflected in textbooks (or their digital versions), they risk being sidelined in classrooms. The rapid growth of digital textbooks underscores the importance of ensuring that these resources align with and support curriculum innovations, and offers opportunities to increase alignment. Digital textbooks can offer interactive features and up-to-date content, but many simply mirror traditional books. Curriculum planners must actively monitor and guide the development of textbooks and digital learning materials so that they reinforce, rather than impede, the goals of reform (OECD, 2020[2]). This may involve updating approval processes for textbooks and providing guidance to publishers and EdTech developers to embed new competencies and pedagogical approaches in their materials.

5.2. Further research and possible future developments

More research is needed on empirically testing out the ecosystems approach on short- and long-term outcomes for students and for educators. Much of the research on curriculum change discusses implementation processes *or* curriculum impacts, and often focuses on a singular stakeholder or a particular outcome in a particular moment in time. The development of robust case studies that document ecosystems approaches and their impacts on student learning over varying periods of time can serve as a foundation for comparison of what works in ultimately achieving greater student and educator success and well-being.

The relationship between curriculum changes at different life stages is another potential area for further exploration. Stakeholders have observed that the higher the level of education, the more complicated transformative change becomes, due to factors like institutional inertia, departmental silos and strongly vested interests among subject specialists or examination boards. We need to better understand how an ecosystems approach could bridge these layers so that competencies and values introduced in early childhood can be reinforced and built upon through K-12 levels of education, into vocational training, higher education and lifelong learning.

In vocational education and training (VET), it is widely accepted that curricula must be closely linked to real work environments to be effective. Indeed, many OECD countries mandate *authentic workplace experiences* as part of upper-secondary VET (OECD, 2025[113]). This authentic learning not only improves skill acquisition but also keeps VET curricula responsive to industry changes. Further research could

examine how approaches like project-based learning, community partnerships and experiential learning can make academic education more authentic and how this impacts student engagement across different age groups. An ecosystem perspective suggests viewing education as a connected system beyond general education schools, including early childhood centres, workplaces, community organisations and adult learning providers as all part of the learning ecosystem. Curriculum change must aim to foster continuity and complementarity across these settings.

Shift from supply- to demand-mindset is a possible future development worth watching. Curriculum policymaking has traditionally been a *supply-driven* enterprise: experts and authorities determine what learners should be taught, and the system delivers it. A potential future shift is towards demand-driven curriculum design, wherein the content and skills taught are more directly responsive to the "pull" of learners, parents, employers and communities. However, making this shift raises complex questions that warrant further exploration. Policymakers must ask: demand from whom, and for what? Parents, for instance, might demand a curriculum that boosts immediate exam scores or university admission chances for their children, which could emphasise certain academic subjects or rote learning. Employers might demand skills relevant to the current labour market, which could favour vocational and technical content. Students themselves might desire a curriculum that is more engaging, relevant to their lives, or oriented toward pressing issues like climate change and social justice. These demands are not always aligned. Research is needed on how to balance and prioritise different demands in the curriculum-making process.

The balance between participatory curriculum development and coherent curriculum design also deserves concerted research attention. Understanding how systems translate diverse stakeholder perspectives into well structured curriculum and instructional designs remains an important challenge for policymakers and researchers (Lindvall and Ryve, 2019[114]). While an ecosystems approach highlights the importance of stakeholder engagement, future research should aim to provide deeper insight into how education systems ensure that broad participation leads to clear and coherent curriculum frameworks centred on student learning (OECD, 2024[20]).

6 Conclusion

This paper set out to examine curriculum change through an ecosystem lens, investigating what a curriculum ecosystem entails, who shapes it, how alignment is (or is not) achieved across system components, and what can be learnt from past and ongoing reforms. Taken together, the analysis suggests that curriculum change is both a design challenge and a systemic, relational and adaptive process. While the quality of curriculum design remains fundamental, whether reforms translate into meaningful changes in the real world depends on the broader ecosystem in which curricula are interpreted, implemented and supported. An ecosystems approach does not simplify reform, but it illuminates the interdependencies that determine whether reform efforts translate into meaningful change in classrooms and learning experiences.

A curriculum ecosystem extends well beyond formal curriculum documents (i.e. the "expected curriculum"). It encompasses the actors, institutions, cultures, resources and routines that collectively shape what is taught, how it is taught, and how learning is valued. The principles underpinning this interpretation – inter-dependence, co-agency, coherence and adaptability – frame curriculum not as a static artefact, but as a living system that evolves through interaction. This understanding helps explain why well designed curricula can still fail to deliver their intended outcomes when ecosystem conditions are misaligned.

Student needs and evidence must remain the guiding principles. An ecosystems approach engages stakeholders in curriculum design for a purpose — to increase the chances that curriculum change will improve student learning. Clarity about this goal will generate a sense of shared purpose that can make potentially difficult conversations more productive, and lead to student-centred curriculum design at all levels.

Curriculum change requires a stakeholder engagement process. Policymakers, teachers, students, families, intermediaries and wider society all shape curriculum change and implementation, whether this is explicitly recognised or not. Evidence across systems shows that reforms progress more effectively when stakeholders are engaged strategically, when peer learning is cultivated, and when dialogue replaces one-way communication. At the same time, the analysis underscores persistent challenges: uneven participation, contested narratives about purpose and value, and the difficulty of sustaining trust across diverse actors. An ecosystems approach clarifies that stakeholder engagement is not a matter for public relations, but a core mechanism through which curriculum change gains legitimacy, momentum and resilience.

Misalignment between curriculum intentions, pedagogy, assessment and teacher development remains one of the most enduring obstacles to effective change. High-stakes assessment regimes, unclear professional expectations, fragmented professional learning, and market-driven instructional materials can all pull practice away from curriculum goals, leading to perceived curriculum overload and "teaching to the test". Conversely, systems that invest in coherence – through aligned assessment practices, sustained professional learning and clear signals about valued learning – are better positioned

to support consistent implementation. Importantly, alignment is not achieved once and for all; it requires ongoing adjustment as systems, technologies, stakeholders and societal expectations evolve.

Turning to lessons learnt, the evidence suggests that an ecosystems approach can improve the effectiveness of curriculum change by strengthening relationships, supporting agency and making interdependencies visible. But this approach does not guarantee outcomes. Change unfolds unevenly, takes time, and often produces unintended effects. Lessons from collective impact, logic models and theory-of-change approaches reinforce the importance of shared purpose, relational trust and multi-perspective evidence for learning and adaptation. At the same time, gaps remain in understanding how ecosystem-level change influences long-term student outcomes, how demand for curriculum change is articulated and balanced across stakeholders, and how coherence can be sustained across education levels and life stages.

Throughout an ecosystem, **student agency, teacher agency and co-agency across the system are not simply desirable outcomes of curriculum reform; they are enabling conditions for it**. When teachers are treated as professionals and co-designers, when students are positioned as active participants in learning, and when systems create space for collective learning, curriculum change is more likely to be meaningful and durable. Conversely, reforms that neglect agency risk becoming symbolic, compliance-driven or short-lived.

Adopting an ecosystems approach reframes curriculum change as a process of continuous sense-making, alignment and learning across all actors and levels of the system. It shifts attention from isolated policy instruments to the quality of relationships, feedback loops and shared understanding that sustain change over time. While uncertainty remains, this perspective offers policymakers a promising foundation for designing, implementing and stewarding curriculum reforms that are fit for increasingly complex and uncertain futures.

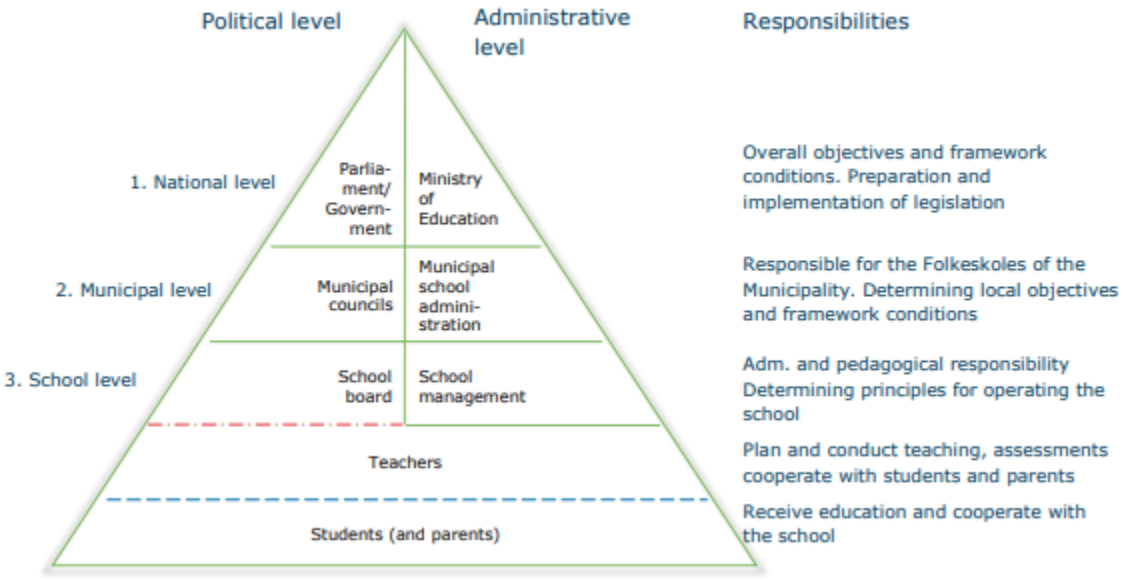
Annex A. Case Studies of Ecosystems in Action

The decentralised Danish schooling system

The public primary and lower secondary schools in Denmark are owned and operated by the municipalities within a legal framework laid down by the parliament and the Ministry of Education. The overall framework for the content of the subjects and expectations for the learning outcomes of the students are laid down in the national curricular framework prepared by the Ministry of Education. In addition to the binding core curriculum, municipalities are required to adopt syllabi for each subject. The Ministry of Education prepares indicative syllabi. Municipalities have the option of preparing their own syllabi, but virtually all municipalities use the indicative syllabi prepared by the Ministry of Education, as the municipalities generally do not consider that the amount of work involved in preparing locally adapted syllabi would be commensurate with the added value.

The following figure illuminates the distribution of responsibilities:

Figure A A.1. Distribution of responsibilities in the Danish school system



Note: The "Folkeskole" is the Danish municipal primary and lower secondary school.
Source: Adapted from Houlberg, K., et al. (2016[115]) Country Background Report – Denmark: OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools.

The role of the municipalities in developing the schools consequently does not focus on the development of steering documents, but rather on support and inspiration for the development of pedagogy and practice in schools. The municipalities support the schools in a variety of ways, including professional development for teachers, support from municipal consultants and advisers, facilitation of networks for teachers (e.g. The PEERs Network led by the municipality of Høje Gladsaxe), and financing of local development

initiatives and municipal development projects at one or more schools. Most of the municipal support for improving the quality of schools is planned and implemented by the individual municipality.

Especially since the municipal reform in 2007, when 271 municipalities were merged into 98 significantly larger municipalities, almost all municipalities have a size that ensures that they have sufficient capacity to carry out development projects and other support initiatives in the school area themselves.

It is not uncommon, however, for municipalities to collaborate on major development projects or other development initiatives. In some cases, two or more municipalities enter into an agreement on such co-operation. In other cases, the collaboration is the result of participation in research programmes or other development initiatives initiated by the Ministry of Education or private foundations.

In addition to joint projects, the municipalities co-operate through sharing experiences. One of the core tasks of the Local Government Denmark (LGDK), which is an association for all municipalities in Denmark, is to contribute to the sharing of knowledge and experiences and to help the municipalities to develop their practice based on new knowledge. With this aim, LGDK annually holds a two-day conference called the Children and Youth Summit. The meeting brings together mayors, municipal councils, heads of administration, heads of schools and day care facilities and other decision makers. The conference includes presentations of new knowledge from researchers, political debates, and presentations of municipal practice.

The OECD was invited to the conference in 2022 to give a presentation on the OECD Learning Compass. This presentation was made by Yuri Belfali. A Danish translation of the central texts in the Learning Compass, made by Jørn Skovsgaard, was distributed during the session.

The Children and Youth Summit plays an important role in setting the agenda for the municipalities' efforts to develop schools and day care facilities. LGDK also organises several conferences with more specific themes and target groups within e.g. day care and school. LGDK also facilitates thematic networks where municipalities gain new knowledge and share experiences. Finally, LGDK organises thematic partnerships between municipalities, where municipalities both gain new knowledge, carry out initiatives based on new knowledge and inspiration and share their experiences.

Note: contribution from Christian Lamhauge Rasmussen (2023), Senior Adviser in LGDK; Jørn Skovsgaard, CEO of Counter Current Consult.

The World Science Movement: A multi-stakeholder model for scalable STEM education and recovery

The World Science Movement (WSM) is a globally recognised, multi-stakeholder, competency-based initiative that has reached over 1.4 million children, 3 165 schools, and 2 742 teachers across 20 countries, with a strong focus on underserved and crisis-affected communities.

Developed to advance STEM education globally, WSM is strengthened by the involvement of leading academic institutions. Notably, University College London provides academic advising and training support. The World Science Movement was mobilised as an emergency education response to the 2023 earthquakes in southeastern Türkiye. The programme also receives backing from the private sector, with major companies such as Türkiye İş Bank and Petrol Ofisi supporting its mission to scale inclusive, future-ready STEM education. The programme played a crucial role in post-earthquake recovery in Türkiye, training 2 000 teachers and reaching 1 200 schools to support children's educational continuity and emotional recovery. In 2024, WSM expanded to Rwanda, in partnership with the Ministry of Education, training 30 teachers across 10 schools, with curriculum integration currently underway. WSM is implemented through a holistic learning ecosystem that includes physical STEM kits, gamified Twin student app, an AI-supported educator portal, and a professional learning community of role model teachers. Its core objective is to develop both competence and conscience, aligning closely with the OECD Learning Compass 2030, which emphasises the integration of knowledge, skills, attitudes, values and student agency. WSM follows a structured implementation model that includes the distribution of student kits, teacher training with access to the educator portal, student engagement through the Twin app, and participation in global science competitions. The model is flexible and adaptable to local contexts, ensuring both cultural relevance and long-term sustainability.

The project's impact on student skill development is validated by its receipt of Global Impact Level 4 recognition from the Skills Builder Partnership, the highest rating awarded for measurable, sustained progress in creativity, teamwork and problem-solving skills. This recognition affirms WSM's globally benchmarked and evidence-based approach for both learners and educators. Another independent impact study conducted by the Future Bright Group during December-January 2024 confirmed significant positive outcomes in student well-being, cognitive and meta-cognitive development, and social-emotional learning. To illustrate, among 113 teachers that participated in the study survey, a significant majority of them reported noticeable positive impact on student curiosity (89%), creativity (91%), and communication (89%) skills as well as coping with feelings (89%). WSM also fosters professional growth and collaboration among educators. According to Future Bright's research, a majority of participating teachers reported a positive impact on their well-being (97%) and co-agency (95%), attributing this to the programme's AI-supported tools and its emphasis on collaborative, inquiry-based teaching. One educator shared, that the students started saying, 'I am a scientist now'" to emphasise the impact of the programme on the students. By uniting civil society, academia, the private sector and educators, WSM offers a replicable, scalable model that contributes directly to the goals of the OECD Learning Compass 2030.

Note: contribution from Elif Girgin Harmanci, Global Impact high School & Pioneers Program Manager. Young Guru Academy. World Science Movement (WSM).

Public-private collaborative network to support children and parents in Nishinari, Japan

The "Nishinari Child-Rearing Network" is a public-private collaborative network for child-rearing and child development in Nishinari Ward, Osaka City, Osaka Prefecture. This network offers a people-centred approach, where support is provided in line with the needs of individuals based on repeated consultations, rather than forcing them to fit into existing support systems.

The network consists of 72 organisations including volunteer groups, daycare centres, government agencies and hospitals. It was established in 2000 and implements activities to protect children's rights, support child-rearing and prevent abuse.

Regarding child-rearing support, with the aim to create a town that is friendly to children and parents, welfare facilities, various local groups and the related sections of local government are working together to create a network to support parents who are worried about raising children and to provide a place where they can gather and talk to each other. As a part of their activity, they held a festival in which parents and children could work on crafts and play together, or enjoy the "Board game on Children's Rights" game, with which they could learn about the rights of children while playing.

Regarding abuse prevention, the Nishinari Child Abuse Prevention and Parenting Support Committee is working on a recovery support programme for parents who had abused children. It also conducts a survey of “Young Carers”, who have to take care of their families (e.g. young siblings and the elderly) and cannot do learning activity enough. This committee also plays the role of the "Regional Council of Countermeasures for Children Requiring Aid" based on the Child Welfare Act, which is responsible for abuse prevention measures. Specifically, monthly meetings are held in each district of six junior high schools in Nishinari Ward in order to detect and respond to child abuse early. At these meetings, local stakeholders such as individuals from child welfare facilities, daycare centres, kindergartens, school teachers, medical and health institutions, and administrative officials gather to exchange opinions on the current status of children in need of protection and the issues they face. They also discuss support plans adapted individually and the roles of each stakeholder to implement the plans.

To implement these activities, the participation of various public and private organisations and institutions is very important. They implement support by combining public sector measures with those of the private sector, such as organisations belonging to the "Nishinari Child-Rearing Network". By doing so, comprehensive supports that the only government cannot cover, such as taking children to and from nursery schools, are conducted.

Note: contribution from Child-Rearing Support, Non-Profit Organisation (2024), Translation by Yoshie Sekiguchi.

Student agency in the face of adversity

During the OECD / Tokyo Gakugei University Joint Workshop “Open Dialogues: Learning from disasters to build resilience in education" on 28-29 March 2022, students from Israel and Japan spoke with Princess Laurentien of the Netherlands about student agency in the face of adversity. The students shared their personal experiences with conflict, disasters, and learning and well-being during the COVID-19 pandemic; and Princess Laurentien invited them to reflect on the power of their agency as well as co-agency with teachers during these challenging times.

A student participant from Israel talked about how situations of adversity and conflict unite students and teachers. During the COVID-19 pandemic and during conflicts, he experienced a feeling of family between students, teachers and staff, as everyone is in the difficult situation together. For this student, the personal connection comes from teachers checking in and making sure that everyone is okay, especially when there is conflict involved.

This student and those he knew were sleeping in bomb shelters when they were attacked by missiles. It was 3am, and everyone was woken up by air raid sirens. At this time, his teacher sent a Zoom link to him and his classmates, and everyone connected and checked in on one another. His teacher lives in an area that was hit harder than where most of the students live, and they all wanted to make sure she was okay. This act of checking in gave everyone a sense of community and family, and it comforted everyone.

A student participant from Japan had experienced an earthquake in Kumamoto 6 years earlier. Like the student from Israel, he finds that disasters bring people together. When the earthquake struck, he was watching television with his family in the living room. It was his first time experiencing such a disaster. To make matters worse, there was fake news that a lion had escaped from the zoo during the earthquake, which made people even more scared. He found it difficult to believe in information after that. While he describes the earthquake as horrifying and unforgettable, he acknowledges that he learnt a lot from his experience. For example, before the earthquake, he thought school was something normal; but when he could not go to school because of the earthquake, he realised how important it is to him and his peers. There were some things he was unable to learn while the school was closed. The student participant expressed an appreciation for being able to mutually exchange experiences and feelings with his teachers after the earthquake. He has come to realise the importance of connecting with people.

The workshop concluded with the point that these students are great examples of how students can help education systems and teachers deal with adversity. Sometimes teachers need to feel like they know it all and be the strong one in the class, but young people can help. No one can be strong all the time. We are humans, and we rely on each other. We need to continue to understand how students can collaborate with teachers and help them deal with difficult subjects: the lessons learnt from student experiences with adversity can catalyse that dialogue.

Note: contribution from OECD / Tokyo Gakugei University Joint Workshop (2022), “Open Dialogues: Learning from disasters to build resilience in education" 28-29 March.

Navigating the future: Co-agency and collective agency in school curriculum redesign

Prometeu-Prim Lyceum in Chisinau, Moldova, is one of twenty-five schools participating in the Digital Schools initiative under the “Tekwill in Every School” programme. The initiative supports a shift towards a skills-based curriculum aligned with the OECD Education and Skills 2030 Learning Compass. Using design thinking and agile approaches, including minimum viable products (MVPs), the school developed skills-based learning modules centred on student agency, co-agency, relevance and collaboration.

Building on this experience, Prometeu-Prim Lyceum embedded teacher-student co-design into its curriculum redesign strategy, with green skills and sustainability as core values. A design workshop involving teachers, students, parents and sustainability experts supported the development of MVPs for green skills modules, fostering entrepreneurship, curiosity, responsibility and problem-solving through practical initiatives such as gardening, recycling and energy conservation.

This multi-stakeholder approach strengthened collaboration, ownership and curriculum relevance. Digital tools, including the collaborative whiteboard Miro, enabled rapid development and collective analysis. Generative AI, specifically ChatGPT, supported the process as a knowledge resource, while reinforcing the central role of human judgement as the ethical and pedagogical guide. The school is now scaling green skills across the curriculum and expanding stakeholder involvement in shaping future learning.

Note: contribution from Tatiana Bologan, Prometeu-Prim Principal; Elena Rusu, Prometeu-Prim Pedagogical Director, (2023), Moldova.

Hwa Chong Institution: Cultivating future-ready leaders

Alignment between curriculum, pedagogy and assessment in the development of 21st century competencies in a Singapore school

Hwa Chong Institution (HCI), a leading independent school in Singapore, integrates Singapore's 21st Century Competencies (21CC) and the OECD Learning and Teaching Compasses through systematic student analysis, global scanning and strategic planning, resulting in a coherent school-wide framework that aligns curriculum, pedagogy and assessment. Central to this approach is HCI's school-based Total Curriculum, which prioritises leadership, cross-cultural understanding and inclusive talent development, with the aim of developing autonomous learners as both thought leaders and thoughtful leaders. Artificial intelligence is strategically embedded to support personalised learning, adaptive feedback and guided exploration, strengthening metacognition and self-directed learning across academic and co-curricular programmes, supported by partnerships with Institutes of Higher Learning and think tanks, including the National Institute of Education.

Coherence through evidence and agency

Alignment is reinforced through HCI's assessment philosophy, which emphasises feedback partnerships and assessment literacy to strengthen student agency. Impact is evidenced through school-based professional learning community research and system-level collaboration evaluating competency and leadership outcomes.

Civic literacy: Exemplifying integration

The alignment of curriculum, pedagogy and assessment is exemplified in the development of civic literacy. Students engage with Singapore's values and context while addressing global realities, contributing meaningfully to school, community, nation and the wider world.

- Curriculum: Explicitly taught in Character and Citizenship Education (CCE) and Project Work
- Pedagogy: Enacted through Values-in-Action (VIA) projects and extended via international initiatives such as the Asia-Pacific Young Leaders Summit and OECD Project Infinity, fostering inclusive leadership and cross-cultural collaboration
- Assessment: Utilises self-, peer-, and teacher-led feedback ("assessment as and for learning") for growth; projects demonstrating adaptive/inventive thinking are showcased at a Learning Festival, amplifying peer learning; research methods provide outcome evidence.

Alignment with OECD Learning and Teaching Compasses

HCI's Total Curriculum advances Singapore's and the OECD's goals by:

1. Building agency: Cultivating personal, co-, and collective agency among learners and stakeholders
2. Developing transversal competencies: Equipping students to navigate complexity through cross-cultural collaboration
3. Advancing well-being: Empowering thoughtful leaders committed to personal, societal and planetary flourishing.

Note: contribution from Hwa Chong Institution, Cultivating future-ready leaders, (2025), Singapore.

The Levinsky-Wingate Academic Centre, Israel

This case study examines inclusive teacher preparation across pre-service education and in-service professional development in Israel. It involves four colleges of education and partner schools supporting bachelor's of education programmes, with the Ministry of Education acting as an equal implementation partner.

The initiative focuses on including learners with special needs by strengthening key teacher competencies: agency and co-agency, lifelong learning, social-emotional skills, cognitive flexibility and pedagogical capacity for curriculum adaptation, from universal design to individualised support.

Aligned with the OECD 2030 Learning Compass, the programme follows four stages:

The first stage, design, analyses gaps in inclusive teacher education curricula (Kimhi and Bar Nir, 2025[116]). Adaptation then embeds inclusive principles in policy and establishes a national forum with teacher education institutions. The next stage, refinement and alignment, draw on UNESCO and European Agency for Special Needs and Inclusive Education (EASNIE) policy guidance and research evidence (Kimhi and Bar Nir, 2025[116]); (S. Symeonidou, 2020[117]). Implementation includes a Ministry-led call encouraging adoption of inclusive practices and investment in professional development.

Activities include introducing Universal Design for Learning (UDL) and personalised learning approaches. Strong institutional commitment supports implementation, while limited funding remains a key barrier to system-wide scaling.

Note: contribution from Yael Kimhi, Aviva Barnir, and Alona Forkosh Baruch, (2022) Israel.

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An ecosystems approach means designing and implementing a curriculum using principles of quality curriculum design, while navigating and responding to the complex dynamics of a variety of concerned and influential parties, to the benefit of student outcomes. Curriculum reform is among the most politically and institutionally demanding forms of education change. This paper argues that reform outcomes depend not only on high-quality and responsible design in the interest of students, but also to a significant extent on the ecosystem in which they are interpreted and enacted. This ecosystem – a living web of actors, relationships, routines, resources and infrastructures spanning multiple levels – is always present, whether or not it is acknowledged. Synthesising principles of effective curriculum design, country cases and insights from the OECD Future of Education and Skills 2040 initiative, the paper details ecosystem strategies that improve the odds of success: nonpartisan multistakeholder dialogue to build legitimacy; strengthening agency; using collective impact; and aligning pedagogies, assessment and teacher standards with curriculum intent. The paper concludes with pointers for action and a research agenda on longitudinal ecosystem effects, coherence across life stages, and pathways for demand responsive curriculum design. An ecosystems approach does not simplify reform, but it illuminates interdependencies and strengthens coherence, rigour, focus, trust and adaptive capacity, increasing the likelihood

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