



What types of challenges do countries face in addressing curriculum time lag, and what strategies do they use to address these challenges?

This section presents the types of challenges faced by countries and jurisdictions in addressing curriculum time lag and the strategies they have adopted to address them. They relate to the four main types of time lag examined in this chapter: **recognition time lag, decision-making time lag, implementation time lag** and **impact time lag**.

It is important to note that the strategies listed are not recommendations, but rather opportunities for countries/jurisdictions to learn from one another, in line with the Education 2030 project's peer-learning mission.

RECOGNITION TIME LAG: OVERVIEW OF CHALLENGES AND STRATEGIES

A delay in recognising the needs for curriculum change can lead to students lacking the competencies needed for the future. It can also contribute to students' dissatisfaction and disengagement with education. Table 7 summarises the full challenges relating to recognition time lag reported by countries/jurisdictions and the strategies they use to address them.

Recognition time lag: Challenges

Countries and jurisdictions reported experiencing **difficulty in keeping educational change aligned with rapid societal changes**. While societies and economies have become more interconnected, several countries/jurisdictions reported challenges relating to identifying or articulating in curriculum the competencies needed to prepare students for an increasingly globalised world. These competencies may include empathy, tolerance and respect for others, and the ability to reconcile conflicts, tensions and dilemmas (OECD, 2019_[1]).

Similarly, recognition time lag can result from **difficulty in forecasting future changes and competencies needed for the future in a time of rapid technological advancement**. Technological changes, such as the exponential rise in the use of digital devices, computer adaptive testing and the advent of AI are some of the trends or opportunities that policy makers in education,

Table 7 **Challenges and strategies related to recognition time lag**

	Challenge/strategy	Countries/jurisdictions reporting the challenge/strategy
Challenges	Difficulty in keeping educational change aligned with rapid societal changes in an increasingly globalised world	Ireland, Korea, India ¹ , Singapore
	Difficulty in forecasting future changes and competencies needed for the future in a time of rapid technological advancement	Czech Republic, Japan, Portugal, Sweden, Wales (United Kingdom), Kazakhstan, Singapore
	Lack of awareness of the potential value of student voice for designing a future-relevant curriculum	n/a
Strategies	Developing systems or processes to forecast future needs of society	Finland, Japan, Korea, Ontario (Canada), Poland, Portugal, Hong Kong (China), India ¹ , Kazakhstan, Singapore
	Taking students' needs and voices into account during the curriculum redesign process	Australia, British Columbia (Canada), Finland, Ireland, Korea, Ontario (Canada), Brazil ¹ , Russian Federation
	Providing more diverse learning experiences to students to bridge the gap between school and their future lives	Mexico, New Zealand, Scotland (United Kingdom), Russian Federation

Note: 1. Responses for these countries/jurisdictions were submitted by independent researchers, not government administrations.

Source: Data from the PQC, findings from the research section.

including curriculum designers, have struggled to recognise on time. A recent OECD report shows that the education sector is behind the digitalisation curve across many OECD countries (OECD, 2019^[2]).

Students may have valuable insights on future needs and trends, but countries/jurisdictions often neglect to consult them when identifying the direction of curriculum change. This reflects a **lack of awareness of the potential value of student voice in designing a future-relevant curriculum**. It can lead to challenges in reflecting students' interests in the curriculum, an important element in engaging and motivating students. Students may feel disconnected from the learning content if they do not see how it can apply to their lives, now or in the future. As discussed in the research chapter of this report, listening to students' voices during the recognition and decision-making phases may initially add to the time lag, but if it is done well, it can save significant time in implementation and accelerate the impact of curriculum changes (see "Involving students as owners of their own learning").

Difficulty in keeping educational change aligned with rapid societal changes

Several countries/jurisdictions, including India, reported struggling to identify the competencies needed to prepare students for our increasingly globalised world. Globalisation and increased human mobility across borders have also led to greater diversity in the classroom, and so curriculum needs to adapt to the learning needs of students of various language backgrounds and education experiences, as highlighted by Ireland, Korea and Singapore.

- In **Ireland**, the pace of change in modern society and associated social issues compound the difficulties that arise from the time lag between today's curriculum and future demands. Ireland's rapidly changing demographics since the late 1990s have led to increasing multiculturalism. Socio-economic disadvantage and the inclusion of pupils with varying needs in the mainstream classroom all pose challenges for the education system. There are frequent calls on the education system to equip young people with myriad practical and life skills, including resilience and social skills.
- **Korea** attributes difficulty in forecasting and diagnosing future changes to the rapid changes taking place in society (e.g. increased multiculturalism) and technology. The pace makes it challenging to establish continuity and maintain a relevant scientific perspective in educational policy.
- In **India**, there is a need for learners to acquire new skills on a regular basis, due to globalisation and the increasing demands of a knowledge economy and a knowledge society.
- **Singapore** recognises the need to ensure that curriculum content remains relevant and to provide students with the dispositions and a broad and deep foundation for a lifelong journey of learning. Singapore faces challenges connected to language knowledge and cultural competency, as well as skills useful for the workplace, emphasising that knowledge is quickly outdated, and that professional and occupational fields constantly change.

Difficulty in forecasting future changes and competencies needed for the future in a time of rapid technological advances

Countries and jurisdictions face the challenging task of forecasting the technological changes that are most likely to become transformative for students' future lives. The pace of technological advances makes it challenging for education systems to keep up, as was reported by countries/jurisdictions including the Czech Republic, Portugal and Sweden. Policy makers need to identify not only the latest technological innovations, but also how students are most likely to interact in a world dominated by this new technology and the competencies they will need to do so effectively, as reported by Kazakhstan. In some countries/jurisdictions, existing curricula were designed before many of the major technological innovations of the 21st century. This presents challenges in preparing students for the future, as reported by Wales (United Kingdom).

- The **Czech Republic** cites the very fast progression of ICT systems as one of the factors that make it difficult to anticipate future needs and understand how to integrate these in today's curriculum.
- In **Portugal**, due to the gap between the constant changes in science and technology and what is taught at school, it has been the teachers' responsibility to update knowledge rather than incorporating it in curriculum change.
- **Sweden** notes that challenges in determining how to incorporate ICT and digitalisation into the curriculum are due to rapid technological developments.
- **Wales (United Kingdom)** cites its curriculum, devised in 1988, as reflecting a world that was yet to see the World Wide Web, mobile phone technology or the advances in technology and in globalisation that have transformed the way we live and work.
- **Kazakhstan** recognises the rapid increase in the rate at which technological change is occurring around the world and that such an unpredictable context requires increased capability to engage with complex challenges and adapt to new situations, along with a diverse set of individual competences.

Lack of awareness of the potential value of student voice for developing a future-oriented curriculum

Discussions in the student focus group during the OECD Future of Education and Skills 2030 meetings have shown that students in lower and upper secondary education from around the world are able to identify and articulate their learning needs. They are also able to reflect on the competencies they need to be active and engaged citizens and to integrate successfully into the labour market in the future (see Box 10). A recent study of PISA data, for example, shows that students tend to aspire to jobs and professions that are the least at risk of future automation, such as health, social, cultural and legal professions (Mann et al., 2020_[3]).

Box 10 Students' interest in becoming future-ready

Alice



At the Education 2030 project's Informal Working Group meeting held in Paris, France in October 2018, meeting participants discussed the issue of managing time lag between today's curriculum and future needs. The discussion kicked off with interventions from a student representative followed by a country representative.

Speaking on behalf of students was Alice, a university student in France and a Youth 20 (Y20) young leader. She talked about future challenges, in particular climate change, and the current lack of knowledge and awareness about such issues. She also highlighted the challenge of preparing the future workforce for jobs that do not yet exist. She explained that this evolution would imply new needs for new generations, such as being more flexible, adaptable and equipped with digital skills, especially as many jobs will be automated. There may also be more opportunities for people to create their own jobs.

She then discussed how the current curriculum focuses on academic achievement and valorises individual effort rather than collective effort to solve a problem. She cited the benefits of her experience as a scout doing collective projects on real-world issues and highlighted that she learned new ways of looking at the world, and becoming more aware of problems around her. Alice said that experimentation and collaboration can increase motivation and satisfaction for students. She stressed that school could teach students to be future-oriented creative thinkers who can collaborate with others to solve problems.

RECOGNITION TIME LAG: STRATEGIES

To address the challenge of keeping abreast of technological and societal changes and their implications for curriculum, some countries/jurisdictions report **developing systems or processes to forecast future needs of society**. These can include formal research processes involving experts and academics, as well as active monitoring of trends and global dialogues.

While the stakeholder engagement undertaken by countries/jurisdictions in the curriculum design process typically involves academic experts, teachers and sometimes parents, a number of countries/jurisdictions now recognise the potential benefits of **taking students' needs and voices into account**. Such an approach can involve collecting information about students' interests in education, as well as about their future career and life aspirations.

Some countries/jurisdictions have adopted the strategy of **providing more diverse learning experiences for students to bridge the gap between school and their future lives**. Such an approach can involve allowing students to choose some of the subjects they study from a menu of options or modules and can involve exploring links with industry or other employers. This strategy, particularly at upper secondary level, can help prepare students for the labour market or further education by allowing them to acquire the types of competencies most relevant to their chosen future path. By providing a wider range of subject and content choices, countries/jurisdictions decrease the recognition time lag and ensure that students' needs are met. However, such strategies (i.e. giving student choice) should be considered carefully, and students should be supported to make informed decisions (OECD, 2012_[4]).

Developing systems or processes to forecast future needs of society

Many countries/jurisdictions now set processes to forecast future needs of society and to identify how to redesign curriculum content accordingly. This can be done through a formal forecasting research and insight process, as is the case in Finland, Korea, Ontario (Canada), Hong Kong (China) and Singapore. It can also involve consultations with various strands of society to better understand emerging needs, such as those reported by Poland and Portugal. Some countries/jurisdictions, such as Poland, also use insights from global dialogues and international conferences to inform curriculum redesign.

- **Finland** started future-oriented curriculum reforms in the 1990s. The whole curriculum for basic education has been reformed once every decade. During the curriculum reform process, future challenges are considered and taken into account.

- **Korea** is carrying out research for forecasting the future and has changed the methods of revision of the national curriculum.
- **Poland's** Ministry of National Education has employed the following practices to ensure that it is able to reduce the time lags associated with recognition of future needs: 1) research by the Educational Research Institute to examine the changing educational needs of pupils across cohorts; 2) participation in international dialogue on the future of education, such as the OECD Education and Skills 2030 initiative; and 3) consultations and social debates with various stakeholders through meetings, conferences, discussions and correspondence.
- In **Portugal**, to respond to the social and economic challenges of today's world, a working group was created to design a competency profile for students after 12 years of compulsory education. Concurrently, different teacher associations worked together on a flexible and updated core curriculum per subject and school year. Both the student profile and core curriculum are now in force in Portugal.
- In **Ontario (Canada)**, curriculum is currently written with the vision of the learner ten years from now in mind. This is achieved by allowing for a certain degree of adaptability to future demands by using an inquiry-based model, rather than a content knowledge attainment model. An initial step was to move away from printed curricula to web-based platforms because it facilitates keeping curriculum documents up to date. Furthermore, continuous exploration of how to make curriculum more responsive is grounded in a research-based and evidence-informed curriculum review process, where stakeholder groups are frequently consulted to forecast demands.
- In the 2017 renewal of the secondary education curriculum in **Hong Kong (China)**, after a review of the social, scientific, technological and economic changes in the global and local environments, eight Major Renewed Emphases such as STEM and IT education, entrepreneurial spirit and values education were selectively strengthened to prepare students for the future. Hong Kong (China) has also participated in international dialogue through international projects (e.g. the OECD Education and Skills 2030 project) to keep abreast of the latest international developments.
- In **Singapore**, the responsiveness of the curriculum to external developments is strengthened by the curriculum review process. Singapore conducts external scans that include reports on global future trends and demands, developments in the global and local economy and international syllabuses. This process is integral in guiding the subsequent decisions made by curriculum designers and policy makers in the course of curriculum review.

Taking students' needs and voices into account during the curriculum redesign process

Countries/jurisdictions such as Finland collect information on how students experience the curriculum and on the aspects that they would like to see changed. This information helps to ensure that curriculum redesign reflects students' needs and that students feel engaged as agents of their own learning. Countries such as the Russian Federation also report recognising student agency and student agendas in their curriculum development, while Korea launched a process of student consultation to ensure that students have a say in the future direction of the education system.

- In the process of co-creating the vision for a future education system, **Korea** launched the "Children's and Youth's Rights Declaration – 100 voices of students" at the Korea-OECD International Education Conference and 10th Informal Working Group meeting in October 2019. This initiative collected suggestions from students in Korea on directions for the future of education, helping to make student voice heard in the process of education reform.
- **Finland** conducted a survey of students just before the curriculum reform officially started and 60 000 students from lower and upper secondary education responded. Students in basic education were also asked to give feedback during the curriculum reform process.
- The **Russian Federation** prioritises an approach which assumes the position that students are proactive learners in the learning process. Additionally, individual psychological and physiological characteristics are also taken into account. The curriculum defines subject-specific, meta-disciplinary and personal outcomes.

Providing more diverse learning and assessment experiences for students to bridge the gap between school and their future lives

In order to bridge the gap between what is included in national curriculum and the competencies students may need in their future lives and careers, some countries/jurisdictions, including Scotland (United Kingdom), have made efforts to strengthen links between schools and employers and to provide learners with a wider variety of learning experiences that are relevant for their future lives. In New Zealand, no courses or subjects are mandatory for upper secondary students. This means that students can select those that are most relevant for their future lives and careers and can focus on them in depth.

- The Curriculum for Excellence in **Scotland (United Kingdom)** set out to ensure that the curriculum framework better supported the needs of learners and the future workforce. To complement and support this aim, Scotland pursued reforms such as

Developing the Young Workforce and Learner Journey, which are intended to provide a wider variety of learning experiences, more diverse pathways and options for learners, and better links between employers, further and higher education and schools.

- In **New Zealand**, senior secondary students (upper secondary education) can choose to take five to six subjects at three levels of depth from among 17 disciplinary fields and gain qualification units in these fields. There are no compulsory courses for students. Schools often set up the units that make up each course, but a growing number of schools are offering students the possibility to personalise their courses by choosing the unit of learning and assessment.

DECISION-MAKING TIME LAG: OVERVIEW OF CHALLENGES AND STRATEGIES

Several challenges may create a time lag between the moment the need for curriculum change is recognised and when the new curriculum is made available. Table 8 summarises the decision-making time lag challenges experienced by countries/jurisdictions and the strategies they have adopted to address these.

Decision-making time lag: Challenges

Several countries and jurisdictions reported that **difficulty in building consensus on the direction of change** can cause considerable delays. Different sectors in society may have diverging views on the direction of curriculum change and the priorities for the education system or may resist any change at all. For example, a country/jurisdiction may find it difficult to build national consensus on whether to include values and attitudes in the curriculum and, if so, which should be explicitly addressed.

Curriculum designers often have to reconcile conflicting timelines in decision-making. While they are under pressure to respond quickly to changes in a fast-paced world, they also need to respect the **time requirement of a rigorous review process** in order to make sure that the curriculum redesign process is based on strong evidence. Such rigorous processes take time and add to the overall time needed to decide on the specific aspects of the curriculum change and to develop a roll-out plan.

While a relatively long and stable curriculum cycle helps to reduce uncertainty among education practitioners and thus improves their capacity to implement the curriculum (see “Characteristics of fixed and ad hoc curriculum change”), some countries and jurisdictions reported challenges related to **limited responsiveness of periodic curriculum renewal cycles** in the face of rapid societal changes.

Table 8 **Challenges and strategies related to decision-making time lag**

	Challenge/strategy	Countries/jurisdictions reporting the challenge/strategy
Challenges	Difficulty in building consensus on the direction of curriculum change	Denmark, Korea, Argentina, Viet Nam
	Delays resulting from the time requirement of a rigorous review process	Estonia, Ontario (Canada)
	Limited responsiveness of periodic curriculum renewal cycles	Hungary, Japan, Brazil ¹ , India ¹
Strategies	Engaging stakeholders to develop shared understanding and ownership of curriculum change	British Columbia (Canada), Ireland, Netherlands, Ontario (Canada), Poland, Scotland (United Kingdom), Sweden, Costa Rica, Poland
	Setting out a vision for the future of education to guide curriculum changes over time	British Columbia (Canada), Norway, Ontario (Canada), Portugal, Russian Federation, Singapore
	Engaging in ad hoc, partial or continuous reform	Denmark, Ireland, Mexico, Netherlands, New Zealand, Northern Ireland (United Kingdom), Poland, Portugal, Québec (Canada), Scotland (United Kingdom), Sweden, Turkey, United States ¹ , Hong Kong (China)
	Articulating key curriculum concepts that endure over time	Australia, British Columbia (Canada), Ireland, Japan, Korea, Norway, Québec (Canada), Turkey, Brazil ¹ , China, India ¹ , Kazakhstan, Russian Federation, Singapore, Viet Nam
	Creating space in the curriculum to accommodate new changes	Australia, Czech Republic, Japan, New Zealand, Norway, Québec (Canada), Saskatchewan (Canada), Brazil ¹
	Using “learning to learn” as the centre of curriculum reform decisions	Finland, New Zealand, Portugal, Hong Kong (China), India ¹
	Assessing the relevance of current curricular content through systemic reviews	Mexico, New Zealand, Norway, Ontario (Canada)
	Digitalising the curriculum to facilitate faster change	Australia, Denmark, New Zealand, Norway, Ontario (Canada), Hong Kong (China)

Note: 1. Responses for these countries/jurisdictions were submitted by independent researchers, not government administrations.

Source: Data from the PQC, findings from the research section.

Difficulty building consensus on the direction of curriculum change

Even when policy makers are ready to make the case for change, diverging views among stakeholders can make it difficult to build consensus on the direction of curriculum renewal. Denmark, Korea and Viet Nam all reported delays in curriculum redesign caused by the need to reconcile stakeholder views on the future direction of curriculum. In some countries/jurisdictions, stakeholders actively resist certain types of curricular change, as in Argentina.

- In its process of curriculum redesign, **Denmark** found the need to take time to reconcile competing views from stakeholders on what content should be included in the curriculum. While policy makers sought to reduce curriculum overload, business lobbied for including industry-relevant topics, while non-governmental organisations had an interest in including more specific content into topics such as human rights, sustainability and developing countries.
- **Korea** recognises that, while its system for curriculum revision is flexible, which is conducive to reflecting societal change in curriculum, it is difficult to agree on the direction of curriculum revision to help students prepare for the future.
- **Argentina** reported that academic stakeholders (e.g. universities) concentrate more on academic knowledge, resisting replacement of traditional content by emerging knowledge.
- In **Viet Nam**, the process of curriculum reform was delayed by the need to reconcile different stakeholder opinions about the key qualities that should be included in the general education curriculum, the level of detail and the methods to embed qualities in the curriculum.

Delays resulting from the time requirement of a rigorous review process

Countries/jurisdictions including Estonia and Ontario (Canada) reported finding it challenging to reconcile the time needed for rigorous review or consultative processes with the fast pace of changes to be reflected in the curriculum.

- In 2011, education cycles in **Estonia** were redesigned, leading to a split between upper secondary education and basic education. This created a short-term need in both education cycles for a new curriculum. As a result, there was limited time to conduct a rigorous review process. Furthermore, educators and school leaders had limited availability to participate in co-creating the curriculum, which resulted in further challenges for curriculum implementation.
- **Ontario (Canada)** is exploring how to make the curriculum respond to the needs of all students in a fast-paced society. This requires allocating sufficient time to create a highly consultative review process to ensure that the curriculum continues to be research-based and evidence-informed.

Limited responsiveness of periodic curriculum renewal cycles

As reported by Japan and Brazil, curriculum designers can feel constrained and unable to respond to changes in society, for example by incorporating 21st century skills, when they have periodic and potentially infrequent curriculum renewal cycles. As Hungary noted, without a continuous process of review, it is difficult for countries/jurisdictions to keep pace incorporating emerging needs into curriculum. The ability to make timely changes to curriculum is particularly important in subjects where content can change rapidly, such as science and technology, as was reported by India.

- **Hungary** describes the lack of a continuous review process as a major hurdle in the timeliness of its curriculum design process. The country aims to set up a permanent curriculum development team tasked with research and the provision of feedback.
- **Japan** acknowledges that a recurring ten-year defined cycle for curriculum reform has had benefits for teachers in terms of both continuity and stability. It helps avoid reform fatigue among teachers and gives them time to appropriate the curriculum content. It also gives time to teachers, school leaders and authorities to prepare adequately for the new curriculum, as dates of reform are known well in advance. But an unanticipated consequence is that it has made the curriculum less responsive to the pace of change in society.
- The national core curriculum in **Brazil** was intended to prepare students for the future by developing competencies and skills aligned with demands from the global movement advocating for an education for the 21st century. However, the competencies and skills are a moving target, and the curriculum must adapt constantly to changes at local and international levels in order to adequately prepare students for the future.
- In **India**, the narrow time lag between the generation of new knowledge and its application, especially in science and technology, makes it necessary to periodically renew school and higher education curricula to maintain their relevance to changing societal and personal needs of learners and emerging national development goals.

Decision-making time lag: Strategies

Countries/jurisdictions are employing various strategies to reduce the decision-making time lag. In order to combat the time lag resulting from difficulty building consensus on the direction of curriculum change, some countries/jurisdictions are now **engaging stakeholders to develop shared understanding and ownership of curriculum change**. Stakeholder engagement, when properly designed, helps to ensure that different voices and opinions on the future needs of society are heard and to more efficiently build consensus on curriculum change.

Most of the strategies adopted by countries/jurisdictions to address the decision-making time lag relate to making sure that the curriculum structure is responsive to change without requiring too much disruption. For instance, some countries/jurisdictions are **setting out a vision for the future of education to guide curriculum changes over time**. These visions are then used to inform several cycles of curriculum redesign, allowing for coherence over time and reducing the time needed to build consensus on curriculum change.

Other countries/jurisdictions have curriculum frameworks that are flexible and can be updated on a regular basis (see “How often do countries/jurisdictions reform curriculum?”). **Engaging in ad hoc, partial or continuous reform** helps countries/jurisdictions to be quicker to accommodate societal needs or implications from new research (although there are also risks associated with such an approach; see “Characteristics of fixed and ad hoc curriculum change”).

In order to avoid the need for frequent overhauls of curriculum in response to changing demands, some countries/jurisdictions instead take the approach of **articulating key curriculum concepts that endure over time**. Such a structure reduces the decision-making time lag by giving curriculum designers a clear starting point for their review process.

Other countries/jurisdictions adopt the strategy of **creating space in the curriculum to accommodate new changes**, for example by creating a dedicated subject for new or cross-curricular content. Such an approach facilitates more rapid inclusion of new material in response to societal or technological developments, while minimising disruption and avoiding the need for a major curriculum overhaul. Such an approach was also reported as a strategy for addressing curriculum overload (see “Challenges and strategies” section (OECD, 2020_[5])).

Some countries/jurisdictions reported **using “learning to learn” as the centre of curriculum reform decisions**, as a strategy to prepare students to thrive in a world characterised by volatility, uncertainty, complexity and ambiguity. Such an approach to curriculum recognises that a consequence of the increasingly rapid pace of societal change and exponential technological advancement means that education systems may not be able to keep fully abreast of such developments, but can instead prepare students to adapt to change itself (Laukkonen, Biddell and Gallagher, 2019_[6]).

Countries/jurisdictions take the approach of **assessing the relevance of existing content through systemic reviews** in order to reduce the decision-making time lag. Such reviews help to identify which areas of curriculum may require redesign and help to set priorities for change. As discussed in *Curriculum overload: A way forward* (OECD, 2020_[5]), systemic reviews can also help identify duplications or misalignment in the curriculum and thus help curriculum designers address issues of overload in a timely manner (OECD, 2020_[5]).

Finally, countries/jurisdictions report the strategy of **digitalising the curriculum to facilitate faster change**. Digitalising the curriculum has helped countries/jurisdictions reduce both the costs and time associated with curriculum redesign. For example, portions of the curriculum content can be revisited without needing to reprint the full curriculum. The time needed between curriculum redesign and implementation is also reduced, as the curriculum, guidelines and teacher training materials are available on line. As such, digitalisation can encourage more rapid decision-making regarding curriculum redesign by alleviating some of the costs associated with it.

Engaging stakeholders to develop shared understanding and ownership of curriculum change

Curriculum designers can reduce the decision-making time lag by putting in place processes to engage with a variety of stakeholders in the decision-making phase, as in the Canadian provinces of British Columbia and Ontario. Some countries/jurisdictions, such as the Netherlands, make use of social media platforms to reach a wider set of stakeholders and collect their views on curriculum content.

- **British Columbia (Canada)** uses an ambitious consultation agenda in its curricular reform process. The first two years of reform are reserved for consultation with key stakeholders (e.g. teachers, school administrators, parents, academics) about what should be changed/improved in any upcoming curriculum revision processes. Once the curriculum teams have developed drafts based on their inputs, one year of public feedback and consultation is launched. Each subject area draft is made available on their website and also distributed to key stakeholders for their review, feedback and trailing. This feedback

is then integrated and necessary changes to the drafts are made. British Columbia (Canada) also pays careful attention to consulting indigenous groups at every step of the process, and their suggestions and feedback are incorporated to improve curriculum development along the way.

- In the **Netherlands**, a commission was formed to start a national dialogue on the content of the curriculum and the direction that a revision of the curriculum should take. All stakeholders were encouraged to share their views on line. The public was also invited to react to specific questions regarding the three functions of education: qualification, personality development and academic development. This national debate aimed to develop a shared vision for the upcoming renewal (van Schaik, Voogt and Nieveen, 2017^[7]). The interim products of this phase of curriculum development (the “building blocks”) were made public to receive stakeholders’ feedback on them. This process was directed by the representative bodies in the educational field: unions, education councils and subject associations.
- For **Ontario (Canada)** the process of curriculum development is considered just as important as the outcome, as it renders the involvement and ownership of different stakeholders visible and makes it possible to develop relationships with them. The core understanding is that: “Curriculum cannot be written from one perspective without participation of all across the province.” Ontario (Canada) engages with educators from across the province to write and review the curriculum, as well as other subject-matter experts. Reviews are also conducted by academic and community-member experts, and their feedback is reflected in curriculum.

Setting out a vision for the future of education to guide curriculum changes over time

Countries/jurisdictions such as Norway, Portugal and Singapore define long-term visions for their education systems which can help to reduce decision-making time lag. Setting out and agreeing on a clear vision for education helps to build faster consensus on curriculum change. This vision can be articulated in an aspirational student profile, as described by Portugal (see “How do countries compare?” for more information on student profiles across a range of countries/jurisdictions). British Columbia (Canada) has set out a broad vision of the future of education that can be responsively updated once additional future needs are identified at local or school levels.

- In order to ensure a shared understanding and tackle challenges resulting from fast-paced global changes, **British Columbia (Canada)** has developed a large-scale vision of the future of the education system set out in its BC Education Plan,¹ launched in 2011. The plan is based on a vision of “Flexible, Adaptable, Excellence in Education” that has five key elements: 1) personalised learning for every student; 2) quality teaching and learning; 3) flexibility and choice; 4) high standards; 5) learning empowered by technology. These are explained in an accessible manner outlining action steps on the part of jurisdictional authorities as well as leaving the flexibility and the freedom to adapt needed with local authorities. Regular updates are published to document the progress made and the next steps envisaged.
- **Norway’s** Knowledge Promotion Reform (2006) was designed to meet two major trends in contemporary society: the importance of knowledge as a resource and a driving force and the increasing complexity and diversity of Norwegian society. To adapt education to these trends, a government report preceding the reform set out a vision of lifelong learning as important for the individual’s quality of life and opportunities to participate in the knowledge society. The 2017 renewal of the curriculum was based on the vision outlined in 2006, but it included some adjustments to meet the future challenges in society as described in the “Core curriculum – values and principles for primary and secondary education”.
- Before embarking on the process of curriculum reform, **Portugal** took a step back to outline a vision for the future of education in the country. To do this, it clearly identified the student profile that the education system would aim to develop, consolidating the vision for the education system. Thus, this profile is a reference guide for the entire curriculum, the school, the students and their families on the competences that learners should have by the end of compulsory schooling. After doing this, Portugal followed this with a pedagogical framework for compulsory education for the construction of a solid and learning pathway, aligned with the student profile that was envisioned.
- Since 2013, **Singapore’s** Ministry of Education has emphasised the importance of a student-centric, value-driven education as a basis for a broad and deep foundation for lifelong journey. This vision has provided the direction to schools for better preparing students for the future. The competence approach, curriculum review process and future orientation reinforce one other in providing a strong focal point for the development of curriculum. These have led to shifts in how the humanities subjects are learned and taught, with stronger emphasis on critical thinking and creativity, social perceptiveness and citizenship. For example, the recommended inquiry approach allows students to actively construct new knowledge by investigating, extracting, analysing and synthesising information and to reflect on the nature of knowledge-construction.

Engaging in ad hoc, partial or continuous reform

Québec (Canada), New Zealand and Mexico are among countries/jurisdictions reporting that their curriculum frameworks are designed to give policy makers flexibility to update only portions of the curriculum or to update only the guidelines, without needing to overhaul the full curriculum.

- In **Québec (Canada)**, the Québec Education Programme was designed to last over time and is flexible enough to be tailored to needs that arise. The curriculum was developed based on 21st century skills and competencies which remain valid over time. The curriculum and study programmes are amended regularly in line with research developments and the needs expressed by the community.
- **New Zealand** has a permissive curriculum, with guidelines published and updated from time to time and, as needed, revision of mandatory requirements.
- As opposed to engaging in complete curriculum reforms, **Mexico** carries out systematic and continuous reviews and evaluations of curriculum plans and programmes to keep them permanently updated. This facilitates smooth incorporation of new needs and challenges at the national and global level.

Articulating key curriculum concepts that endure over time

Some countries/jurisdictions organise their curriculum around concepts and ideas designed to endure over time. For example, Australia, Japan and Kazakhstan report basing their curriculum on concepts that are likely to remain relevant. As reported by Australia, such an approach may reduce the need to update the full curriculum frequently by avoiding obsolescence.

- In **Australia**, key concepts/key ideas have been the basis for the development of each learning area. They are expressed in various forms (individual words, phrases or questions) to prompt the process of inquiry and generate notions of universality and currentness. The curriculum operates as a flexible framework rather than a prescribed syllabus. The content descriptions and achievement standards are presented in broad rather than specific terms. For example, in the technologies learning area, the focus is on key concepts, in order to reduce the likelihood of obsolescence.
- **Ireland's** National Strategy: Literacy and Numeracy for Learning and Life 2011-2020 has yielded very good results across the range of targets that were originally set out, particularly in the area of literacy.
- **Japan** considers that the skills needed in the future are not totally different from those that have been fostered in traditional school education. For many decades, the Japanese curriculum has promoted a holistic approach to education to develop students' academic ability, their physical health and morals. While the recent revisions to the curriculum have introduced new concepts and competencies to better prepare students for a rapidly changing society (the Society 5.0 reform), the curriculum recognises that the fundamental competencies already promoted by the curriculum remain very relevant.
- The renewed curriculum in **Kazakhstan** has used concepts, knowledge and skills that are expected to stand the test of the time. The curriculum emphasises a problem-based approach applicable to any learning context. A particular feature of the renewed curriculum is that it enables learning to take place in "authentic, real-world and relevant contexts" as situations change. The government approves standards for every educational level that indicate the expected outcomes students should achieve after completing each level. These standards serve as the basis for development of subject programmes, which are common to all state mainstream schools (private and international schools have the autonomy to use different subject programmes).

Creating space in the curriculum to accommodate new changes

Countries/jurisdictions use various strategies to ensure that the curriculum structure allows for rapid accommodation of changes without the need for major redesign. For instance, Japan set up a dedicated subject for teaching cross-curriculum content. This means that curriculum designers in Japan can revise cross-curricular competencies without needing to overhaul the whole curriculum. The inquiry-based approach in Saskatchewan (Canada) facilitates asking questions about current real-world issues to guide teaching and learning. Similarly, in New Zealand, schools are granted the autonomy to cover issues locally that are deemed relevant or timely.

- **Saskatchewan (Canada)** curricula are comprised of broad knowledge, skills and understandings that allow for teachers to incorporate relevant topics and big ideas into their teaching. Using an inquiry-based approach, students are active participants in their learning within meaningful and relevant contexts. Teachers have the ability, through the adaptive dimension, to adjust learning environments, instruction, resources and assessment to meet the needs of all learners, and thus reflecting the needs-based philosophy that exists in Saskatchewan (Canada).
- To respond to the challenge of keeping the curriculum up to date, **Japan** uses the Period for Integrated Studies for elementary schools and junior high schools (primary and lower secondary education) and the Period for Inquiry-Based-Cross-Disciplinary

Study for high schools (upper secondary education) to accommodate the needs of students by, for example, bringing real-world issues into classrooms with an interdisciplinary approach.

- In **New Zealand**, schools have a great level of autonomy for curriculum development. This flexibility allows them space to incorporate emerging global or local needs within curriculum, developing, for instance, their own courses or refreshing the syllabuses of existing courses. This allows schools to accommodate new changes without having to wait for large-scale curriculum redesign processes.

Using “learning to learn” as the centre of curriculum reform decisions

Some countries/jurisdictions, such as Finland, Portugal and Hong Kong (China), are highlighting the importance of fostering students' metacognitive competencies, particularly “learning to learn”, as key cross-curricular competencies when redesigning curriculum. These competencies are not context-dependent and help students adapt to an uncertain future. This is particularly helpful when countries and jurisdictions are adopting a flexible curriculum, or personalised curriculum, as students are expected to take more responsibility and ownership of their own learning in such curriculum innovations.

- **Finland** encourages the use of phenomenon-based learning as a forward-looking approach to curriculum and pedagogy for 21st century learners. Phenomenon-based learning is an instructional approach based on student inquiry and problem solving. In this approach, the compartmentalisation of subjects is broken down in phenomenon-based classes that address phenomena from a holistic perspective, cutting across subject boundaries. This approach guides students in understanding, using, and constructing different models for interpreting and explaining human beings, the environment, and related phenomena through small-scale research projects. Students are also encouraged to collect information, engage in field trips and present the results of research in different ways.
- **Portugal** is trying to manage the existing gap between what students are learning and what they really need to learn, bearing in mind 21st century skills and challenges. It is working on a curriculum reform to foster “learning to learn”, based on the idea that developing a competence composed of a matrix of knowledge, skills and attitudes enables every student to thrive in an uncertain and fast-changing world.
- **Hong Kong (China)** adopted the Education Commission's future-oriented Education Blueprint for the 21st century in 2000 and implemented the Learning to Learn curriculum reform in 2001. This aimed to nurture “learning to learn” capabilities in students to prepare them to face the future challenges of the 21st century. Subsequently, in the ongoing curriculum renewal, updates on the curriculum content continued to be forward-looking.

Assessing the relevance of existing curriculum content through systemic reviews

Countries and jurisdictions including New Zealand, Norway and Ontario (Canada) have implemented or are currently implementing comprehensive reviews of curriculum to identify content in need of removal or updating, while Mexico has plans to carry out such reviews in the future.

- **Mexico** plans to carry out systematic and continuous reviews and evaluations of curriculum plans and programmes to detect new needs and challenges at the national and global level and will keep them permanently updated.
- **New Zealand** renewed parts of the recently reformed curriculum because of the rapid development of technology. A 2017 review of the positioning and content of digital technology within the New Zealand Curriculum and *Te Marautanga o Aotearoa* led to the formal integration of digital technology as a strand of the technology learning area in the New Zealand Curriculum, and as a *whenu* within the *Hangarau Wāhanga Ako of Te Marautanga o Aotearoa*. This is intended to support young people to develop skills, confidence and interest in digital technologies and lead them to opportunities across the information technology sector.
- In **Norway**, the government appointed a committee to assess the degree to which the content of school covers the competencies pupils will need in future society and their working life and to provide proposals for change. The committee, appointed by Royal Resolution in 2013, submitted a report entitled “The School of the Future: Renewal of subjects and competences” to the Ministry of Education and Research in 2015.
- In **Ontario (Canada)**, systemic research and stakeholder consultations are conducted to ensure that curriculum design is aligned with current needs. The process of curriculum co-creation is conducted through consultations with school boards, educators and other stakeholders that occur in parallel across different regions. As new curriculum needs become evident from research and stakeholder consultations, courses are often developed in collaboration with external editors, allowing co-development of curricula with stakeholders so that innovative ideas are incorporated in real time.

Digitalising the curriculum to facilitate faster change

Countries/jurisdictions including Australia, Denmark, New Zealand, and Hong Kong (China) reported that having a digitalised curriculum allows for more expedient curriculum change.

- In **Australia**, the curriculum is published and updated on line. This ensures that all information and resources are current.
- With its National learning portal (EMU), **Denmark** has created a flexible instrument combining an online portal for up-to-date curriculum frameworks and materials for teaching in the public schools that are continuously updated by the Ministry of Education.
- **New Zealand** introduced digital technology to the curriculum incrementally. The revision was undertaken in a much more reduced time frame than the original development of the national curriculum, and it recognises the urgency to respond to the challenges from increasing digitisation of life and work.
- **Ontario (Canada)** is developing an interactive digital curriculum and resources platform. It will be developed through an iterative process based on user feedback. This new digital space will help educators, parents and students' to access curriculum and learning resources in a user-friendly and mobile friendly manner and will become increasingly interactive over time with new content and features.
- In **Hong Kong (China)**, the curriculum guides and other curriculum documents are prepared in electronic format and uploaded to the Education Bureau website, offering free access for schools and the public. This will ensure that the latest curriculum documents are up to date and available to schools at any time.

IMPLEMENTATION TIME LAG: OVERVIEW OF CHALLENGES AND STRATEGIES

A time lag is often reported between the intended or written curriculum and the implemented or taught curriculum. Table 9 summarises the specific challenges and strategies relating to the issue of implementation time lag reported by countries and jurisdictions.

Implementation time lag: Challenges

Countries/jurisdictions that have a decentralised curriculum design process may face particular challenges in ensuring timely implementation across all jurisdictions or local authorities (see "What does research say?"). **Variation in the pace of curriculum implementation across regions, localities or schools** was a challenge reported by several countries and jurisdictions.

A smooth and successful implementation phase depends to a large extent on the teachers and school leaders who are implementing that curriculum. A **lack of teacher buy-in for curriculum reform** was reported as causing implementation delays by several countries/jurisdictions. If teachers do not have a sense of ownership over curriculum, disagree with the direction of curriculum change, or have values or attitudes that conflict with new curriculum content, this can contribute to slow or uneven implementation.

Challenges to timely and effective curriculum implementation can also arise if the education, training and support received by teachers does not embody both the content of the new curriculum and best pedagogical practices for teaching that content. Several countries/jurisdictions report experiencing challenges arising from **misalignment between curriculum change and teacher education, professional development and support**.

Table 9 Challenges and strategies related to implementation time lag

	Challenge/strategy	Countries/jurisdictions reporting the challenge/strategy
Challenges	Variations in the pace of curriculum implementation across regions, localities or schools	Australia, Finland, Argentina
	Lack of teacher buy-in for curriculum reform	Ireland, Korea, Poland, Singapore
	Misalignment between curriculum change and teacher education, professional development and support	Argentina, Costa Rica, India, Singapore
Strategies	Promoting teacher understanding of curriculum reforms through dissemination campaigns and/or training	Chile, Japan, Poland, New Zealand, Hong Kong (China), India
	Developing pedagogical resources and materials for teachers	Argentina, Chile, Hong Kong (China)

Note: Responses for these countries/jurisdictions were submitted by independent researchers, not government administrations.

Source: Data from the PQC, findings from the research section.

Variation in the pace of curriculum implementation across regions, localities or schools

When there is a high degree of flexibility across regions, localities or schools in how curriculum is implemented, countries and jurisdictions can face challenges in ensuring timely implementation in all quarters. In Australia, for example, the pace of implementation of curriculum varies in line with the priorities and timelines of individual states or territories. In Finland, curriculum implementation can be faster in large urban areas and slower in rural areas, due to challenges in supporting and training teachers and school leaders in more remote areas. Argentina reports limited capacity in provinces to adapt the national curriculum to local needs in a timely manner.

- **Australia** has a flexible framework for curriculum implementation, allowing states and territories to implement the curriculum in ways appropriate to their needs and contexts. This results in a varying pace of implementation of the national curriculum across Australia, depending upon the plans, resources, priorities and timelines of the individual states and territories.
- **Finland** is a sparsely populated country with a large share of the population concentrated in urban areas. Due to these factors, curriculum development is usually centralised in big urban areas, making it challenging to facilitate engagement and in-service training for curriculum redesign among teachers in rural areas. Schools across the country sometimes have diverging paces for curriculum implementation.
- **Argentina** cites a lack of knowledge, professional development and institutional capacity in provincial curriculum departments to play their part in adapting curricula and developing guidelines or resources to address future demands in progressive and effective ways.

Lack of teacher buy-in for curriculum reform

Several countries/jurisdictions reported that a lack of teacher buy-in for curriculum reform, manifesting as scepticism or doubt about reform (as in Korea and Poland), fear of change (as in Ireland), and personal beliefs or attitudes that conflict with a new curricular direction (as in Singapore) can present barriers to effective and timely curriculum implementation.

- In **Ireland**, at the initial stages of the implementation of recent curricular reform in lower secondary education (2015), there was fear of and resistance to change among some teachers, as well as a lack of capacity among school leaders to manage change. While all stakeholders in education at the time accepted that curriculum development was necessary to reflect social and economic change, the move to a dual approach to assessment and a learning-outcomes approach to subject specifications was particularly challenging for teachers.
- In **Korea**, periodic curriculum reforms created doubts about the “legitimacy and necessity” of reforms. From the 1980s to 2005, Korea revised its curriculum every five to seven years and had found this approach to be inefficient because: 1) old reforms were not always in place before new reforms arose, therefore it was difficult for the results of the old reforms to be reflected in the new reforms. 2) it revised parts that did not need change. Consequently, full-on revisions can create teachers and practitioners’ cynical attitudes towards reform. It can also be difficult to get them motivated to implement reforms.
- **Poland** reports scepticism among school leaders about curriculum reform and concern among teachers about whether they are appropriately qualified. School heads have curricular changes related to personnel issues and equipment of subject laboratories and organisational difficulties, such as setting out new lesson plans. They are also concerned about whether their schools are properly prepared for methodological challenges.
- **Singapore** notes the difficulty of getting teachers ready for the implementation of the revised curriculum to ensure that classroom practices do not deviate from the intent of the syllabuses and curriculum. Implementation can be impeded by teachers’ attitudes and beliefs on the subject, their own teaching styles and practices and also by a lack of lead time for teachers to acquaint themselves with the revised curriculum.

Misalignment between curriculum change and teacher education, professional development and support

Some countries/jurisdictions have experienced implementation time lag resulting from gaps between what is covered in initial teacher education programmes and the pedagogies most appropriate to foster new competencies introduced during curriculum renewal, as in the examples of Argentina, Costa Rica and India. India and Singapore also reported that ongoing teacher professional development does not always align or keep pace with curricular changes, contributing to implementation time lag.

- In **Argentina**, there is a lag between the content of teachers’ initial education and the new learning content and methods promoted by the curriculum, and Argentina also faces the challenge of teachers not wanting to be retrained. Teachers have shown resistance to changing from a teacher-centred approach to teaching and learning to a student-centred approach. Even when teachers are retrained, it is hard to modify teaching practices after ten years of experience in the system. Some teachers also fear losing part of their salary because of curriculum realignment. Teachers may also see curriculum reform as a source of instability, with new subjects made compulsory and other subjects eliminated from the core curriculum, resulting in teaching positions being cut.

- **Costa Rica** recognises that there is a gap between the education that teachers received during their initial teacher education and the competencies they need to implement in the curriculum. This creates a disconnect between the educational offer and the demands of today's society. It also can lead to students losing interest in what is taught in school. For example, the incorporation of cross-curricular themes pertaining to values was intended to provide the curriculum with themes deemed necessary in society today. According to the National Forum of Education 2008, the strategy did not work, because the teachers saw it as another requirement. Teachers perceived cross-curricular themes as content separate from the syllabus, and they did not know how to integrate them in class instruction. After this experience, new syllabuses already integrate cross-curricular themes.
- In **India**, an identified challenge is how pre-service and in-service teacher training build perspectives of educators at all levels and prepare them for implementation of curriculum reforms. Effective implementation of new curriculum design was hampered by resistance to change among teachers. Misalignment of new curriculum directions with pre-service and in-service teacher training programmes was found to play a particular role in creating this resistance to change.
- In **Singapore**, a possible reason for implementation time lag is that teachers' own learning is not keeping pace with the new developments and requirements for new skills, knowledge and technology.

Implementation time lag: Strategies

Several countries/jurisdictions reported making concerted efforts towards **promoting teacher understanding of curriculum reforms through dissemination campaigns and/or training**. If there is no communication between those designing curriculum and those implementing it, there is the potential for misunderstanding about the goals and expectations of curriculum, leading to implementation delays. Investing time and resources to build a shared understanding of and buy-in for curriculum change may improve curriculum implementation.

Some countries/jurisdictions support teachers to implement new curriculum by **developing pedagogical resources and materials for teachers** that are aligned with the redesigned curriculum. Such an approach avoids the need for individual teachers to develop these themselves, reducing implementation delays that might otherwise occur. This strategy may help address the challenges described above relating to variations in pace of implementation across regions localities or schools and the lack of teacher preparation to implement curriculum reforms.

Promoting teacher understanding of curriculum reforms through dissemination campaigns and/or training

Methods of dissemination reported by countries/jurisdictions aimed at ensuring effective and timely implementation of curriculum include information seminars (as in Japan), practical workshops (as in Poland) and dedicated websites for teachers and schools leaders (as in New Zealand). In countries/jurisdictions such as Chile, Hong Kong (China) and India, professional development courses have been developed to prepare teachers to successfully implement curricular reforms.

- In **Chile**, the Ministry of Education, the Curriculum and Evaluation Unit, and the General Education Division have jointly developed strategies for disseminating curricular change in schools, including designing resources to support curriculum implementation and dissemination days. In addition, the Center for Improvement, Experimentation and Pedagogical Research has carried out an improvement course aimed at teachers on curriculum updating.
- In **Japan**, Shido-shuji (supervisors deployed at each education board) play very important roles in the curriculum implementation process. All Shido-shuji deployed to prefectural education boards attend seminars held by the ministry and are responsible for disseminating what they learn back in their own prefecture. Those deployed to municipal education boards attend seminars held by a prefectural education board and are responsible for disseminating what they learn from prefectural Shido-shuji back in their own municipality. In addition, each prefecture and municipality holds its own seminars and symposiums to deepen understanding of curriculum reforms, often inviting ministry officials and/or members of the Central Council for Education who know the background of how the curriculum was designed.
- Each change of **Poland's** core curriculum is accompanied by activities supporting schools and teachers. The authors of the core curriculum develop comments on individual subjects to explain the changes introduced and tips on how to implement new teaching content. The obligation to use the new core curriculum is preceded by conferences and workshops organised by educational institutions for school heads and teachers. They are aimed at practical preparation of the school environment for implementation of programme changes.
- **New Zealand** established websites for both The New Zealand Curriculum² and for *Te Marautanga o Aotearoa*.³ The sites are designed to help educators create an engaging, inclusive and dynamic curriculum that meets the needs of their unique school communities. They offer information, resources, news, advice and guidance, inspiring school stories, practical ideas, research reports and information on how to get support.

What types of challenges do countries face in addressing curriculum time lag, and what strategies do they use to address...

- To familiarise school stakeholders with the new elements and start them planning for implementation, **Hong Kong (China)** provided professional development programmes three years prior to the implementation of the new senior secondary curriculum under the New Academic Structure, for all secondary schools at all levels of school leaders, middle managers and front-line teachers.
- In **India**, the National Curricular Framework (2005) emphasised that the in-service teacher education process needs to be formulated in a way that enhances teachers' knowledge and helps develop their attitudes, skills, dispositions and practice. In line with these recommendations, the National Centre for School Leadership was established to design and implement nation-wide in-service professional development plans for head teachers (or school leaders). The key objectives of the school leadership development initiative are to: 1) align school leaders on how and why national curricular reforms must be implemented; and 2) enhance their knowledge, skills, attitude and practices to catalyse transformative change.

Developing pedagogical resources and materials for teachers

Chile, Argentina and Hong Kong (China) develop resources for teachers to support the implementation of new curriculum, thus ensuring that teachers do not have to create these themselves from scratch. These supports include multimedia resources in Hong Kong (China) and digital interactive resources in Chile. In Argentina, in an effort to reduce time lag, the resources provided sometimes relate to material that has not yet formally been included in curriculum but will be in future.

- In **Chile**, the National Curriculum website seeks to guide the implementation of the curriculum at a national level. This platform's purpose is to offer a flexible digital space, where teachers of all grades and educational modalities can access varied quality documents and resources that promote good teaching practices. Moreover, the purpose is to provide students and their families with quality documents and resources in order to support comprehension of the curriculum and its consequent implementation. The website promotes the use of a digital language for the planning of lessons, by providing documents, activities, suggestions, interactive and audio-visual resources aligned with the curriculum and that aim to enrich the educational process.
- **Argentina** is developing pedagogical resources and materials for provinces and teachers which address current or future topics that are not included in current curricula. This can encourage teachers to address new issues without undergoing structural curriculum reforms and can help ensure that reforms are implemented.
- In **Hong Kong (China)**, the Education Bureau develops a range of learning and teaching materials, such as resource packages and multimedia resources, for use by schools and teachers. The provision of supplementary learning and teaching materials to teachers can help reduce the implementation time lag by reducing the lead time for teachers to prepare their own resources.

IMPACT TIME LAG: CHALLENGES AND STRATEGIES

Despite curriculum designers' best efforts to make timely decisions and ensure effective implementation, it can take several years for curriculum change to have an impact on students' learning and well-being. This lag often leads to curriculum reforms being overturned before they have had the opportunity to have an impact. Table 10 summarises the main challenges relating to the issue of impact time lag reported by countries/jurisdictions and the strategies they have adopted in response.

Table 10 **Challenges and strategies related to impact time lag**

	Challenge/strategy	Countries/jurisdictions reporting the challenge/strategy
Challenges	Insufficient research on competencies needed for the future	Denmark, Korea, China
	Lack of studies evaluating the implementation and impact of curriculum change on student learning and well-being	(n/a)
Strategies	Piloting curricular changes and evaluating their impact on student learning and well-being	Australia, British Columbia (Canada), Chile, Ireland, Hungary, Korea, Poland, Scotland (United Kingdom), Turkey, Kazakhstan, Russian Federation
	Ongoing monitoring of the implementation of curricular innovations	Japan

Note: Responses for these countries/jurisdictions were submitted by independent researchers, not government administrations.

Source: Data from the PQC, findings from the research section.

Impact time lag: Challenges

Countries/jurisdictions that take an evidence-informed approach to curriculum redesign may be more likely to see curriculum have its desired impact on student outcomes. However, while there are decades worth of robust research on teaching and learning in traditional learning areas like reading and mathematics, some countries/jurisdictions identified that there is **insufficient research on competencies needed for the future**, at least in some areas or domains. Without such information, the decisions taken by curriculum designers may lead to a time lag in the impact of curriculum in these areas.

In addition, **a lack of studies evaluating the implementation and impact of curriculum on student learning and well-being** can contribute to the time lag between when curriculum is implemented and when effects on student learning are observed. Careful monitoring of implementation would allow curriculum designers to identify what is and is not working well, allowing for timely course correction where necessary. Without this information, the desired impact of curriculum on students will likely be delayed.

Insufficient research on competencies needed for the future

Countries/jurisdictions including Denmark, Korea and China, reported challenges where there are gaps in the research base available to inform curriculum redesign.

- **Denmark** outlines lack of evidence of future needs for students as a key challenge for curriculum reform. Stakeholders such as business/industry and civil society usually put forward their views for co-creating curriculum. However, these are not always aligned, revealing tensions and dilemmas for discerning which skills will be relevant for students in the future.
- **Korea** outlines lack of systematic research on future needs as a curriculum challenge. This challenge is aggravated by the speed of changes surrounding education in the near future, such as rapid technological development, together with a research agenda for education policy where continuity and scientific perspective are difficult to ensure.
- **China** identifies some gaps between social development, scientific and technological progress and students' experiences in schools. China attributes this lag to insufficient research on future needs for talent.

Lack of studies evaluating the implementation and impact of curriculum changes on student learning and well-being

While a growing number of countries are using impact studies and evaluations to measure the effects of various education reforms, their use for evaluating the impact of curriculum remains relatively limited. The complexity of isolating the effect of curriculum redesign from other factors, such as pedagogy or teachers' capacity, may be a leading reason why policy makers are reluctant to use impact evaluations to measure the effect of curriculum redesign. The impact of curriculum redesign is, rather, often evaluated as part of a broader ecosystem of policies, including pedagogies, teacher preparation and assessment. (For a wider list of research gaps, see "What is still unknown?" above). More research is needed on the ecosystem approach to curriculum reform and measuring the collective impact of curriculum reforms. This is being explored in Phase II of the OECD Future of Education and Skills 2030 project.

Impact time lag: Strategies

In order to ensure that curriculum change has a timely impact on student learning, some countries/jurisdictions take the approach of **piloting curricular changes and evaluating their impact on student learning and well-being**. This strategy means that countries/jurisdictions collect evidence of impact on student learning and well-being prior to introducing the changes more broadly across the education system.

While some countries/jurisdictions focus on monitoring impact, others actually engage in **ongoing monitoring of the implementation of curricular innovations**. Increasing device use among students allows for real-time collection of process data on how and when students are engaging with the devices. These data can then potentially be used to inform pedagogical practices in classrooms.

Piloting curricular changes and evaluating their impact on student learning and well-being

A growing number of countries/jurisdictions, including Korea and Kazakhstan, are piloting new pedagogies and assessments as part of a broader curriculum change. Collecting evidence of impact before scaling up should help to reduce the impact time lag of associated with curriculum change.

- To change the nature of teaching and learning, **Korea** piloted a "Free Semester" (i.e. a semester without mid-term and final examinations). In teaching and learning, it introduced pedagogies such as project-based learning and flipped learning. In curriculum, it offered a common curriculum in the morning and an optional curriculum in the afternoon, including activities such as career exploration and clubs. Korea expanded the number of research (pilot programme) schools from 42 in 2013 to 811 in 2014 (25% of all middle schools), to 2 551 schools in 2015 (80%), and to all middle schools in 2016. The Ministry

What types of challenges do countries face in addressing curriculum time lag, and what strategies do they use to address...

of Education evaluated the implementation and impact of this policy on students by monitoring research schools, voluntary schools and non-participating schools. Based on the results of the analysis, the Ministry set an advanced policy in 2018 which stipulates that schools voluntarily designate two semesters of the first middle school year as the Free Year, offering 221 Free Semester activity hours based on students' needs and interests.

- **Kazakhstan** has a network of innovative schools which are at the forefront of innovation developments in the country, Nazarbayev Intellectual Schools. This school network serves as an education laboratory where innovations on pedagogies and assessments are piloted and evaluated before being scaled up.

Ongoing monitoring of the implementation of curricular innovations

Box 11 outlines how the monitoring and collection of data on device use in schools in one city in Japan allows for targeted intervention in schools where the devices are not being used as intended. Facilitating early intervention in this way is an opportunity afforded by technology and can limit delays in achieving the intended impact of curriculum innovation on students.

Box 11 **How the board of education uses data to monitor targeted interventions without time lag**

The city of Kumamoto in Japan has 92 elementary schools and 42 lower secondary schools. Kumamoto introduced Long Term Evolution (LTE) model tablets to all public elementary and lower secondary schools over the period of 2018 to 2020. A feature of the LTE model tablets is that users can connect to them anytime, anywhere. The board of education in Kumamoto has added useful applications to these tablets and has actively provided technical support. In order to improve pedagogical practices in class, the board of education not only provides the tablets, but also monitors which schools use them and how. The board would like to improve the classes by shifting the focus from input by teachers to output by students, using ICT. It promotes improvement of lessons at school by dispatching supervisors to observe classes, in addition to the ICT support staff at the schools.

The data are used to design targeted interventions in schools where either teachers or students are struggling to use the devices. Based on monitoring data on the use of the tablets, the board of education staff are able to design interventions targeting schools that were not using them effectively with no time lag. Thus, being able to eliminate the time lag is one of the advantages of digital devices. The board of education is promoting this project through a series of initiatives in collaboration with industry, academia and local government.

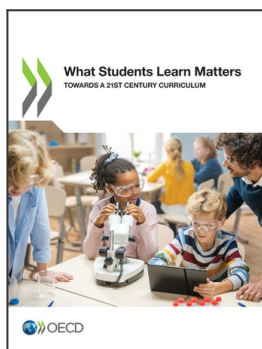
Source: Website of the Kumamoto city, https://www.city.kumamoto.jp/common/UploadFileDsp.aspx?c_id=5&id=25530&sub_id=10&fid=203298, accessed on 30 September 2020.

Notes

1. http://buildingpublicunderstanding.org/assets/files/pubstory/bc_edu_plan.pdf
2. <http://nzcurriculum.tki.org.nz/>
3. www.tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa.

References

- Laukkonen, R., H. Biddell and R. Gallagher** (2019), "Preparing humanity for change and artificial intelligence: Learning to learn as a safeguard against volatility, uncertainty, complexity, and ambiguity", OECD, <https://dx.doi.org/10.31234/osf.io/g5qwc>. [6]
- Mann, A. et al.** (2020), *Dream Jobs? Teenagers' Career Aspirations and the Future of Work*, OECD, Paris, <https://www.oecd.org/education/dream-jobs-teenagers-career-aspirations-and-the-future-of-work.htm>. [3]
- OECD** (2020), *Curriculum Overload: A Way Forward*, OECD Publishing, Paris, <https://doi.org/10.1787/3081ceca-en>. [5]
- OECD** (2019), *OECD Future of Education and Skills 2030 Conceptual Learning Framework. Concept note: OECD Learning Compass 2030*, <http://www.oecd.org/education/2030-project> (accessed on 10 June 2020). [1]
- OECD** (2019), *Trends Shaping Education 2019*, OECD Publishing, Paris, https://dx.doi.org/10.1787/trends_educ-2019-en. [2]
- OECD** (2012), *Equity and Quality in Education: Supporting Disadvantaged Students and Schools*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264130852-en>. [4]
- van Schaik, M., J. Voogt and N. Nieveen** (2017), "Education 2032: A study about the method and returns of the societal dialogue: The process of vision development towards a future-oriented curriculum", in *Onderwijs 2032 : Onderzoek naar werkwijze en opbrengsten van de maatschappelijke dialoog Het proces van visie-ontwikkeling naar een toekomstgericht curriculum*, University of Amsterdam, Amsterdam, <https://hdl.handle.net/11245.1/c5262f03-5485-4ccb-91c5-659759bfa7a0>. [7]



From:
What Students Learn Matters
Towards a 21st Century Curriculum

Access the complete publication at:
<https://doi.org/10.1787/d86d4d9a-en>

Please cite this chapter as:

OECD (2020), “What types of challenges do countries face in addressing curriculum time lag, and what strategies do they use to address these challenges?”, in *What Students Learn Matters: Towards a 21st Century Curriculum*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/7c5b3d7d-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.