Organisation for Economic Co-operation and Development

EDU/WKP(2020)27

Unclassified **English text only**

8 December 2020

DIRECTORATE FOR EDUCATION AND SKILLS

CURRICULUM REFORM: A LITERATURE REVIEW TO SUPPORT EFFECTIVE IMPLEMENTATION

OECD Working Paper No. 239

Pierre Gouëdard, Beatriz Pont, Susan Hyttinen Pinhsuan Huang, OECD

This working paper has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

Pierre Gouëdard pierre.gouedard@oecd.org
Beatriz Pont beatriz.pont@oecd.org

JT03469580

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.

OECD EDUCATION WORKING PAPERS SERIES

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed herein are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works. Comments on Working Papers are welcome, and may be sent to the Directorate for Education and Skills, OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

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.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

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.

Comment on the series is welcome, and should be sent to edu.contact@oecd.org.

This working paper has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

---

www.oecd.org/edu/workingpapers

© OECD 2020

Acknowledgements

This working paper was prepared by Pierre Gouëdard, Policy Analyst, OECD; Beatriz Pont, Senior Policy Analyst, OECD; and Susan Hyttinen and Pinhsuan Huang during an internship at the Education Policy Advice and Implementation Division in June-September 2018 and in June-December 2019 respectively.

The authors would like to thank Jose-Luis Alvarez-Galvan, Romane Viennet, Esther Carvalhaes, Miho Taguma, Paulo Santiago and Andreas Schleicher for valuable feedback on earlier drafts of this paper. The authors wish to give a special mention to Jan van den Akker, Graham Donaldson, and Makito Yurita who reviewed the draft, shared their expertise and helped improve the paper. The authors would also like to express their gratitude to Rachel Linden for reviewing the paper and, last but not least, to Jacqueline Frazer for her help with editing and formatting the manuscript.

Abstract

Countries consider curriculum reform as an important and necessary measure to make schools enter the 21st century and respond to a fast-changing world. In recent years, many OECD countries have engaged in curriculum reform as a way to equip children with the knowledge, skills and competences needed for tomorrow. However, how to initiate such change in the most suitable and effective way remains somewhat challenging. In other words, there is a missing step between the intention, and the realisation of this curriculum renewal, crystallising what has been coined in the literature "the implementation gap".

This paper analyses the curriculum reform literature through the lens of the OECD proposed implementation framework that promotes, among others, inclusive stakeholder engagement. Curriculum reform has indeed long been considered from a "top-down" perspective, but has progressively shifted towards a more "bottom-up" approach, emphasising the central role of teachers in the process. The analysis is enriched with successful practices and examples from different countries, and concludes with a specific resource for countries to make the lessons learned actionable through the planning of a coherent curriculum implementation strategy.

Table of contents

Acknowledgements 3

Abstract 4

1. Introduction 7

2. What do we mean by curriculum reform? 8

3. Curriculum reform through the lens of education implementation 9

4. Curriculum design is a multifaceted process 10
- 4.1. A new curriculum requires a clear vision 11
- 4.2. Different types of curriculum and documents support the achievement of the education vision 18
- 4.3. Teachers' practices and self-efficacy mediate curriculum implementation 20

5. The engagement of stakeholders can drive the curriculum change 22
- 5.1. Early involvement of stakeholders as a way to build support for the new curriculum 23
- 5.2. A transparent system supports stakeholder engagement 28
- 5.3. A targeted communication strategy contributes to building global support 30

6. Transversal factors require consideration to ensure coherence around curriculum reform 31
- 6.1. Assessing the available resources dedicated to curriculum change 31
- 6.2. Curriculum reform requires a whole-of-system approach 32
- 6.3. Taking into account existing governance arrangements 41

7. Shaping a coherent curriculum implementation strategy 42
- 7.1. The new curriculum is a means to achieve an educational vision 43
- 7.2. Stakeholders are the main drivers of the curriculum change 43
- 7.3. Curriculum reforms require a holistic approach 44
- 7.4. Planning a coherent implementation strategy 44

References 47

Tables

Table 6.1. Spectrum of continuous professional development models 36
Table 6.2. Types of school accountability 38
Table 7.1. A tool for planning a coherent implementation strategy 45

Figures

Figure 3.1. The Implementation Framework 10
Figure 4.1. Teachers' autonomy in determining course content, TALIS 2018 21
Figure 5.1. Potential stakeholders in education 23
Figure 6.1. The OECD framework of evaluation and assessment 37

Boxes

Box 4.1. The curriculum spider web 11
Box 4.2. Curriculum reform in Japan: same words, different interpretations 13
Box 4.3. Data gathering to support implementation: country examples 15
Box 4.4. Monitoring and piloting implementation: country examples 16
Box 5.1. Engaging stakeholders to develop sense-making: country examples 25
Box 5.2. Engaging stakeholders to develop ownership: country examples 27
Box 5.3. Allocating tasks in curriculum reform: country examples 29
Box 5.4. Communication to support the curriculum reform in Wales 30
Box 6.1. Selecting teachers in Finland 34
Box 6.2. Policy measures for improving the quality of initial teacher education in Wales 35
Box 6.3. A national resource for school improvement in Wales 39
Box 6.4. The communities of schools in New Zealand 39

1. Introduction

Modern societies are facing new challenges, be they environmental, economic, health-related, or societal. Climate change and the depletion of resources question our consumption habits, the development of artificial intelligence and new technologies challenge our traditional conception of work, and ongoing globalisation entails migration, urbanisation and increasing diversity shaping countries and economies. If children in school keep on learning what was taught to their parents, they will not be appropriately prepared for a more uncertain future characterised by an ever-changing environment (OECD, 2018[1]).

Due to these global trends, countries have increasingly considered reviewing the curriculum as a way to equip children with the knowledge, skills and competences needed for tomorrow. In fact, several OECD countries have engaged in curriculum reform in recent years such as Estonia, Finland, Japan, Norway, and Wales (United Kingdom) for example. More than 40 countries are participating in the OECD-led Education 2030 project, an effort that explores the skills and competencies that are needed for children to thrive in the 21st century (OECD, 2018[1]).

While each country has a different trajectory of reform, some similar patterns emerge in several countries, such as the emphasis on well-being, learner agency, the ability to solve problems and navigating an uncertain world. The similarity, as well as distinctiveness, of curriculum reform between different countries reflects a broader complexity about curriculum reform, which concerns the interplay of global and local influences. On one hand, curriculum reform is a national affair, as it is expected to define the knowledge and abilities that are seen to be most valuable in a society and necessary to prepare the future. On the other hand, it can be influenced by international trends, such as globalisation, and international student assessments also reflect this (e.g. the Programme for International Student Assessment, PISA, Trends in International Mathematics and Science Study, TIMSS, Progress in International Reading Literacy Study). Curriculum reform is an intersection between these forces.

In addition to this complexity, a major issue many countries encounter when trying to reform curriculums concerns implementation of the reform. According to Fullan (2015[2]), curriculum implementation corresponds to the means to accomplish desired objectives, and for the new curriculum to bear fruit, it needs to be translated into classroom practices. The topic of implementation has been widely studied in fields such as public management, public policy, organisational change and education. Echoing traditions and debates in these fields, curriculum reform has previously been seen from a "top-down" perspective, where the "success" of the implementation was measured by the "fidelity" and "adherence" to the reformed curriculum by implementers, such as teachers (Castro Superfine, Marshall and Kelso, 2015[3]; Wedell and Grassick, 2017[4]). Nevertheless, this approach does not fit the trend of autonomy-centred curriculum enactment, where the central role of teachers in the process, both as enactors and mediators of the policy, makes obsolete the concept of fidelity itself (Snyder, Bolin and Zumwalt, 1992[5]; Braun, Maguire and Ball, 2010[6]).

In effect, a more dominant view of implementation has appeared recently, shifting towards a more "bottom-up" approach that emphasises the autonomy and discretion of implementers. In this view, teachers' agency is recognised as playing a crucial role in curriculum implementation, as teachers are not solely passive executors only playing a role at the final stage of the reform, but rather active actors that should be taken into account throughout the whole reform process. Accordingly, "implementation fidelity" has given way to "implementation integrity", that is "the degree to which teachers' adaptations of materials are congruent with the curricular goals and principles undergirding the structures

of curriculum" (Penuel, Phillips and Harris, 2014[7]). From this point of view, shared by this paper, curriculum implementation encompasses a wider range of areas that go beyond the traditional "teacher fidelity" and include topics like stakeholder engagement and other contextual factors likely to affect the outcome of implementation.

This paper looks at the implementation of curriculum reform from this broad implementation perspective, taking on board the broader dimensions surrounding it. It uses the implementation framework developed by Viennet and Pont (2017[8]), and refined by the OECD (2020[9]), to list the key factors that policy makers can consider when they undertake curriculum renewal. It builds on the curriculum reform literature, and draws on successful practices and examples from different countries to render this work more action-oriented. Although each country has its unique history, value, culture and institutional set-up that shape the educational system and determine how curriculum reform would work most effectively in its unique context, this paper posits that certain general principles might still apply regardless of the dissimilarity in specificities.

The structure of the paper is as follows: following the introduction, the second section delimits the scope of the analysis and its contribution to the literature by briefly discussing what we mean by curriculum, curriculum reform and implementation, and reviewing several related challenges. The third section presents the implementation framework and applies it to curriculum reform. The fourth, fifth, and sixth sections detail the specific dimensions of the implementation framework, respectively policy design, stakeholder engagement, and context. The final section weaves it all together with a conclusion on the dimensions that can shape a curriculum coherent implementation strategy.

2. What do we mean by curriculum reform?

While the definition of "curriculum" could differ based on its context, in essence, it is "a plan for learning" (van den Akker, 2010[10]). In other words, it is a set of guidelines for what students should learn and what should be taught through the education system. Stoll et al. (2006[11]) adopt a stricter definition, where curriculum refers to the materials or documents used for teaching and learning, such as textbooks or instructional materials. Conversely, Saavedra and Steele (2012[12]) consider curriculum in a broader sense, including issues that would have an explicit impact on how the curriculum is designed and realised, such as teaching methodology, class size, learning hours allocation, learning objectives, assessment and examination practices.

This paper focuses on curriculum reforms that specifically involve change in the objectives of learning, namely which competencies, knowledge, values and attitudes should students acquire. Under this definition, curriculum is highly cultural and political, since it determines the vision of a society by deciding what kind of knowledge and skills are most valuable for its people and what knowledge is worth passing on. In other words, a curriculum reflects a broader social and political agreement (Amadio et al., 2016[13]) and as the society evolves and changes, so should the curriculum.

Attempts to review or update the "content" of knowledge, including its selection and organisation, and associated issues concerning student learning, are thus "curriculum reforms" (Gilbert, 2010[14]). Recognising the need for their curriculums to evolve with time, in recent years countries have engaged in curriculum reforms at various paces and methods in order to better prepare students for a fast-changing world. This interest in curriculum reforms has not only been sparked by the necessity to ensure that students have the skills and attitudes suited for the 21st century, but also by the potential impact of the adoption of

a specific curriculum on students' learning outcomes (Chingos, Russ and Whitehurst, 2012[15]; Boser, Chingos and Straus, 2015[16]; Steiner, 2017[17]).

However, curriculum reforms are demanding in terms of implementation, since they require changes in many aspects that might challenge the existing beliefs and subjective realities deeply embedded in individual and organisational context (Fullan, 2015[2]). Factors such as high cost, uncertainty of the outcomes, risk aversion of stakeholders etc. also create additional obstacles for initiating and materialising changes in curriculum. In addition, they may require high investments in training and capacity building for the teacher workforce and in schools to take up the new curriculum, the development of new approaches to teaching and learning and new material resources. Consequently, as observed in several countries, there is often a tendency for individuals and institutions in education to prefer the status quo over changes (OECD, 2017[18]).

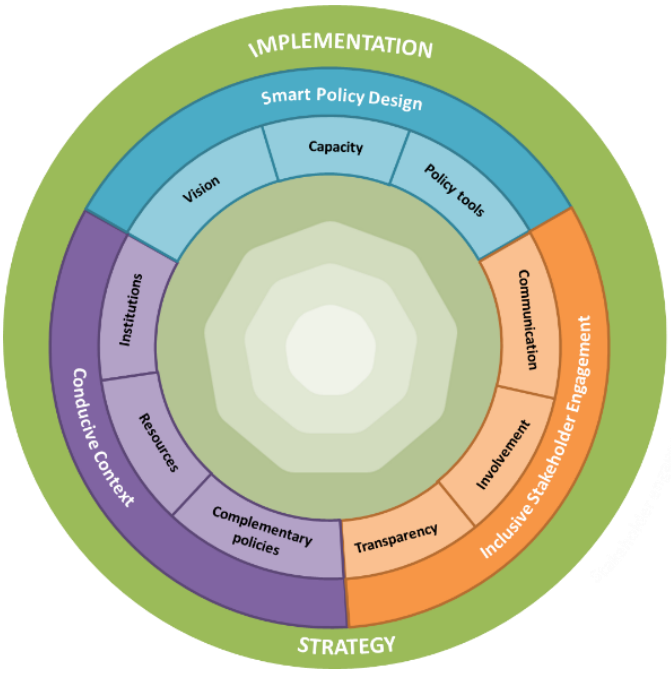
This is why the question of "how" this process of translating a policy into reality, specifically the policy of curriculum reform, is the major concern of this paper. Existing literature has provided some insights on this topic. For example, Tyack and Cuban (1997[19]) proposed a bottom-up approach to educational reform, with a focus on ways to help teachers improve instruction from the inside out. Fullan (2015[2]) argues that in order for a reform in education to be successfully implemented, at least three dimensions of changes should take place: materials, teaching approaches, and beliefs. Viennet and Pont (2017[8]) analyse the reasons behind the challenges to the implementation of education reforms, and refer to changes in governance towards greater decentralisation, greater awareness and engagement by more stakeholders in shaping education policy, and an increased focus on education results. The nature of education reform implementation processes is changing in the 21st century, from top-down to bottom-up, and the traditional roles of education policy makers are evolving.

The impact of these shifts for curriculum reform are important to understand and elucidate. However, there is limited research or comprehensive analysis of implementation focused on curriculum reform from the perspective of policy making (Castro Superfine, Marshall and Kelso, 2015[3]; Cheung and Wong, 2012[20]; O'Donnell, 2008[21]; Pietarinen, Pyhältö and Soini, 2017[22]). As many education systems around the world have initiated curriculum reforms, transitioning for instance from a knowledge-based to a competency-based curriculum, this paper provides policy advice to facilitate curriculum implementation.

3. Curriculum reform through the lens of education implementation

Applying a general education policy implementation framework developed by Viennet and Pont (Viennet and Pont, 2017[8]; OECD, 2020[9]) to the curriculum reform literature, we gather analysis and information on the key factors that policy makers can consider when they undertake curriculum renewal. Following the analysis, the paper proposes an implementation framework for curriculum reform that aims to provide guidelines for countries and education systems that are trying to initiate a reform or re-examine their curriculum reform process.

Figure 3.1. The Implementation Framework



Source: OECD (2020[9]), "An implementation framework for effective change in schools", *OECD Education Policy Perspectives*, No. 9, https://dx.doi.org/10.1787/4fd4113f-en.

The framework (Figure 3.1) proposes that a coherent education policy implementation strategy brings together three dimensions in an actionable way. These are: smart policy design, inclusive stakeholder engagement, and conducive context. Each dimension includes three levers to be considered for implementation. The way the three dimensions are weaved in together and communicated through an actionable lens can determine the extent to which the implementation strategy is coherent and can result in effective change. The following sections detail each of these dimensions.

4. Curriculum design is a multifaceted process

As mentioned earlier, curriculum reform can be seen as a process that aims to change the objectives of learning and the way learning takes place. How such change would be implemented depends on the goal and intention behind the change. Policy design addresses the central considerations of *what* is to be learned, *how* it is to be learned, and *why* it is to be learned. It also addresses how the success of this learning is evaluated, and what resources are required for the attainment of the outlined objectives. In practice, there is a myriad of components that need to be taken into account in the process of curriculum design, all of which will be consequential for the successful implementation of curriculum. If the design itself is not informed by a sophisticated understanding of crucial components concerning learning and teaching, like effective pedagogical methodology, it cannot be successfully implemented (van den Akker, 2010[10]).

Box 4.1. The curriculum spider web

The traditional major planning elements for curriculum are content, purpose, and organisation of learning. However, van den Akker (2010[10]) considers it is wise to pay attention to a more elaborated list of components. His framework relies on ten components that address ten specific questions about the planning of student learning:

- •Rationale or Vision: Why are they learning?
- •Aims and Objectives: Toward which goals are they learning?
- •Content: What are they learning?
- •Learning activities: How are they learning?
- •Teacher role: How is the teacher facilitating learning?
- •Materials and Resources: With what are they learning?
- •Grouping: With whom are they learning?
- •Location: Where are they learning?
- •Time: When are they learning?
- •Assessment: How to measure how far learning has progressed?

Source: van den Akker (2010[10]), Curriculum Design Research, SLO: Netherlands Institute for Curriculum Development.

While traditional planning elements for curriculum focus mostly on content, purpose, and the organisation of learning, van den Akker (2010[10]) considers it wise to pay attention to a more elaborated list of components (Box 4.1). He proposes ten specific questions about the planning of student learning, among which the "Rationale/Vision" refers to overall principles while the nine other components should ideally be linked to the vision and consistent with each other. Each of the elements not only encompass substantive issues (content of the curriculum), but also organisational matters that influence learning.

While all the components are important for a successful design of curriculum reform, a few are particularly crucial from the viewpoint of curriculum implementers and policy makers. The educational vision, the type of curriculum and associated documents to be developed, and the role of teachers are vital. We discuss these components more in-depth in the following text.

4.1. A new curriculum requires a clear vision

The vision of curriculum reform signifies the purpose of the curriculum change. It covers the questions of *why* the curriculum reform is needed, *what* kind of curriculum is preferred, and *how* the desirable changes could be achieved. Answers to these questions would affect the outcome of implementation through various ways. In the absence of a clear justification of the reform, the curriculum policy might suffer from not gaining public and political support. Moreover, if there is no consensus on what kind of support is needed, the diverging and even conflicting opinions might hinder curriculum change. Finally, if there is not a clear roadmap or theory of change that can delineate how the proposed policies would contribute to the objectives the reform set out to achieve, it might lead to confusion among key actors, undermine credibility of the policy and waste of resources. All of these may

disfavour the successful implementation of the curriculum reform. The following sub-sections focus on the vision looking at the "why"- the justification of the reform, the "what" - the clearness and consensus, and the "how"- the theory of change.

4.1.1. Justifying the curriculum reform to build global support

Curriculum reform, like many other reforms, has a high opportunity cost. It requires an enormous amount of time, financial and human resources to make it happen, in relation to resources spent on other, less controversial topics, like teacher professional development or measures fostering equity, for example. A clear justification of the curriculum reform is, therefore, required to draw resources, political support and legitimacy that would facilitate its implementation. Indeed, Fairhurst and Sarr (1996[23]) have found that when reform is being interpreted in a broader normative framework which provides the sources of legitimisation of the change, individuals are more likely to accept and commit to the change. Without a solid justification, the curriculum reform could easily be disregarded or even misinterpreted.

The justification of the curriculum reform could come from different sources according to the situation in each country. On one hand, the need for updating content to fit evolving social, cultural, and economic contextual factors, has been an important driver in OECD countries (section: A global trend towards competence-centred curriculums). This future oriented approach aims at adapting academic requirements and envisioning what a student should acquire through the educational system to thrive in a 21st century society. For instance, the most recent curriculum reform document in New Zealand states its vision as cultivating "young people who will be confident, connected, actively involved, and lifelong learners" (The New Zealand Curriculum, 2007[24]). Estonia aims to develop within youth the "intellectual curiosity, learning skills, self-reflection and critical thinking, self-expression, social and cultural identity and participation in lifelong learning" (Ministry of Education and Research, Estonia, 2014[25]). On the other hand, the reform could be seen as a way to respond to particular challenges, such as poor learning outcomes, high drop-out rates, high stress levels of students or teachers, or the lacking of skills required for the labour market.

4.1.2. A global trend towards competence-centred curriculums

The kind of vision the curriculum aims to achieve determines which curriculum policy will be adopted. The vision, usually documented in a curriculum statement or an official document, depicts the desired results of an educational system or the knowledge and skills students should possess. It provides the guidelines for the reform as well as for curriculum materials such as textbooks or syllabus.

A clearly defined vision, agreed by multiple stakeholders, is pivotal to ensure a shared understanding of the policy objectives. Different interpretations of the curriculum vision would be translated into different education philosophy, pedagogical choices and eventually teaching materials. The absence of consensus on these underlying values concerning education would make systematic improvement of curriculum difficult (Benavot, 2011[26]). For instance, in the Japanese curriculum reform of the early 2000s, different interpretations and understanding of the vision of the reform have hindered the implementation efforts (Box 4.2). Conversely, in Finland, a general bottom-up approach to decide on the vision of their curriculum reforms has helped to form consensus and reduce the gap between different understandings of the reform goals (Box 5.1).

Box 4.2. Curriculum reform in Japan: same words, different interpretations

Different interpretations of the vision led to challenges during the implementation process in the curriculum reform in Japan from the 1990s to 2000s. The goal of the curriculum reform was two-fold:

- •to nurture traditional values such as emotional and social competency
- •to promote individuality and the ability to think for oneself – qualities that were considered necessary for the Japanese society to meet future challenges.

This emphasis on "individuality", that shifted from "one-size-fits-all" (where everyone studied the same thing for the same goal), and the different understanding of it led to different attitudes towards the reform. Stakeholders who understood individuality as providing children with the chance to make choices that would allow them to flourish based on their different interests and aptitudes, were positive towards the reform. On the contrary, stakeholders who understood individuality as a way to differentiate children into elite and non-elite programmes, considered the reform would increase inequalities, and were reluctant to implement it.

This reform was later reversed. Though the ambiguity regarding the vision was not the only cause for the reversal, this example demonstrates how different vision interpretations challenge curriculum implementation.

Source: Cave (2016[27]), Schooling Selves, University of Chicago Press, http://dx.doi.org/10.7208/chicago/9780226368054.001.0001

Countries have different visions for curriculum change that match their specific context. Nevertheless, there have been some broad global trends concerning curriculum design. The most recent one is probably the shift from a content-based curriculum to a competence-based curriculum (Wesselink et al., 2010[28]; Bergsmann et al., 2015[29]; Autio, 2013[30]). Despite the fact that there are different categories of ideology and philosophy of the purpose of curriculum, and that the names of these categories vary (Schiro, 2013[31]), this shift in curriculum vision stresses the importance of cultivating in students certain competencies that draw on multidisciplinary knowledge and skills. This is opposed to focusing only on the mastery and memorisation of knowledge structured by different subjects regardless of its "usefulness" and direct connection to the student's ability in problem-solving.

This global shift towards a competence-centred curriculum implies an emphasis on "the integration of knowledge, skills, and attitudes that enable a person to perform a certain task in ill-defined and unique environments" (Wesselink et al., 2010[28]). In other words, competence-centred curriculum aims to provide students with an integrated performance-oriented capability to reach specific achievements that would allow them to navigate through a world that is constantly changing and full of uncertainty (Mulder, 2001[32]).

Many countries have engaged in curriculum reforms that emphasise and incorporate competencies into the vision and design of their curriculum reform. In countries like the United States, the United Kingdom, Germany, France and Australia, such an approach has been popular since its inception in the 1960s (Velde, 1999[33]). More recently, more countries have joined this trend. For instance, in South Korea, the curriculum revisions in 2009 and 2015 aimed to shift the role of schools from a centralised knowledge-delivery system to a competency-development one that gives local schools more autonomy. Competencies such as self-management, knowledge-information gathering ability, creative thinking, aesthetic-emotional capacity, communication skills, and civic competency were

regarded as ways to cultivate young people that have individuality, creativity, dignity and the ability to engage with others (So and Kang, 2014[34]).

At a global level, international organisations also analyse the shift towards the competence-centred curriculum. The OECD Future of Education and Skills 2030 Project that involves more than 40 countries, aims to help education systems determine the knowledge, skills, attitudes and values students need to thrive in and shape their future (OECD, 2018[1]). According to Mulder et al. (2007[35]) there are several international examples such as the European Qualification Framework proposed by the European Union, which allows cross-country comparison of skills; the Programme for International Student Assessments (PISA) led by OECD to assess selected competencies of students, and professional training programmes led by UNESCO.

4.1.3. The ambiguity of monitoring progress

The vision can be strengthened by having clear and measurable objectives that can guide the implementation of the curriculum. According to Viennet and Pont (2017[8]), having clear goals and focus is an essential consideration for the implementation process to ultimately reach its aims. To assess completion, objectives can rely on existing indicators (such as grade repetition, equity, average level in a specific field etc.) or on new ones to be defined in the implementation strategy, while bearing in mind that information systems are often already largely developed and survey fatigue among different actors should be avoided.

However, for curriculum reform, concrete objectives ought to be balanced with more general ones, to avoid narrowing or toning down objectives for the sake of measurement. Curriculum implementation choices do not only relate to learning outcomes or standards but also to the kind of system they aim to foster, which ultimately facilitates the attainment of the more specific objectives. For instance, in systems that have tried to improve student outcomes through increased emphasis on teacher autonomy and professionalism, the dominant focus on student outcomes in the form of examinations has obstructed teacher autonomy (Mellegård and Pettersen, 2016[36]; Leat, 2014[37]). This can even lead to worse learning outcomes, where teachers are not able or willing to follow the curricular aims (Baker et al., 2010[38]). It is, therefore, important to balance both more specific and general, short-term and long-term objectives, and define the strategic links between the two.

Education policy has been increasingly guided by what can be measured, namely, indicators (Kauko and Varjo, 2008[39]). This has partly paved the way to the trends in increased accountability, standardisation, and learning outcomes emphasis (Mølstad and Karseth, 2016[40]). Moreover, the choice of indicators, the timing of the measurements, and where the threshold for "success" is set, have distinct implications in terms of how policy is guided and perceived. As these need to be determined in a manner that can never fully escape subjectivity (Unterhalter, 2013[41]), vigilance is required on behalf of researchers, international organisations, and local actors alike in putting the available data to best use in a balanced manner (Volante et al., 2017[42]).

The development of indicators to measure "fidelity", to ensure that teachers adhere to the intended curriculum, is a major pitfall when it comes to monitoring curriculum implementation. First, because the development of such indicators has not only been seldom informative, as defining standards of fidelity has been proven strenuous (Steiner, 2017[17]), but also at odds with the trend of teachers' increased autonomy in terms of curriculum development (van den Akker, 2010[10]). Second, defining threshold for "the success of curriculum implementation" is challenging, because there will never be a clear-cut point where curriculum will be "implemented" (Cowie, Hipkins and et al, 2009[43]).

However, the trialling of the curriculum and dissemination of best practices (Box 4.3), the translation of curriculum objectives into indicators (Box 4.4), the establishment of strategic measures (are teachers working with new pedagogical material, do they follow specific professional development, how much schools need central support etc.) can contribute to draw a map of the curriculum implementation and its progress.

Box 4.3. Data gathering to support implementation: country examples

Japan: Internal monitoring is integral to the 10-year curriculum cycle

In Japan, a "Plan – Do – Check – Act" cycle takes place in every school. It respectively consists of organising, implementing, evaluating and taking action to improve the educational curriculum. At the school level, the way curriculum is taught can evolve based on data concerning students and communities. At the national level, PDCA data concerning teaching the curriculum are gathered before the end of the ten year revision of the curriculum. Due to the high professionalism of Japanese teachers, this accumulation of evidence on teaching practices, pedagogical pitfalls and success stories feeds into the discussion of the reform of National Curriculum Standards.

Source: OECD (2018[44]), Education Policy in Japan: Building Bridges towards 2030, Reviews of National Policies for Education, http://dx.doi.org/10.1787/9789264302402-en

Portugal: A phasing in strategy to identify good practices

Portugal chose a phasing-in strategy to support the implementation of the curriculum. In July 2017, Portugal launched a project called the "Project for Autonomy and Curriculum Flexibility (PACF)", allowing Portuguese schools to join on a voluntary basis. PACF provided schools with the necessary conditions to manage the curriculum while also integrating practices that promote better learning, and was implemented as a pilot project during the 2017-2018 school year. The pilot project has helped to identify innovative schools and good practices at the national level, while also helping to identify innovative teachers and good teaching practices within schools. The pilot laid a strong foundation to support schools in effectively exercising autonomy and greater flexibility as they redesign their curriculums.

Source: OECD (2018[45]), Curriculum Flexibility and Autonomy in Portugal - an OECD Review, OECD Publishing, Paris.

New Zealand: A research programme on school approaches

The development of research programmes strengthened the curriculum implementation strategy in New Zealand. In 2007, the New Zealand Curriculum set "the direction for learning for all students while at school". It gave schools the freedom to design their own curriculum to best meet the identified learning needs of their student population, in consultation with their wider school community. The Ministry of Education expected all schools to be engaged in the implementation process by 2010. Nevertheless, after taking into account the variability in terms of school capacity for implementing the new curriculum, the Ministry of Education determined that it would be helpful if the successful experiences of schools that got underway with the process were documented. Consequently, Curriculum Implementation Exploratory Studies were launched and

gathered case studies to identify factors that support curriculum implementation in early-adopter schools, with a view to supporting other schools in their journey.

Source: Cowie Hipkins et al. (2009[43]), Curriculum Implementation Exploratory Studies: Report to the Ministry of Education, New Zealand Council for Educational Research, Wellington.

Box 4.4. Monitoring and piloting implementation: country examples

Wales: An external monitoring institution follows implementation progress

Estyn, the Welsh education and training inspectorate, provides advice and guidance to the Welsh Government on quality and standards in education and training in Wales.

In 2017, following a request from the Welsh Government, Estyn led an education review assessing to what extent schools were adapting in light of recent curriculum developments. The report drew on evidence from 20 case studies that provide examples of how schools that are at different stages of curriculum development are exploring new curricular approaches and associated teaching strategies. In particular, inspectors focused on the three following questions:

- •How are schools evaluating their curriculum to determine what needs to change to realise a new Curriculum for Wales?
- •How are schools responding to evaluation outcomes to plan and develop a curriculum that is engaging and attractive, one that develops an ability and enthusiasm to apply knowledge and skills independently?
- •How are leaders monitoring change and taking their work to the next step?

Estyn's report will help head teachers and staff in primary schools to reflect on their current curriculum provision and plan for curriculum change.

Source: Estyn (2018[46]), Curriculum innovation in primary schools.

Estonia: System level monitoring to support the national education strategy

In 2014, Estonia published the Estonian Lifelong Learning Strategy 2020 (LLS), a guiding document for the development of education policy for the period 2014-20. The LLS is aligned to the National Reform Programme "Estonia 2020" and the Estonian national strategy for sustainable development ("Sustainable Estonia 21"). Five strategic goals have been established in the LLS:

- •Change in the approach to learning
- •Competent and motivated teachers and school leadership
- •Alignment of lifelong learning opportunities with the needs of the labour market
- •A digital focus in lifelong learning
- •Equal opportunities and increased participation in lifelong learning.

One of the interests of the LLS is the identification of a list of indicators to monitor the achievement of the five strategic goals by 2020. This methodology is similar to the one

adopted by the European Commission for the Education and Training 2020 framework, where the achievement of four common EU objectives (fostering lifelong learning, improving the quality and efficiency of education and training, promoting equity and social cohesion, and enhancing creativity and innovation) is supported by the monitoring of specific indicators.

As the LLS was coming to an end, the Ministry of Education and Research (MoER) started preparing a new strategy towards 2035. Three broad-based expert groups (values and responsibility group, welfare and cohesion group, and competitiveness group) were tasked with developing a joint vision on issues that can be influenced by the MoER's four areas of responsibility: education, research, language and youth policy. The resulting vision is still under-development, but has identified the main targets for Estonian future strategy: happy learner, inclusive society of welfare and shared values, competitive and sustainably growing economy, and a viable and strong Estonian culture and language. The MoER is now selecting a set of coherent and comprehensive indicators to support the achievement of the education 2035 strategy.

Source: Estonian Ministry of Education and Research (2015[47]), Estonian Ministry of Education and Research (2015), The Estonian Lifelong Learning Strategy 2020.

4.1.4. Curriculum reforms take time

The pace and timeline set for curriculum reform will determine how the implementation process unfolds. There is a consensus on the need for long-term commitment and follow-through in education policy research in general (OECD, 2015[48]), as well as in curriculum literature (Kuiper and Berkvens, 2013[49]). This is due to the fact that profound educational change takes time, and consequently so does witnessing the results of changes (Burns, Köster and Fuster, 2016[50]). For instance during curriculum reform in Hong Kong, the tight timing imposed on teachers and principals was seen as undermining the effective implementation of the policy (Cheung and Wong, 2012[20]). Due to the need for policy alignment, similar long-term commitment for fundamental supporting policies is recommended.

In terms of the curriculum reform process, there exists some consensus in the literature that long-term vision and related practices can be aided by the establishment of a periodic curriculum review cycle (Gray, Scott and Auld, 2014[51]; Sargent et al., 2010[52]; Pietarinen, Pyhältö and Soini, 2017[22]). However, scheduled curriculum reviews of consistent cycles seem less common than those undertaken on a more ad hoc basis. For example, amongst 23 countries or states covered in a 2010 study, only seven of these had a more systematised review process (Sargent et al., 2010[52]). Socio-political developments are common drivers for the renewal of curriculums, often relating to a change in government. Establishing a regular curriculum cycle can deflate the political dimension of curriculum change, as the cycle follows its own pace towards a non-partisan vision of education. Other drivers include efforts to mitigate curriculum overload, steering the curriculum towards contributions to more equitable outcomes, as well as the increasing pressure and emphasis on 21st century skills and competencies (Sargent et al., 2010[52]).

Amongst the seven countries having a systematic curriculum review process in the 2010 study, many are top-performers in PISA (OECD, 2019[53]): Japan (ten year cycles), Singapore (six years with a mid-review at the 3-year-mark), Finland (ten year cycles), and Ontario (seven year cycles) (Sargent et al., 2010[52]). Evidence does not point towards an ideal length for the curriculum cycle. Nevertheless, the establishment of scheduled review cycles is a useful tool for steady improvement and taking practical measures towards the

need for vision and continuity in curriculum policy (Pietarinen, Pyhältö and Soini, 2017[22]). This contributes to stability in education systems more generally, and makes curriculums less susceptible to political fluctuations (Gray, Scott and Auld, 2014[51]).

There also needs to be consideration for a short-term dynamic and for flexibility in the process of curriculum development to allow for constant adaptation (Amadio et al., 2016[13]). Keeping a short-term dynamic can, for example, be done through phasing in implementation and doing pilots, as has been done in Portugal (OECD, 2018[45]) and New Zealand (Cowie, Hipkins and et al, 2009[43]). The conclusions drawn from short-term and smaller-scale examinations, however, need to be taken with caution, as education policy may play out differently in the long-term and also when adjusted to a larger scale (Burns, Köster and Fuster, 2016[50]).

4.2. Different types of curriculum and documents support the achievement of the education vision

To foster curriculum development/implementation, UNESCO recommends establishing a curriculum framework. A centrepiece of the curriculum, the curriculum framework has an impact on all parts of the education system and on a range of matters related to curriculum policy and practice as diverse as teaching methodology, teacher recruitment and selection, class sizes, and assessment and examination practices. It provides a set of parameters within which the content is to be developed. In other words, "a curriculum framework sets the parameters, directions and standards for curriculum policy and practice" (IBE-UNESCO, 2017, p. 6[54]).

A curriculum framework is usually a single document guiding the implementation of specific parts of the learning plan. It ensures the coherence of the curriculum by organising and managing content (policies, procedures, concepts etc.) in systematic ways. The development of a relevant curriculum framework needs to follow a carefully considered process, whose features are beyond the scope of this work, but have been well documented in the literature (IBE-UNESCO, 2013[55]; IBE-UNESCO, 2017[54]).

Within the scope of the curriculum framework, the curriculum can be defined. The analysis of different curriculums suggests that these can be categorised into two curriculum models, and three types of curriculum design. The two models differ in terms of whether they are a product or a process. The product model originates from the work of Tyler (1949[56]), who greatly influenced curriculum development in the United States (O'Neill, 2010[57]). It is results-oriented, and is based on a clear definition of learning outcomes in the cognitive, affective, and psychomotor domains. This facilitates communication of what is intended, and helps with the selection of structure and content of teaching, which supports more accurate methods of testing and evaluation (Rowntree, 1974[58]).

The process model was originally developed by Stenhouse (1975[59]). It shifts the focus from the outcome of a learning experience to the learning process. The emphasis lies on independent and individualised learning, requiring an active part of the student to solve problems. The student either chooses the problem himself/herself or at least negotiates the choice with the teacher. The purpose of the process model is to develop tendencies (attitudes, morals, values) and capacities (information processing skills, problem-solving skills, social skills, manipulation skills, observation, communication) through appropriate learning experiences. This has been implemented in countries like Ireland, Scotland, and Finland during their last curriculum revision.

The product model is associated with high-constraint contexts where teachers are obliged to follow a comprehensive, potentially externally developed syllabus. It may narrow

students' experience as learning follows a pre-established map of outcomes to reach. On the other hand, the process model is associated with courses in low-constraint contexts where teachers have considerable curriculum-making freedom and flexibility. However, the process approach considers learning as holistic and, therefore, renders measurement and accountability challenging (Wette, 2010[60]).

Building on the curriculum model, educators can organise the curriculum within a course or classroom, according to three types of curriculum design:

- Learning content-based approach focuses on the content to master by the end of the course. It describes what needs to be studied and how it should be studied.
- Learning objective-based approach revolves around behavioural objectives (particularly cognitive and affective), since learning is understood as a change in the perceptible behaviour of students. It implies to develop differentiated instructional plans to take into account the diversity of students, and empower them as they shape their learning experience through educational choices.
- Competency-based approach illustrates the global trends towards the development of general competencies rather than rote learning. It initiates the learning process using life situations, real problems, or local issues, to develop skills that are transposable to the real world by teaching students how to look at a problem and formulate a solution (IBE-UNESCO, 2013[55]).

A curriculum, however, seldom follows a pure model and may combine different types of approaches in its design. To support the realisation of the vision for education, it will be necessary to select between the different models and types of curriculums to match the vision.

As highlighted in the previous section, in the 21st century countries are progressively shifting content-centred curriculum to competence-centred curriculum. Similarly, a new trend is placing the learner at the centre of the curriculum, and aligning pedagogies accordingly. For instance, the implementation of the new curriculum in Japan (to be implemented from 2020-22) insists on the importance of active learning, a pedagogy that requires students to be proactive and the class to be interactive (OECD, 2018[44]). The new curriculum for Wales (2022) aims to cater better to the diverse needs of Welsh learners in the 21st century (OECD, 2020[61]).

Aside the framework and the curriculum model, another tool used by countries to support curriculum implementation is the definition of standards. The curriculum framework may detail standards for content and assessment, as well as for teacher qualifications, educational resources and learning materials, management and evaluation to guide implementation. Particularly, content standards define the learning goals for what students should know and be able to do at each grade level and in each subject. However, the establishment of national content standards has been criticised by some educators as it may narrow down the curriculum experience to what is tested, instead of focusing on what is important (IBE-UNESCO, 2013[55]).

Well-designed guidelines (or standards) or pedagogical materials also support curriculum implementation. On one hand, they can provide clarity on the expectations, reduce teachers' workload, and allow teachers to focus their time and energy on tasks that require their attention during the reform (Cheung and Wong, 2012[20]). On the other hand, curriculum materials, such as textbooks, syllabuses or IT supports, can be the main tools used by schools and teachers to implement the curricular reform (Castro Superfine, Marshall and Kelso, 2015[3]).

Well-designed materials that provide clear guidelines support the implementation of the new curriculum, as it makes the transition easier for teachers by providing focus on students' learning progress and reducing the uncertainty and anxiety that may come from a new curriculum (Oates, 2014[62]). For instance, in Japan, the Japanese Ministry of Education, Culture, Sports, Sciences and Technology (MEXT) supports the implementation of the curriculum by providing free textbooks to all students in mandatory education. MEXT establishes the National Curriculum Standards, and defines a list of authorised textbooks. Local Boards of Education (for public schools) and school principals (for national and private schools) are then free to choose pedagogical material from this MEXT-authorised list (OECD, 2018[44]). As 87% of Japanese teachers in lower secondary education report that a heavy workload hinders them from participating in professional development (OECD, 2020[63]), taking the burden of designing textbooks from teachers would support them in participating in activities that would help them adapt to the new curriculum.

While guiding materials could support teachers and facilitate implementation, they are not sufficient to change teachers' ideas and beliefs about the new content and can water-down the impact of the curriculum reform (O'Donnell, 2008[21]). Therefore, well-designed curriculum guidelines should go hand in hand with the provision of professional development to ensure better outcomes (Roehrig and Kruse, 2005[64]).

4.3. Teachers' practices and self-efficacy mediate curriculum implementation

A significant proportion of the literature on curriculum implementation discusses the foremost implementers of curriculum, teachers, since the way they enact and engage with the curriculum directly shapes the outcome of the reform. Pointing to the importance of teachers in implementation, Fullan (2015[2]) argues that individuals are the core unit of change; if they do not have the adequate skills, change will not occur. This concurs with the idea of Kisa and Correnti (2015[65]) that teachers' lack of knowledge or existing beliefs and practices would hinder a smooth curriculum implementation. A smart policy design takes into account the existing capacity of stakeholders, but also ambitions to shape it in the future.

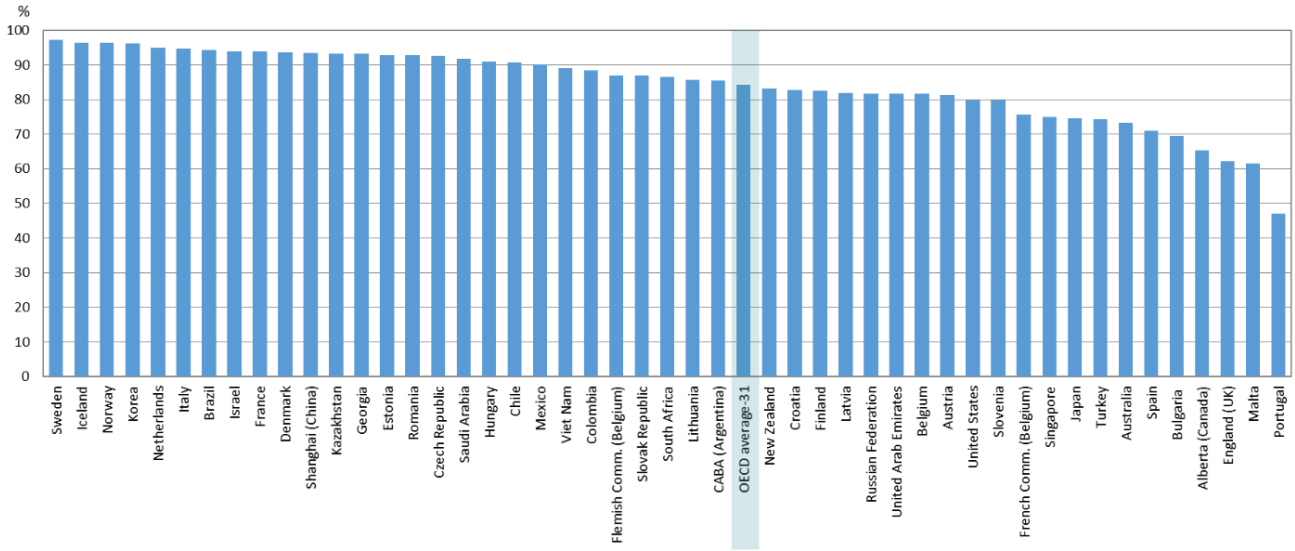
The trend of autonomy-centred curriculum enactment recognises the central role of teachers in curriculum development and implementation (van den Akker, 2010[10]). Given the understanding teachers have of their students' needs through their daily interactions with them, their input is particularly relevant for curriculum and instruction (Hargreaves and Fullan, 2012[66]).

A majority of principals across the OECD reports significant responsibility for teachers in choosing learning materials (75%),even though fewer principals report for teachers' responsibility in deciding which courses are offered (39%) (OECD, 2020[63]). The Teaching and Learning International Survey (TALIS) autonomy index in determining course content indicates that 84% of teachers on average across the OECD have control over determining course content in their target class (Figure 4.1). Yet, PISA data only reveal a moderate association between school autonomy and adaptive instruction (tailoring teaching to students' needs and helping students who struggle in a specific task) on average across OECD countries (OECD, 2016[67]; OECD, 2020[68]).

This highlights the need to factor teachers' effective autonomy in curriculum implementation. It implies to ensure that all teachers have adequate capacity to select, develop, or adapt the curriculum (Leat, Livingston and Priestley, 2013[69]). The design of a professional development strategy should be integral to any curriculum reform (section: The selection and professional development of teachers are key).

Figure 4.1. Teachers' autonomy in determining course content, TALIS 2018

Percentage of lower secondary teachers who "agree" or "strongly agree" that they have control over determining course content in their target class



Note: This percentage is calculated based on whether principals report that teachers have significant responsibility in at least four of the following six tasks: "establishing student disciplinary policies and procedures"; "approving students for admission to the school"; "establishing student assessment policies"; "choosing which learning materials are used"; "deciding which courses are offered" and "determining course content.

Source: OECD (2020[63]), *TALIS 2018 Results (Volume II): Teachers and School Leaders as Valued Professionals*, TALIS, https://dx.doi.org/10.1787/19cf08df-en

The TALIS report indicates that if teachers exert their agency, it is not necessarily in an isolated way. In effect, teachers with higher feelings of control over their target class also tend to report that they engage more often in professional collaboration activities with their peers, after controlling for teacher and class characteristics (OECD, 2020[63]). The way teachers interact and collaborate within the school also shapes implementation through, for instance, collective sense-making and peers pressure or "soft accountability" (Bryk, Camburn and Louis, 1999[70]; Coburn, 2001[71]; Priestley and Biesta, 2013[72]).

Teachers' opportunities for networking and collaboration can facilitate implementation when structured in particular ways. According to the literature, characteristics of supportive networks include: 1) shared commitment, responsibility, and goals focused on improving student learning; 2) teacher support for one another in innovating practices and encouraging risk-tasking; 3) adequate time and space to develop norms of engagement and build shared repertoires of practice, and 4) conversations focused on classroom instruction (McLaughlin and Talbert, 2001[73]; Little, 2002[74]; Stein and Coburn, 2008[75]; OECD, 2020[68]).

Teachers' agency and capacity of co-operation have been identified as key component of teachers' professionalism (Hargreaves and Fullan, 2012[76]; OECD, 2016[77]), which is in turn positively correlated with teacher self-efficacy (OECD, 2016[77]). Teachers' perceived self-efficacy also influences the way teachers will interact with the new curriculum. Wanberg and Banas (2000, p. 134[78]) define self-efficacy as "an individual's perceived ability to handle change in a given situation and to function well on the job despite new demands". In the case of curriculum reform, if teachers are confident they can manage original learning materials and ways of teaching and learning, they are more likely to have a positive attitude towards the new curriculum while facing less stress, fear and uncertainty

that might prevent them from implementing the reform. Studies have indeed suggested that faced with changes, individuals will not perform well if they are not confident about their abilities (Conner, 1993[79]) or that they would only undertake and perform activities that they judge they are capable of while avoiding those they perceive to exceed their capacity (Armenakis, Harris and Mossholder, 1993[80]). In short, low self-efficacy among teachers may result in a narrowed-down implemented curriculum, or in the failure to implement the new curriculum.

While a teacher's level of self-efficacy could be determined by circumstances that are beyond the scope of policies discussed here, such as individual traits and personal experience, policies and implementation strategies still have a role to play. Training and communication, for instance, are ways that could possibly increase teachers' own perceived capacity to manage changes (Eden and Aviram, 1993[81]; Peus et al., 2009[82]).

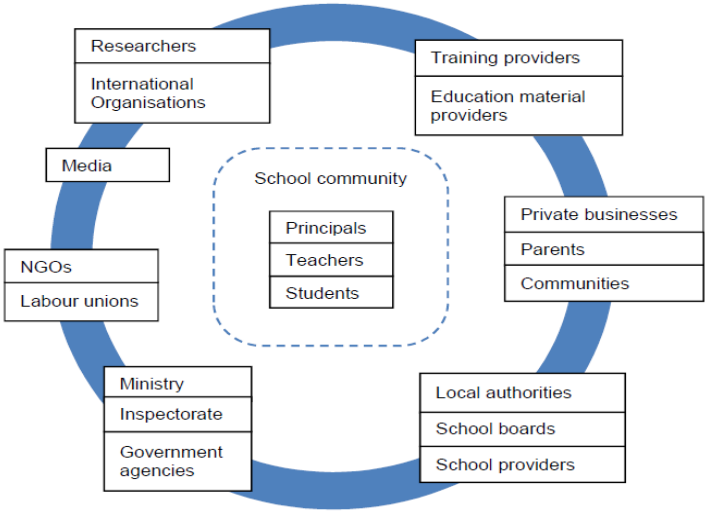
5. The engagement of stakeholders can drive the curriculum change

Education systems are now characterised by multi-level governance where the links between multiple actors operating at different levels are to a certain extent fluid and open to negotiation (Burns and Köster, 2016[83]). Against this backdrop, different stakeholders are more likely to exert their agency, either to support or oppose the curriculum reform, and influence the organisations or communities they are embedded in (Lemke and Harris-Wai, 2015[84]). This is why it is important to 1) identify relevant stakeholders to the curriculum reform and, 2) engage stakeholders in the implementation process to get their insights in the design of the curriculum and address their potential reactions against curriculum change.

In curriculum reform, stakeholders are individuals (e.g. teachers, parents, school principals, students and politicians), experts in subjects or pedagogy (scientific community) or collective entities (e.g. ministry of education, local authorities, school boards, teacher unions) participating in or affected by the curriculum change (Figure 5.1). Their engagement refers to the process that involves them at different stages, from designing the curriculum to rolling it out.

Often, there is a tendency in education to maintain the status quo and resist change in different countries (OECD, 2017[18]). Reforming is costly and uncertain in terms of outcomes in complex education systems, and stakeholders may exhibit risk adverse behaviours and favour traditional well-known practices (OECD, 2016[85]). This is why attitudes towards change have direct consequences on the outcomes of a reform implementation process: a positive perspective regarding a reform and the willingness to support it is a necessary condition for successful change (Miller, Johnson and Grau, 1994[86]; Covin and Kilmann, 1990[87]). Engaging stakeholders along the reform process helps mitigate this resistance to change. Moreover, adopting a participatory approach can enhance the outcomes, as it is based on professional expertise and can give political legitimacy: practitioners are best placed to know what needs to be reformed and how, and giving a voice to stakeholders helps to represent the interests of voters (McGinn and Welsh, 1999[88]).

Figure 5.1. Potential stakeholders in education



Source: Burns and Köster (2016[89]), *Governing Education in a Complex World*, https://dx.doi.org/10.1787/9789264255364-en

However, engaging stakeholders can take time, is complex and can lead to lack of results if not well organised. For effective implementation, the main issue is h*ow* stakeholders can be engaged in ways that would support the curriculum change. Several factors have been found to be important in engaging stakeholders, such as effective involvement, transparency, and communication.

5.1. Early involvement of stakeholders as a way to build support for the new curriculum

A curriculum reform can go against stakeholders' beliefs and practices. However, when stakeholders are involved early on in the reform process, they can shape and "make sense" of the new curriculum based on their existent belief system, and develop ownership that encourages their willingness to commit to the reform.

5.1.1. Individual and collective sense-making support implementation

Curriculum implementation involves a complex process in which stakeholders translate the curriculum policies into practices that suit their local context. During this process, how stakeholders make sense of the curriculum would shape their actions and decisions, and affect how they enact the curriculum (Spillane, 2000[90]; Coburn, 2006[91]; Spillane, Reiser and Reimer, 2002[92]). Sense-making could be seen as an "(inter)active and dynamic process by which individuals and groups make meaning from the environments in which they operate, which in turn orients their actions" (März and Kelchtermans, 2013[93]; Pietarinen, Pyhältö and Soini, 2017[22]). In other words, local actors would actively construct their understanding of the curriculum policies through the lens of their pre-existing beliefs and practices (Coburn, 2006[91]).

Sense-making in curriculum implementation, namely the interpretation process of curriculum policies, mediates how teachers implement the curriculum (Kelchtermans, 2009[94]). Studies show that teachers would select what to teach and what to exclude concerning the new curriculum based on their beliefs about what they regard as important for the pupils (Castro Superfine, Marshall and Kelso, 2015[3]). Teachers whose beliefs are more aligned with the curriculum reform tend to be the ones who apply the most teaching

practices required by the reform (Roehrig and Kruse, 2005[64]). Moreover, situating the new knowledge and associated practices with existing ones is a central tool through which teachers and other actors come to understand and enact new curriculum (Mellegård and Pettersen, 2016[36]).

Sense-making may also influence student engagement, which is in turn associated with higher levels of educational achievement and attainment (Klem and Connell, 2004[95]). Some countries have actively involved students in early design phases, such as the Netherlands (van Schaik, Voogt and Nieveen, 2017[96]) and Finland (Pietarinen, Pyhältö and Soini, 2017[22]), to incorporate student perspectives into curriculum design, and increase the relevance of curricular goals and values. The development of pedagogies that connect students' culture, passions and experiences to content, such as culturally responsive teaching (Gay, 2002[97]) and modalities of inquiry-based instruction (e.g. project-based learning, problem-based learning, design challenges) that encourage students to question, investigate, and take action on issues that matter to them (Larmer, Mergendoller and Boss, 2015[98]), also contribute to student sense-making and engagement.

As stakeholders are not working individually, their response to the curriculum reform will be shaped by their social environment. Collective sense-making is based on a "shared set of assumptions, norms, values and cultural artefacts" that can guide and evaluate stakeholders' actions (März and Kelchtermans, 2013[93]). In schools, it is sometimes referred to as "school culture" (Schein, 2010[99]), and influences subconsciously the perception and behaviours of individuals within the school and their response to the curriculum reform. Recognising this collective dynamic, Coburn (2006[91]) points out that the lack of coherent and shared sense-making at a collective level might pose obstacles for the curriculum reform. If teachers and school principals have conflicting interpretation of the curriculum change, it is difficult to see how the curriculum would be successfully implemented (Spillane, 2000[90]; Banner, Donnelly and Ryder, 2012[100]).

An intervention to foster sense-making will support the implementation of the reform. It can include targeted communication to disseminate the intention of the new curriculum, guidelines to articulate the new pedagogical practices with the former ones, participatory approaches such as feedback loops to gather information from stakeholders etc. (Box 5.1). At the collective level, professional learning communities or schools as learning organisations have the capacity to adapt to new circumstances thanks to collective learning, participatory leadership and leadership for change management (OECD, 2018[101]). The inclusion of diverse stakeholders in educator teams within design-based implementation research (DBIR) provides another example of collective sense-making. DBIR proposes to co-construct curriculum according to the following principles: 1) focusing on problems of practice through the perspectives of multiple stakeholders, 2) commitment to iterative, collaborative design, 3) emphasis on developing understanding of classroom learning and implementation, and 4) concern with developing capacity for systems-change (Penuel et al., 2011[102]).

These types of collaborative structures help develop collective sense-making and can further support the curriculum implementation since they 1) provide an arena for stakeholders to discuss and refine collectively the aim and possible outcomes of the new curriculum, 2) provide a source of continuous feedback and an extensive knowledge-sharing mechanism based on the multiple interactions characterising these structures, 3) reduce stakeholders' anxiety caused by the potential changes through clarifying the consequences of the reform, and 4) facilitate the shared interpretation of the reform and contribute to building curriculum coherence (Pietarinen, Pyhältö and Soini, 2017[22]).

Box 5.1. Engaging stakeholders to develop sense-making: country examples

Finland: Early inclusive consultation during curriculum design process

In Finland, the vision of the 2016 curriculum reform was documented in the National Core Curriculum, a document led by the state-level Finnish National Board of Education (FNBE). It explicitly defines the objectives of the curriculum reform and provides pedagogical guidelines for teachers (Vitikka, Krokfors and Hurmerinta, 2012[103]). Hundreds of professionals, such as representatives from universities, schools and parents' associations, participated in a 2.5-year curriculum design process. In addition, the curriculum draft was published on the Internet where anyone interested could comment (Lähdemäki, 2019[104]). As a result, the "noncompliance" issue was less of a topic in Finland's case as teachers and local municipalities were given a high level of autonomy. But this also means that the new curriculum relied heavily on teachers' capacity to use their own interpretation to develop the curriculum as well as collaborative efforts between actors in the municipalities and educational practitioners in schools (Pietarinen, Pyhältö and Soini, 2017[22]).

Singapore: Focus groups discussions during the planning phase

The curriculum cycle in Singapore follows a well-established pattern: "Plan (one year) – Develop (two years) – Implement (one year) – Review (two years)" that lasts around six years. During the first phase (Planning and Consultation) and the second phase (Design, Development and Trialling), stakeholders, such as employers, staff from next-level education institutions, school teachers etc., can provide input during focus group discussions (FGDs). On one hand, FGDs with external stakeholders gather feedback and suggestions from stakeholders (for instance Junior Colleges and Polytechnic Institutions comment on secondary curriculum, and universities comment on pre-university curriculum). On the other hand, FGDs with principals, heads of division, and teachers solicit suggestions to close gaps in current curriculum, and comments on preliminary curriculum ideas being explored by the Ministry of Education. This participatory approach contributes to a system that balances central directives with school autonomy: a "tight-loose-tight" system, where schools develop their own curriculum following national guidelines, and are held accountable at key stage national exams.

Source: Ministry of Education, Singapore (2012[105]), The Case of Singapore Rethinking Curriculum for the 21st Century.

Japan: Developing collective sense-making through the Lesson Study

The Lesson Study, a widespread method in primary school in Japan, used in particular in mathematics lessons, incites teachers to work together to identify specific teaching issues, spread good practices and update their knowledge. Usually, teachers work together to prepare a specific lesson on a topic where students have struggled, and nurture their reflexion with leading-edge academic literature. Then, one teacher teaches the lesson to students, while other teachers (sometimes even from other schools) observe and learn the new pedagogical approach.

The Lesson Study not only improves teaching practices over time, but also strengthens co-operation between teachers and potentially fosters the development of an inter-school network of teachers. This collaborative approach to working supports the ten-year curriculum cycle in Japan, as it develops collective sense-making, promotes a shared interpretation of the new curriculum, and contributes to building curriculum coherence.

Source: OECD (2018[44]), Education Policy in Japan: Building Bridges towards 2030, Reviews of National Policies for Education http://dx.doi.org/10.1787/9789264302402-en

5.1.2. Teacher's ownership of the new curriculum is essential to support change

The concept of ownership is more specific to teachers as implementers. Ownership in curriculum reform could be seen as "a mental or psychological state of feeling owner of an innovation, which develops through the teacher's mental and/or physical investment in it" (Ketelaar et al., 2012, p. 274[106]). The quality of sense-making moderates the teacher's degree of ownership of the innovation, whether the reform is adopted, rejected, or resisted by the teacher (Ketelaar et al., 2012[106]).

This is concurred by studies related to "ownership" in curriculum reform where teachers feel that the curriculum is "theirs" (Kärner and Krull, 2016[107]). The feeling of ownership conditions curriculum implementation, particularly through attitudes towards change (Box 5.2). First, ownership is accompanied by the willingness to assume responsibilities, risks, and sacrifices. Experienced responsibilities motivate stakeholders to invest time and energy to advance the cause of the curriculum reform. Second, ownership provides individuals with a sense of satisfaction related to psychic comfort, pleasure and security, a conducive condition for stakeholders to support and carry out the new curriculum (Pierce, Kostova and Dirks, 2003[108]).

Ownership can be strengthened through structured processes, such as the previously described DBIR, where teachers co-construct curriculum (Penuel et al., 2011[102]). A similar approach builds curricular capacity through collaborative design in teacher teams. Teacher learning is characterised by three elements: 1) mediated through the activity of developing concrete curriculum materials, 2) social in nature through solving problems and making decisions, including iterative interpretation and negotiation, and 3) situated and culturally embedded in the context of their own school (Voogt, Pieters and Handelzalts, 2016[109]; Pieters, Voogt and Pareja Roblin, 2019[110]).

However, the level of ownership depends on teachers' authority to speak on the curriculum, on their understanding of the students' needs and ability, and on the available resources that could make the reform work (Kirk and MacDonald, 2001[111]). In other words, little ownership can be expected from a teaching workforce with limited capacity. As ownership is also positively linked to autonomy, it leads to a positive orientation towards change when the change is self-initiated, evolutionary and additive, but may stimulate resistance when changes are imposed, revolutionary and subtractive (Pierce, Kostova and Dirks, 2003[108]).

Box 5.2. Engaging stakeholders to develop ownership: country examples

Wales: Building a network of pioneer schools

In Wales, the recent curriculum review started in 2015. During this process, the government has engaged schools by establishing a "Pioneer Schools Network" that has invited around 190 schools to work with local authorities, regional consortia, the education inspectorate (Estyn) and a range of experts on the design and implementation of the new curriculum. These schools are divided into three subgroups, and each group is involved in shaping one of the major curriculum reform strands, which are: designing and developing a digital competence framework (13 schools), designing and developing the curriculum arrangements (94 schools), and supporting the professional development and learning of the workforce (83 schools).

Each of the three strands of work has been responsible for specific policy initiatives to achieve its objectives. For example, the Pioneer Schools working on the professional development and learning of the workforce have been contributing to the development of a new framework of professional standards for teachers and formal leaders, the Professional Standards for Teaching and Leadership.

Source: OECD (2018[101]), Developing Schools as Learning Organisations in Wales, Implementing Education Policies, https://dx.doi.org/10.1787/9789264307193-en

Ireland: An ambitious three-phased national consultation

Ireland has embarked on a review of its senior cycle (upper secondary education), which has not been structurally reformed for over 20 years. The National Council for Curriculum and Assessment (NCCA) is leading the review, and engaged all key senior cycle stakeholders early in the policy process, to gather their perspective and to report to the Minister for Education and Skills based on their contributions.

The first phase (2016/2017) of the review consisted of identifying topics to explore in relation to upper secondary education, as well as the various approaches to conducting a curriculum review. To this end, the NCCA carefully examined national and international literature, and consulted with national stakeholders and international experts on their experience with curriculum reforms and reviews.

The second phase (2018/2019) of the review involved consultations at school level (through school-based reviews) whose results were further discussed and enriched at national level (through national seminars) with a wider range of education professionals. The NCCA selected a representative sample of 41 schools from the 80 that volunteered to participate in the school-based reviews. The school-based reviews took place in two thematic cycles, the first one investigating the purpose, strengths and challenges of current senior cycle education while the second one focused on pathways, programmes and flexibility. Each school was provided with a grant, access to relevant material, and was assigned an NCCA mentor for support. Students, teachers and parents of the 41 schools were invited to focus groups conducted by the NCCA mentor (for students) or by the teacher or the parent link for each school. Each cycle of the school-based reviews concluded with a series of national seminars in various parts of the country (Athlone, Cork, Dublin, Galway, Limerick, Sligo, and Waterford), which a wider range of stakeholders were invited to take part in. At the end of each series of seminars, the NCCA published and sent to schools a bulletin about the cycle results. In addition, all

materials produced in this review and discussions were published online for the general public to consult.

The third phase (2019) of the review consisted in the presentation of a document prepared by the NCCA to the public, for feedback. The document summarised the themes from the previous phases and identified areas for further development. The results of this phase will inform the final advisory report to be presented to the Minister for Education and Skills with the NCCA advice on the future development of senior cycle.

Source: OECD (2020[112]), Education in Ireland: An OECD Assessment of the Senior Cycle Review, Implementing Education Policies, https://dx.doi.org/10.1787/636bc6c1-en

5.1.3. School leaders are a key change actor

School leaders play a crucial role in curriculum reforms, as they can guide and mediate its effective implementation at the school level. They can create a culture that fosters changes and that are conducive for teacher and student learning (Thompson, Gregg and Niska, 2004[113]). Jackson and Davis (2000, p. 157[114]) state that "no single individual is more important to initiating and sustaining improvement in middle grades school students' performance than the school principal". The kind of leadership adopted depends on the level of capacity of an education system, especially at the school level. In environments with low school autonomy and capacity, central leadership is generally favoured (OECD, 2015[48]). In education systems where the teaching profession is highly developed, distributed leadership may be a more prevalent pattern as in New Zealand or in Japan (Pont, Nusche and Moorman, 2008[115]; OECD, 2018[44]).

In educational systems where school leaders have the responsibility for curriculum and exercise instructional leadership (OECD, 2016[67]), school leaders play a key role in initiating, communicating, and convincing teachers to implement the new curriculum. More importantly, they can set up the school processes for teachers to collaborate in the development of the curriculum, for targeted training and development to take place at the school level, and for including curriculum reform in their school development plans (OECD, 2019[116]). In systems where the principals' role is more administrative, school leaders can support the curriculum implementation by supporting teacher's professional development, promoting professional learning communities, an open arena to discuss the reform and conducive to developing collective sense-making. Particular approaches to school development, such as professional learning communities, can be conducive to curriculum reform as they can bring together school professionals to focus collectively on developing and implementing the curriculum. These are in turn positively associated with the speed of innovation adoption, such as a new curriculum (European Commission, 2017[117]; Stoll et al., 2006[11]).

5.2. A transparent system supports stakeholder engagement

The engagement of stakeholders in the implementation of the new curriculum will depend on the degree of transparency, how well stakeholders know the distribution of tasks. During a curriculum reform, roles may be reshaped, and tasks need to be allocated accordingly. However, given the range of governance and institutional arrangements across OECD countries, there is no "one-size-fits-all" curriculum policy structure (Box 5.3). Questions such as who is in charge of designing the new curriculum materials, what is expected from the teachers and the school leaders, may arise and require clear answers if the stakeholders are to take on their planned role.

For a specified context, defining a task allocation with concrete responsibilities for different stakeholders involved, would facilitate curriculum implementation (Viennet and Pont, 2017[8]; OECD, 2020[9]). This can be either done by policy makers or by those involved in shaping the implementation strategy. In some countries, there is a specific committee or agency devoted to the design of the curriculum. It may involve a range of stakeholders in consultation processes, such as the case of Ireland (Box 5.3).

This distribution of tasks could be published in a strategy document, for instance, but needs more importantly to be communicated, to ensure that all stakeholders are aware, and understand, what the new curriculum entails for them and how they are involved. This will not only reduce uncertainty but also contribute to stakeholders' sense-making reform and curriculum coherence.

Box 5.3. Allocating tasks in curriculum reform: country examples

France: A central counsel at the heart of curriculum design

France is a centralised state, and there is no established curriculum cycle, as the latest reforms have followed political changes (2002, 2007, 2008, and 2015). Overall, the curriculum design is the responsibility of the Ministry of Education, which mobilises to that end the Curriculum Superior Council (*Conseil Supérieur des Programmes,* CSP). The CSP defines guidelines, and appoints an expert group to elaborate the detailed syllabus. The expert group can also consult representatives of parents, teachers, educators etc. for additional insights. The curriculum project is submitted back to the CSP, then to the Education Higher Council (*Conseil Supérieur de l'Éducation*) and ultimately to the Minister of Education. Editors develop textbooks without governmental control.

Source: Gueudet, G. et al. (2017[118]), Curriculum in France: A National Frame in Transition.

Ireland: A central agency is responsible for curriculum implementation

In Ireland, a dedicated agency, the National Council for Curriculum and Assessment (NCCA), advises the Minister for Education and Skills in terms of curriculum. The NCCA leads developments in curriculum and assessment and supports the implementation of changes resulting from this work. It has a board with education stakeholder representatives to ensure wide participation. The curriculum not only sets what is to be taught, but how learning in the particular subject area is to be assessed. Teachers can choose freely the textbooks they will use.

Source: Ministry of Education and Skills, Ireland (2018[119]), Curriculum and Syllabus.

Japan: National guidelines frame school-based curriculum

The Japanese Ministry of Education (MEXT) revises the National Curriculum Standards about every ten years by determining a broad set of standards for all schools from kindergarten to upper secondary schools. The National Curriculum Standards provide curriculum guidelines and structure education programmes to ensure that they comply with a fixed standard of education throughout the country. It consists in a strong central document with local discretion for teachers to develop their own curriculum and reflect local specificities. Textbooks are chosen from the lists of MEXT-authorised textbooks by local Boards of Education for public schools and by school principals for national and private schools. Boards of education can also provide schools with additional

support to help them understand and comply with the new National Curriculum Standards.

Source: OECD (2018[44]), Education Policy in Japan: Building Bridges towards 2030, Reviews of National Policies for Education, http://dx.doi.org/10.1787/9789264302402-en

5.3. A targeted communication strategy contributes to building global support

Communication has been found to be "a vital component of any successful implementation plan" (Schweiger and Denisi, 1991[120]; Allen et al., 2007[121]). Providing quality information can facilitate openness and positive attitude towards change – by reducing uncertainty associated with change – and thus makes the new policies more likely to be implemented (Bordia et al., 2003[122]). Conversely, insufficient or imperfect communication might lead to uncertainty concerning different reform-related issues, such as the rationale of the change, the process of implementation, and the expected result of the change (Allen et al., 2007[121]).

Uncertainty often accompanies changes like curriculum reform. For instance, teachers might be unsure about their new roles and responsibilities, parents might not be certain about the new areas of learning or subjects their children will be taught, while students might need to adapt to new ways of learning and see their future at stake. Effective communication conveys information that is useful, accurate and timely from the perspective of stakeholders as it is updated as the reform evolves (Miller, Johnson and Grau, 1994[86]).

In addition, a cascading approach can be considered, with targeted communication for different administrative or governance levels (Allen et al., 2007[121]). This allows information to be tailored to different audiences (Box 5.4) but also to choose an appropriate medium to engage with stakeholders, as the trust vested in the communicator affects how they will interpret the information received (Carless, 2009[123]).

Box 5.4. Communication to support the curriculum reform in Wales

The new Curriculum for Wales 2022 is the cornerstone of the country's efforts to turn its education system from a performance-driven education with a narrow focus, to an education led by commonly defined, learner-centred purposes. It is embedded in "Education in Wales: Our National Mission", a plan for 2017-21 which presents the national vision for education and calls for all children and young people to achieve the four purposes of the new curriculum.

Wales' success in its support for the reform has been based on the inclusion of all key education stakeholders in the shaping of the national mission and the new curriculum, and the active communication strategy the Welsh Government and some of the intermediate actors have consistently adopted. The brand "Our National Mission" was developed and associated terms such as "transformational curriculum" and "enabling objectives" have effectively brought coherence and clarity to the development of the education reform journey, laying some strong basis for stakeholders to make this mission their own.

The Directorate's communication strategy used a variety of channels online, on paper and live. The Minister held Question & Answer sessions, was consistently present at events, along with the Directorate which was also active on social media, maintained a

blog to help stakeholders keep up with the reform, and worked with designers to make the published content easier to read. A constant presence of key figures such as the Minister and practitioners from all parts of Wales also helped disseminate the message. Careful monitoring of discussions both online and during events allowed the communication strategy to be adjusted, to clarify some issues with the curriculum policy, and debunk some of the myths through a variety of channels.

Source: OECD (2020[61]), Achieving the New Curriculum for Wales, Implementing Education Policies https://dx.doi.org/10.1787/4b483953-en

6. Transversal factors require consideration to ensure coherence around curriculum reform

The policy design and stakeholder engagement dimensions of the implementation framework focus on issues where policy makers have direct discretion upon, and can act to facilitate curriculum implementation. Contextual factors, which condition stakeholders' agency and ability to implement a reform, are equally important but sometimes difficult to adjust in the short-term. Part of the policy maker's task is to consider them when designing the policy and engaging stakeholders, and to aim at shaping some of these factors in the medium-term. For curriculum implementation, three key factors are analysed in the following sub-sections, resources, complementary policies, and institutions.

6.1. Assessing the available resources dedicated to curriculum change

Resources refer to the necessary inputs for the implementation of the new curriculum, and mainly consist of funding and technology (Viennet and Pont, 2017[8]; OECD, 2020[9]).

6.1.1. Establishing a transparent funding strategy

The level of available financial resources, but especially their perceived sustainability, determine the degree of implementation. For instance in Scotland, teachers considered issues relating to austerity to be the major impediments for the implementation of the Curriculum of Excellence. The lack of funding and the reductions in management increased the teachers' workload, but also generated anxiety and uncertainty among staff (Priestley and Minty, 2012[124]). In Alberta, research shows that the termination of funding of the Alberta Initiative for School Improvement in Canada has been the downfall of an educational programme that has borne fruit (Clausen, 2015[125]).

Resources directly relate to the long-term commitment of different actors, and the horizon of the curriculum vision. In the case where teachers perceive there is only temporary support, they may also consider curriculum change as temporary, and underinvest in updating content and practice. This calls for a transparent allocation of funding to support the curriculum, and a level of funding sufficient to cover not only the initial phase, but the whole implementation cycle (Viennet and Pont, 2017[8]; OECD, 2020[9]).

6.1.2. Exploring technology opportunities

In recent years, many countries have incorporated the competencies of using information and communication technologies (ICT) into the major goals of the curriculum reform. The implementation of new curriculums has also raised the issue of the use of different types of media, including both ICT and printed materials in the learning process. The 2015 OECD report, *Students, Computers and Learning: Making the Connection* (OECD, 2015[126])

highlighted the role of technology in significantly expanding students' access to knowledge. Technology provides platforms for collaboration in knowledge creation, where teachers can share and enrich teaching materials. For example, technology can enhance experiential learning, foster project-based and inquiry-based pedagogies, facilitate hands-on activities and co-operative learning, and deliver formative real-time assessment. It can also support learning and teaching communities with new tools, such as remote and virtual labs, highly interactive non-linear courseware based on state-of-the-art instructional design, sophisticated software for experimentation and simulation, social media and serious games.

However, according to an international study for policy makers on the use of ICT in education (Trucano, 2016[127]), policy makers need to carefully consider how best to utilise and integrate ICT, especially in the context of a new curriculum. The success of exploring technology opportunities depends on one hand, on the broadband and IT infrastructure, and its equal access among students, and on the other hand, on teachers' capacity to use ICT resources. The OECD Teaching and Learning International Survey (TALIS) has shown that if the participation in professional development in ICT skills for teaching has significantly increased between 2013 and 2018, the share of teachers in high level need for such professional development has remained stable (OECD, 2019[128]).

The most recent pandemic has also raised the issue of equity – can all students access technology in good conditions? – and health-related issues – are sustained screen activities health neutral? – in the use of technology at home for hybrid learning (Gouëdard, Pont and Viennet, 2020[129]). The exploration of technological opportunities should, therefore, be balanced by these topical concerns.

6.2. Curriculum reform requires a whole-of-system approach

Policies are not designed in a vacuum, and have to articulate with an existing policy framework. Complementary policies are related, either directly or indirectly, to the new policy, and may reinforce or weaken it if they are not taken into consideration (Desimone, 2002[130]). Sometimes a reform contradicts or competes with existing policies, and may create obstacles to effective implementation. Increasing teachers' workload (Berends, Bodilly and Kirby, 2002[131]) or forcing teachers to invest in one policy at the expense of the other (Porter et al., 1988[132]) are potential barriers to curriculum implementation.

Curriculum reforms are labour intensive, and their success can depend on the organisation of the workload for teachers and staff in schools (OECD, 2019[116]). In many countries, workload has become a central issue for the teaching profession, and it is becoming a concern for governments. Countries appear to be considering reorganising working time for teaching staff, reducing class sizes, hiring additional teachers or other approaches to alleviate the burden of teachers and ensure quality teaching (OECD, 2015[133]).

Aside this perennial challenge to the teaching profession, two critical policies are required to ensure coherence around the curriculum reform. These consist of the provision of adequate initial teacher education and professional development opportunities, and the alignment of the whole evaluation and assessment framework. Failing to develop these two policies concomitantly will likely undermine the reform, as teachers will not be equipped to teach the new curriculum and schools will not have adequate incentives to follow it.

6.2.1. The selection and professional development of teachers are key

Teacher initial and continuous professional development equips teachers with the skills and knowledge required for implementing the new curriculum (Desimone, 2002[130]; OECD, 2019[134]). In Finland, the 2014 curriculum reform required local municipalities and schools to develop their own curriculum according to national guidelines. Given that teachers are

highly professional, qualified and autonomous in Finland, this resulted in the implementation of a decentralised curriculum that was owned by the profession and strongly influenced school practices, the provision of education in municipalities, and also activated new school development programmes and educational research in Finland (Halinen, 2018[135]). On the contrary, in India, Batra (2005[136]) argued that the New Curriculum Framework 2005 (NCF) was not aligned with existing teacher's capacity. Particularly, the principles guiding the NCF, such as connecting knowledge to life outside school, enriching the curriculum beyond the textbook, taking learning away from mere rote memorisation, cannot be achieved through textbooks alone, but require the proactive engagement of the teacher. Batra considered that teachers did not possess the sufficient skills, the agency, to follow these principles. Consequently, he urged the government to redesign both pre-service and in-service teacher education programmes, to equip teachers with the adequate skills and to implement the curriculum in a way that would translate into better educational processes and outcomes (Batra, 2005[136]).

High-performing education systems, such as Singapore, Finland, Canada and Australia, have well-developed policies that train and support teachers as a profession (Darling-Hammond, 2017[137]). This process is continuous: starting from teacher selection and education and extending into lifelong professional development. In order to ensure that teachers have sufficient capacity to implement a new curriculum change, investments in the different stages of the teaching profession need to be made.

Updating criteria for teacher selection

Teacher selection criteria set out the qualifications of teachers that are desirable for the educational system. These criteria require alignment with the vision of the curriculum reform so that teachers are capable of implementing it, especially in the case of a competence-centred one. For instance, a biology teacher might also need to know how to guide discussions and moderate a debate on the consequences of genetic editing to the society in addition to teaching about the composition of cells and organisms. In Finland for instance, teacher candidates are observed in the classroom to ensure they have the required non-cognitive skills to teach transversal skills (Box 6.1). Basing the selection for initial teacher education on well-rounded selection criteria and intake procedures that cover a mix of cognitive and socio-emotional skills, could ensure that new teachers are able to adapt to the new curriculum.

Box 6.1. Selecting teachers in Finland

Teacher education programmes in Finland are extremely selective as they recruit from the top quartile of upper secondary graduates. Applicants are assessed based on their upper secondary school record, their extra-curricular activities, and their score in the matriculation exam, which is taken at the end of upper secondary school. Applicants must also take an entrance exam, which is a take-home multiple choice exam that assesses their ability to think critically and evaluate arguments in the education sciences. Having passed this first screening round, applicants are then observed in a teaching-like activity and interviewed; only candidates with a clear aptitude for teaching, in addition to strong academic performance, are admitted.

Source: National Centre on Education and the Economy (2017[138]), Finland: Teacher and Principal Quality.

Reviewing initial teacher education

Education institutions train candidates on "how to become teachers' by preparing them with the necessary pedagogical and content knowledge and skills to facilitate teaching and learning". A study conducted by the OECD on initial teacher education reviewed teacher policies in seven countries, including Australia, Japan, Korea, the Netherlands, Norway, the United States and Wales (United Kingdom, Box 6.2). The study concluded that countries should invest in initial teacher education and induction so candidate teachers would be able to adapt to the new curriculum (OECD, 2019[134]). This includes developing, alongside the ability to effectively transmit and communicate knowledge, familiarity with children and teenager psychology, understanding of the role of education in society, as well as technical skills in computer and technology.

Box 6.2. Policy measures for improving the quality of initial teacher education in Wales

In 2014, the Welsh Government mandated a review of curriculum and assessment arrangements from Foundation Phase to Key Stage 4 (compulsory education from 3 to 16 years old), which resulted in a report proposing a new vision for both curriculum and assessment (Donaldson, 2015[139]). Building on this report, another study listed several measures to improve quality of initial teacher education and align it to the curriculum proposal (Furlong, 2015[140]). All of these measures have now been agreed by the Welsh government and are currently being implemented:

1. That the Welsh Government, as a matter of priority revises the Standards for Newly Qualified Teachers.
2. That the Welsh Government establishes a revised accreditation process for providers of initial teacher education.
3. That the Welsh Government establishes a Teacher Education Accreditation Board within the Education Workforce Council for Wales.
4. That the role of Estyn (the Inspectorate in Wales) within initial teacher education be reviewed once a revised accreditation process is fully in place.
5. That Estyn's Guidance for Inspection for schools be revised to include specific recognition of the contribution of a school to initial teacher education.
6. That the Primary Bachelor of Arts qualified teaching status in its current form be phased out and replaced by a four-year degree with 50% of students' time spent in main subject departments.
7. That the Welsh Government monitors closely the impact of financial incentives on recruitment, particularly taking into account different funding levels in comparison with those available in England.
8. That WISERD (Wales Institute of Social & Economic Research, Data & Methods) Education be extended to include a pedagogical dimension linked to a network of five centres of pedagogical excellence across Wales.
9. That the Welsh Government agrees to resolve future provision of initial teacher education through a process of competitive tendering with the Teacher Education Accreditation Board making the final decision as to how many universities should become accredited providers.

Source: Furlong (2015[140]), Teaching Tomorrow's Teachers: Options for the Future of Initial Teacher Education in Wales.

Promoting continuous professional development

A continuous professional development model serves a dual purpose. On one hand, it fulfils the function of preparing teachers to implement reforms, and on the other hand, it supports teachers in contributing to and shaping education policy and practice (Little, 1993[141]). According to Kennedy's taxonomy of continuous professional development models (2005[142]), transmission models serve the first purpose, as they aim to equip teachers with the competences to implement an educational change. Conversely, transformative models support the second purpose, to empower teachers as shapers, promoters, and well-informed critics of reforms. In between lie the transitional models that can serve either purpose (Table 6.1).

Table 6.1. Spectrum of continuous professional development models

Model	Purpose
The training model The award-bearing model The deficit model The cascade model	Transmission
The standard-based model The coaching/mentoring model The community of practice model	Transitional
The action research model The transformative mode	Transformative

Increasing capacity for professional autonomy

Source: Kennedy (2005[142]), "Models of Continuing Professional Development: a framework for analysis", *Journal of In-service Education*, Vol. 31/2, pp. 235-250.

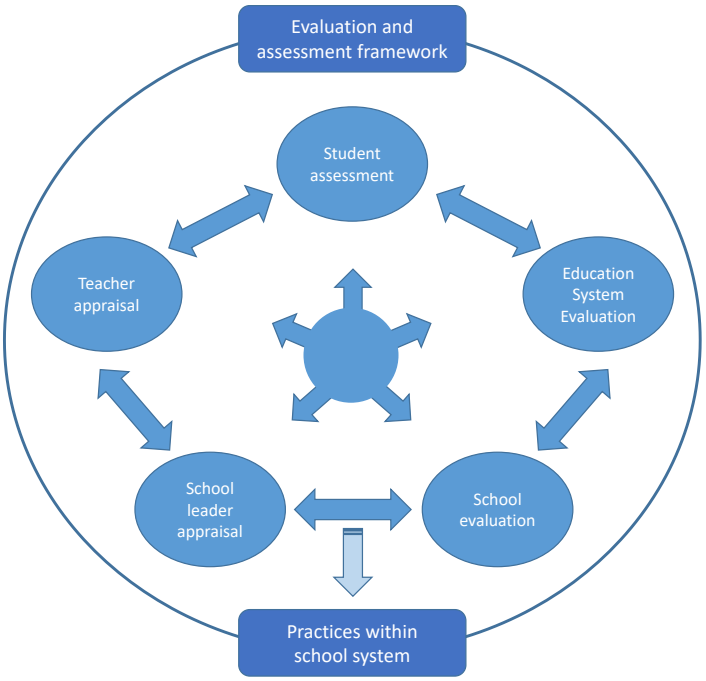
Whether transmission or transformative, continuous professional development for teachers in service is an important way to update skills, knowledge, and practices, and contribute to potential curriculum changes. Also, as the years spent in service are generally longer than the years spent on pre-service training, continuous professional development constitutes a critical component in building teacher capacity. There is consensus that teacher's professional development is crucial for a successful curriculum implementation (Desimone, 2002[130]). In fact, research suggests that learning opportunities aligned with new or redesigned curriculum are a key lever in attaining what Coburn (2003[143]) describes as depth of scale, or changes to teachers' beliefs, norms of social interaction, and pedagogical principles.

For example, Kisa and Correnti (2015[65]), through their survey research in the U.S., found that teachers were more likely to change their practices to match with the goal of the reform if the school provided relevant sustained professional development. Similarly, Garet et al. (2001[144]) showed that enhanced knowledge and skills have substantial influence on changing teaching practices. Allen and Penuel (2015[145]) see advantages of sustained professional development in increasing the likelihood of teachers engaging in instructional practices that are in line with the reformed standard. Desimone and others (2002[146]) suggest that if the professional development focuses on a particular teaching practice, teacher are more likely to use that practice in the classroom, which supports the claim that professional development could effectively initiate changes concerning curriculum reform. Darling-Hammond (2012[147]) points out that jurisdictions that often rank high in international rankings, such as Finland, Hong Kong, Singapore, South Korea and Japan, are also the ones that invest in teachers and support them throughout their careers.

6.2.2. Aligning the evaluation and assessment framework to the new curriculum

As the new curriculum intends to change what students should learn and what should be taught through the education system, the "plan for learning" (van den Akker, 2010[10]), updating practices within the school system is required. It implies to review and align the whole evaluation and assessment framework (Figure 6.1) to bring coherence around the curriculum reform.

Figure 6.1. The OECD framework of evaluation and assessment



Source: Adapted from OECD (2013[148]), Synergies for Better Learning: An International Perspective on Evaluation and Assessment, http://dx.doi.org/10.1787/9789264190658-en.

Since the curriculum reform may define new roles and/or review task allocation, accountability mechanisms are often put into place to ensure that stakeholders take responsibility for their actions and are held accountable for what they are supposed to deliver concerning their expected roles (Cerna, 2014[149]; Pierre and Peters, 2005[150]). Aligning accountability mechanisms to curriculum reform can provide incentives to the different stakeholders to adapt their practices and concentrate on the implementation of the new curriculum (Figlio et al., 2010[151]).

Table 6.2 summarises the different existing types of accountability for schools more generally. The balance between vertical and horizontal accountability varies across educational systems, but Hooge et al. (2012[152]) have observed a trend in shifting from regulatory school accountability to school performance accountability. Moreover, they claim that combining various and complementary forms of accountability, particularly by incorporating horizontal accountability mechanisms, could foster transparency in the educational system and increase the quality of education.

However, Fullan (2011[153]) warns against unintended consequences that may arise when policy makers overly rely on, although important, "wrong" drivers of change. Such "wrong" drivers include accountability, when for instance, test results and teacher appraisal are used to reward or punish teachers and schools, and capacity building is neglected.

Fullan proposes that an effective curriculum implementation relies on a whole-of-system approach, which implies, among others, to balance accountability measures with developmental opportunities, (Fullan, 2011[153]).

Table 6.2. Types of school accountability

Types of school accountability	
Vertical	**Regulatory school accountability:** Compliance with laws and regulations; focuses on inputs and processes within the school. Mechanism: reporting to higher level of school authority.
	School performance accountability: Periodic school evaluations. Mechanisms include: 1) standardised student testing, 2) public reporting of school performance, and 3) rewards or sanctions.
Horizontal	**Professional school accountability:** Professional standards for teachers and other educational staff. Mechanisms: credible, useful standards and the creation of professional learning communities.
	Multiple school accountability: Involving students, parents, communities and other stakeholders in formulating strategies, decision making, and evaluation.

Source: Hooge, E., T. Burns and H. Wilkoszewski (Hooge, Burns and Wilkoszewski, 2012[152]), "Looking Beyond the Numbers: Stakeholders and Multiple School Accountability", *OECD Education Working Papers*, No. 85, https://dx.doi.org/10.1787/5k91dl7ct6q6-en

Student assessment

Student assessment helps focus attention on the learning progress and outcomes of each student. Students need clarity about learning goals and evaluation criteria to measure progress and inform future learning. Teachers need assessment information to target future teaching and improve classroom instruction (OECD, 2013[148]). Curriculum renewal involves rethinking the scope, content and instrument of assessment so that it is aligned to changes to curricular goals, content, materials, and pedagogies. Assessments, particularly high-stakes assessments, impact what is taught, and ultimately, what students learn (OECD, 2020[68]). The assessments that dictate school accountability evaluations, matriculation, and entrance into post-secondary institutions are, therefore, tipping points, since they can drive the whole educational system. Their alignment with curriculum changes is necessary to induce global change in practices and adoption of the redesigned curricular goals (OECD, 2020[68]; OECD, 2019[116]).

Teacher and school leader appraisals

Teacher appraisal refers to the evaluation of individual teachers to make a judgement about their competencies and performance and/or to provide feedback to support the improvement of their practice (OECD, 2013[148]). Teachers may be wary to engage in new pedagogies or assessment methods to enact the new curriculum if these practices are not formally recognised. This is why professional standards (professional school accountability, Table 6.2) describing the skills, knowledge, and behaviours that characterise excellent practice, require updating according to the new curriculum requirements (Box 6.3).

School leader appraisal refers to the assessment of school leader's competences for performance management, employment-related decisions and/or rewards purposes (OECD, 2013[148]). The role of school leaders in mediating the curriculum implementation is critical, as they can create a culture of change, and initiate and sustain improvement at the school level (Thompson, Gregg and Niska, 2004[113]). In educational systems where school leaders are expected to exercise instructional leadership, their appraisals also need to take into account how they set up school processes for teachers to collaborate in the development of the curriculum.

School evaluation

School evaluation refers to the analysis of the following elements at the school level: the effectiveness of the structures and processes in place, the implementation of national educational policies and regulations, the quality of student learning outcomes, and the capacity for schools to improve. In many countries, school evaluation of these aspects takes a dual form. On one hand, self-evaluation consists in an internal review, and on the other hand, school external evaluation is led by specific national or state institutions, such as, for instance, Inspectorates or Quality Review Agencies (OECD, 2013[148]). School performance accountability (Table 6.2) needs to reflect the new objectives of the curriculum, and both the frameworks for internal and external evaluation have to be updated accordingly (Box 6.3). Flat organisational structures (Box 6.4) that favour collective sense-making, could be considered as a softer, but not less effective (Hudson, 2011[154]), approach to accountability.

A majority of countries (80%) taking part in the OECD International Synthesis Report on Curriculum Redesign reported that schools provide a first layer of curriculum monitoring within schools' self-evaluations (OECD, 2020[68]). Updated school reporting should also feed into meaningful external evaluation, geared towards development rather than accountability during that period of change, to support various initiatives to develop and unfold the curriculum at the school level (Fullan, 2011[153]).

Box 6.3. A national resource for school improvement in Wales

To ensure coherence between the evaluation and assessment framework and the curriculum reform (the new Curriculum for Wales 2022), Estyn, the Welsh education and training inspectorate, has developed, with the OECD, schools, local authorities and regional consortia, a school self-evaluation toolkit to support consistent levels of high quality school improvement work. It 1) develops a national definition for school improvement processes, 2) agrees on a national purpose for this work, and 3) defines a set of principles to support effective school improvement processes. Estyn is currently updating its own external evaluation processes to reflect the expected new school self-evaluation. This endeavour attempts to update the Welsh evaluation and assessment framework by aligning school improvement processes with the new curriculum objectives.

Source: Estyn (2019[155]), A National Resource for School Improvement.

Box 6.4. The communities of schools in New Zealand

In 2014, New Zealand departed from the reliance on school-self management to provide good quality and equitable education. The new policy, Investing in Educational Success (IES), provided NZD 359 million over four years, with the intent of lifting student achievement in all schools. This initiative aimed at developing new teaching and leadership roles in communities of schools.

A Community of Schools (CoS) is a group of schools, around ten on average, approved to receive resourcing under the IES initiative. They are formed voluntarily. By the end of 2014, 11 CoS were formed, but in September 2016, 148 CoS had been formed,

involving more than half the country's schools.

The schools of a CoS work together to identify their achievement challenges and frame them in measurable student outcomes. This could include matters such as student attendance and engagement, achievement, transitions between different levels or types of schools, and student well-being.

The interest of a CoS lies on the identification of challenges that are specific to the community and reflect the particular needs of the students. The collaborative nature of the CoS is expressed both horizontally and vertically. It allows time for teachers to work together, and draw on each other's skills, knowledge and experience, while involving the wider community.

Source: Wylie (2016[156]), Communities of Learning | Kāhui Ako: The Emergent Stage - Findings from the New Zealand Council for Educational Research National Survey of Primary and Intermediate Schools 2016, New Zealand Council for Educational Research, Wellington

Education system evaluation

Education system evaluation refers to the evaluation of an education system to provide accountability information to the public and to inform policies to improve educational processes and outcomes (OECD, 2013[148]). System evaluation can support the monitoring of the implementation of the curriculum, and contribute to the transparency of the educational system. It relies on indicator frameworks, tools (national assessments, surveys, diagnosis assessments etc.), and processes (research agendas, ad hoc reviews, and dialogues between sub-national education systems, governmental agencies, local authorities, and schools etc.) that need to reflect the new objectives and requirements of the curriculum (Box 4.4), and gather information relevant to curriculum implementation. For instance, teacher training data (results of teacher assessments during teacher training or data on the number of teacher training sessions conducted), teacher and school surveys can provide evidence on changes in teacher knowledge, attitudes, and beliefs about curriculum changes (OECD, 2020[68]).

System evaluation implies data collection to create feedback loops that serve as a learning tool for stakeholders or policy makers to track their progress or to know what needs to be improved concerning the curriculum reform (Eshuis and Van Woerkum, 2003[157]). Integral to the evaluation and assessment framework, monitoring serves a dual purpose: accountability and development. How this two-fold objective is pursued may condition the level of trust among stakeholders and influence the implementation of the curriculum. Seen as a learning tool that contributes to a shared goal, monitoring could increase trust among stakeholders and create an atmosphere of co-operation. On the contrary, perceived as a control instrument for surveillance, it might cultivate distrust and diminish the intrinsic motivation of stakeholders (Enzle and Anderson, 1993[158]).

Designing the adequate monitoring system that provides incentives while building trust among stakeholders, is highly contextual. It depends on the existing trust among stakeholders (Creed and Miles, 1996[159]; Rousseau et al., 1998[160]), stakeholders' capacity and autonomy level (Langfred, 2004[161]), and the stage of implementation (Holzman, 2012[162]). Depending on these characteristics, a country might opt for an external, internal, or in-between monitoring system for curriculum implementation. In systems where there is a higher level of capacity, and thus more room for autonomy, there can be correspondingly a higher level of trust, and lower need for centrally imposed accountability measures. In such systems, evaluation may be chosen to be conducted internally, by the actors themselves involved, such as teachers in Finland (Hälinen and Holappa, 2013[163])

or Japan (Box 4.3). On the other hand, in systems where more structure is needed in the form of both support and accountability, evaluation can be carried out externally by a more central organ, such as the case in Wales (Box 4.4).

At a time when teachers are more and more central in the process of curriculum renewal (Braun, Maguire and Ball, 2010[6]), their data literacy, and the availability of quality information, conditions how monitoring and evaluation can serve the implementation of the new curriculum (Earl and Katz, 2006[164]). Data literacy refers to a process that involves several capacities, such as knowing what data is needed and why; knowing where to locate it; seeing its limitation; and knowing how to interpret it. However, data literacy should not be restricted to teachers, but also extend to local authorities to reflect on school performance and development plans, and central authorities to pilot the system effectively (Ozga, 2009[165]).

6.3. Taking into account existing governance arrangements

Governance arrangements in a country may be more or less conducive to curriculum reform. They can include governance approaches, institutions as well as cultural and other implicit rules that can affect how education systems function. Which institutions participate in curriculum development influences the implementation strategy. In Japan, where the National Curriculum Standards are revised every ten years, the Ministry of Education sets overarching goals for education, while schools can develop their own curriculum following these guidelines. However, to ensure the national standards are respected, the boards of education at the prefectural level provide schools with additional pedagogical support (OECD, 2018[44]). The institutional structure in Japan allows the central government to grant schools autonomy in terms of curriculum, as the high teacher professionalism is supported by a prefectural structure guiding implementation locally.

Institutions also refer to the explicit and implicit rules that affect individual behaviours and decision making within an organisation. In an educational setting, explicit rules such as laws or regulations confer authority and responsibilities to different levels of educational institutions. Implicit rules might refer to the incentives guiding individual behaviours, teachers' pedagogical practices, co-operation culture, principals' managerial style, the level of trust among individuals and towards certain organisations, etc. Failing to take into accounts these characteristics when designing the curriculum may undermine implementation, for instance, if teachers with low autonomy are expected to design co-operatively school-based curriculum, or if a mistrusted inspectorate has to support schools in updating pedagogical practices.

In particular, a key part of the institutional setting consists in the level of centralisation-decentralisation of education governance. There are reasons for moving towards either end of this spectrum (Erss et al., 2014[166]). On one hand, a decentralised set-up relies on local and school-specific knowledge and institutions to find the best solutions and to allocate efficiently resources (Žakelj, Barle and Cankar, 2013[167]). It fosters teachers' agency as teachers are granted greater autonomy and take on more responsibilities in curriculum implementation, and develops sense-making and ownership, which are crucial to create buy-in from local stakeholders who are the frontline implementers of the curriculum reform. On the other hand, a decentralised system might worsen inequalities among schools and compromise student performance if resources and education quality are not equalised. This is why some believe that a relatively centralised system, with its regulative measures, could generate structure and uniformity across the educational system, and thus increase system-wide results in an equitable manner (Nieveen and Kuiper, 2012[168]).

Nevertheless, curriculum reforms have followed a trend shifting from a centralised institutional setting to a decentralised one. This fundamental shift has direct consequences on the implementation, including the design, of the curriculum reform. This paradigm shift is referred to as top-down versus bottom-up approaches (Pietarinen, Pyhältö and Soini, 2017[22]), regulation versus deregulation (Nieveen and Kuiper, 2012[168]), or prescription versus autonomy (Norman, 1998[169]). While the move from a centralised setting to a decentralised one is more often observed, "reverse pendulum swings" also occur. The question concerning the ideal institutional set-up for curriculum reform is how to strike "a good balance between school autonomy (freedom) and regulations (boundaries)" (Nieveen and Kuiper, 2012[168]). Since there is no "one-size-fits-all" model that guarantees effective curriculum implementation regardless of the context, countries still debate the degree of decentralisation to achieve and how to organise their curriculum development process accordingly (Kuiper and Berkvens, 2013[49]; Erss et al., 2014[166]; Viirpalu, Krull and Mikser, 2014[170]). A possible approach is for national authorities to agree on general principles for curricular goals and objectives while allowing enough flexibility, within agreed parameters, to better meet local needs (OECD, 2013[148]).

7. Shaping a coherent curriculum implementation strategy

Countries consider curriculum reform as an important and necessary measure to make schools enter the 21st century and respond to a fast-changing world. This paper intends to document how to initiate such change in the most suitable and effective way, by applying a generic education policy implementation framework (Viennet and Pont, 2017[8]; OECD, 2020[9]) to the curriculum reform literature. It enriches the analysis with successful practices and examples from different countries, and concludes with a specific resource for countries to make the lessons learned actionable.

A smart policy design implies developing a curriculum that aims to reach clear objectives, according to a robust theory of change, to realise an educational vision. It takes into account the existing capacity, develops ways to adjust it in the medium-term, and considers the available resources and contextual factors that will influence the implementation.

In complex environments, stakeholders' agency plays a pivotal role in the implementation process. Ideally, the vision guiding the curriculum has been co-constructed with stakeholders, building public support and aligning interests. The involvement of stakeholders' at different stages of the curriculum elaboration depends on the resources available, and is fostered by the transparency of the accountability relationships, the diffusion and use of data, and the existence of feedback loops to adjust and monitor its development.

Contextual factors will highly influence the unfolding, or development, of the curriculum on the ground, and need to be factored in the policy design. Adequate resources must be provisioned and the institutional setting can be built upon to provide targeted support to different stakeholders. A whole-of-system approach can ensure the new curriculum is supported by the required complementary policies.

The interdependence between these three dimensions highlights the non-linearity of a coherent implementation strategy, and the need to adopt a holistic point of view when renewing the curriculum, rather than a fragmented approach of disparate policy initiatives. To this end, an effective implementation strategy will consider these dimensions from an action-oriented perspective, in terms of what, how, when, who and how to ensure that curriculum change effectively reaches the classroom.

7.1. The new curriculum is a means to achieve an educational vision

As societies' goals for education evolve and new educational issues arise, countries have initiated curriculum reforms. They represent an opportunity to achieve an educational vision since the objectives of learning and the way learning takes place are updated. To support this change, a theory of change grounded on scientific evidence or robust trials would ideally lay out a logical chain of events that links the vision to the proposed curriculum reform.

Monitoring curriculum implementation is a balancing act. Curriculum reforms have previously been seen from a "top-down" perspective, and the development of indicators meant to measure the "fidelity" of implementation not only lies at odds with teachers' increased autonomy in terms of curriculum development, but has also been proven counterproductive. Although some sharp objectives may help check curriculum implementation is on track on specific points, they need to be balanced by more general ones, to avoid narrowing or toning down the scope of the curriculum for the sake of measurement.

Educational change takes time, and some countries have successfully established a periodic curriculum cycle to deflate the political dimension of curriculum change, the cycle following its own pace towards a non-partisan vision of education. Phasing-in and pilot studies can keep a short-term dynamic alive and effectively support the implementation.

Many countries establish a curriculum framework to ensure coherence around the curriculum and facilitate curriculum implementation. Several models (product or process) and curriculum designs (content-, objective-, or competency-based approach) can support a country's educational vision. The development of standards to guide the implementation (teachers' qualifications, teaching loads, class size, teaching materials, etc.) and delimit learning objectives (national content standards) is also usual in some countries but has been criticised by some educators as it may narrow down the curriculum experience to what is tested, instead of focusing on what is important.

7.2. Stakeholders are the main drivers of the curriculum change

Some processes have been proven necessary for effective curriculum implementation, as they foster ownership, individual and collective sense-making. They include effective communication, guidelines to articulate the new pedagogical practices with the former ones and participatory approaches such as national consultations, feedback loops, design-based implementation research, capacity building through collaborative design in teacher teams, and the development of responsive teaching to students' interests. The role of teachers and school leaders is pivotal in initiating and sustaining curriculum implementation, and little can be achieved, and sustained, without their engagement.

To be effective, all stakeholders need to be aware, and understand, what the curriculum implementation strategy entails for them and how they are involved. A transparent system includes a clear task allocation that has been shaped by and is communicated to all.

Communication plays a critical role in engaging stakeholders. Providing quality and timely information can facilitate openness and positive attitude towards change, thus making the new curriculum more likely to be implemented. The effectiveness of the communication strategy relies on selecting an appropriate medium and language to engage with stakeholders, as the trust vested in the communicator affects how the received information will be interpreted.

7.3. Curriculum reforms require a holistic approach

Different kinds of resources will influence the curriculum implementation. Particularly, the perceived sustainability of the funding strategy conditions the long-term commitment of different actors. Also, new technology opportunities may include individualised teaching, inquiry-based pedagogies, or co-operative learning, and support specific objectives of the new curriculum. They nonetheless require to consider on one hand the broadband and IT infrastructure, and its equal access among students, and on the other hand, teachers' capacity to use ICT resources.

Curriculum reforms are transversal policies, and fragmented approaches can produce inefficiencies and potential synergies loss. Two critical policies are necessary to ensure coherence around the curriculum reform: the provision of adequate initial teacher education and professional development opportunities, and the alignment of the evaluation and assessment framework with the requirements of the new curriculum.

Existing governance arrangements, such as the institutional bodies and the explicit and implicit rules that affect individual behaviours and decision making within an organisation, shape curriculum implementation. In particular, set-ups on both ends of the centralisation-decentralisation spectrum of education governance have been observed. While decentralised systems favour the development of a local curriculum relying on teachers' capacity and agency, centralised systems could generate structure and uniformity across the educational system, and thus increase system-wide results in an equitable manner.

7.4. Planning a coherent implementation strategy

Planning curriculum implementation requires careful thinking about the three key dimensions presented above, and their translation into a set of concrete actions to shape a coherent implementation strategy. Table 7.1 presents a resource for reflection on how to move forward with or assess a curriculum implementation strategy. It displays the dimensions and actions that an education system could consider to move forward, through actionable measures such as the clear attribution of responsibilities, dedicated resources, indicators to monitor progress, and an indicative timeline to guide stakeholders. Curriculum reform is a national matter, and there is no ''one-size-fits-all'' approach for curriculum implementation. This is why this paper presents these as actions to allow policy makers / implementers to adapt it to their own context.

Table 7.1. A tool for planning a coherent implementation strategy

Implementation dimensions	Proposed implementation actions	Who?	Resources	Indicators	When?
Designing a new curriculum to achieve an educational vision					
Co-construct with stakeholders a vision for the new curriculum.	– Develop a rationale to justify the new curriculum: future-oriented and/or an answer to a well-identified issue. – Connect the new curriculum to clear objectives through a robust theory of change. – Define the associated indicators to monitor objectives. – Establish a periodic curriculum cycle. – Consider curriculum trialling, phasing-in, and pilot studies to strengthen the curriculum justification and maintain implementation momentum.				
Develop a curriculum model that is aligned with the education vision.	– Establish a curriculum framework and select the curriculum model and design. – Develop standards (teacher qualifications, educational resources and learning materials, management and evaluation) to guide the implementation and content standards to delimit learning objectives. – Update teaching materials to alleviate teachers' workload and allow teachers to focus on students' learning progress.				
Engaging stakeholders to drive the curriculum change					
Involve stakeholders early to build large support for the new curriculum.	– Consult a wide range of stakeholders to gather comprehensive feedback on expectations and experience, and contribute to define the national vision of the curriculum. – Communicate to disseminate the intention of the new curriculum. – Develop guidelines to articulate the new pedagogical practices with the former ones to help teachers and other actors understand and enact new curriculum. – Promote school-based and network activities (professional learning communities, design-based implementation research, capacity building through collaborative design in teacher teams, etc.) to foster sense-making and ownership. – Inform school leaders continuously and provide them with adequate support, as they are a pivotal change agent.				
Establish a transparent system for the curriculum renewal.	Ensure that the task allocation is clear to all stakeholders.				
Establish a targeted communication strategy tailored to the needs of different stakeholders.	– Set a single repository (usually a website) gathering all up-to-date information about the curriculum implementation and make it easily accessible to stakeholders. – Communicate about the rationale for the curriculum change, the objectives to follow up on, the timeline, the distribution of tasks, the expected responsibilities of stakeholders and their accountability relationships. – Select an appropriate medium and language to engage with different types of stakeholders.				
Building coherence around curriculum reform					
Assess the available financial and technological resources.	– Establish a transparent and sustainable funding strategy to secure the long-term commitment of different actors. – Explore technology opportunities to foster for instance individualised teaching, inquiry-based pedagogies, or co-operative learning. – Consider equity- and health- related issues alongside technology opportunities.				

Implementation dimensions	Proposed implementation actions	Who?	Resources	Indicators	When?
Adopt a whole-of-system approach.	– Base initial teacher education on well-rounded criteria that reflect the range of cognitive and socio-emotional skills of the new curriculum. – Review initial teacher education and continuous professional development targeting new pedagogies and updated assessment practices. – Favour professional development that involves substantial number of contact hours and that lasts over a period of time. – Rethink the scope, content and instrument of student assessment, and particularly assessments that dictate school accountability evaluations and entrance into post-secondary institutions, and drive the whole educational system. – Update teachers and school leaders' appraisal, and review professional standards describing the skills, knowledge, and behaviours that characterise excellent practice, if necessary. – Align school self- and external evaluation with the new curriculum and gear them towards development rather than accountability. – Update the monitoring system to reflect the new objectives of the curriculum, and foster its use as a learning and development tool that contributes to a shared goal. – Gather evidence from teacher and school surveys, or compute new indicators (such as results of teacher assessments during teacher training or data on the number of teacher training sessions conducted) to assess changes in teacher knowledge, attitudes, and beliefs. – Provide professional development for stakeholders to build data literacy and improve the use of the monitoring system.				
Build on existing institutional arrangements.	– Capitalise on the experience of institutional bodies (inspectorate, boards of education) to support schools in their curriculum implementation. – Ensure that the task allocation is coherent with the centralisation-decentralisation balance in the educational system. – Adapt the level of central support to the local teaching and leadership capacity.				

References

Allen, C. and W. Penuel (2015), "Studying Teachers' Sensemaking to Investigate Teachers' Responses to Professional Development Focused on New Standards", *Journal of Teacher Education*, Vol. 66/2, pp. 136-149, http://dx.doi.org/10.1177/0022487114560646. [145]

Allen, J. et al. (2007), "Uncertainty during Organizational Change: Managing Perceptions through Communication", *Journal of Change Management*, Vol. 7/2, pp. 187-210, http://dx.doi.org/10.1080/14697010701563379. [121]

Amadio, M. et al. (2016), "What makes a quality curriculum?", *Current and critical issues in the curriculum and learning*, No. 2, UNESCO-IBE, Geneva, http://unesdoc.unesco.org/images/0024/002439/243975e.pdf (accessed on 28 August 2018). [13]

Armenakis, A., S. Harris and K. Mossholder (1993), "Creating Readiness for Organizational Change", *Human Relations*, Vol. 46/6, pp. 681-703, http://dx.doi.org/10.1177/001872679304600601. [80]

Baker, E. et al. (2010), "Problems with the Use of Student Test Scores to Evaluate Teachers", *Briefing Paper*, No. 278, Economic Policy Institute, Washington, https://eric.ed.gov/?id=ED516803 (accessed on 17 September 2018). [38]

Banner, I., J. Donnelly and J. Ryder (2012), "Policy networks and boundary objects: Enacting curriculum reform in the absence of consensus", *Journal of Curriculum Studies*, Vol. 44/5, pp. 577-598, http://dx.doi.org/10.1080/00220272.2012.699558. [100]

Batra, P. (2005), "Voice and Agency of Teachers: Missing Link in National Curriculum Framework 2005", *Economic and Political Weekly*, Vol. 40/40, pp. 4347-4356, http://dx.doi.org/10.2307/4417232. [136]

Benavot, A. (2011), "Improving the provision of quality education: Perspectives from textbook research", *Journal of International Cooperation in Education*, Vol. 14, pp. 1-16. [26]

Berends, M., S. Bodilly and S. Kirby (2002), *Facing the Challenges of Whole-School Reform: New American Schools After a Decade*, RAND Corporation, https://www.rand.org/pubs/monograph_reports/MR1498.html. [131]

Bergsmann, E. et al. (2015), "Evaluation of competence-based teaching in higher education: From theory to practice", *Evaluation and Program Planning*, Vol. 52, pp. 1-9, http://dx.doi.org/10.1016/J.EVALPROGPLAN.2015.03.001. [29]

Bordia, P. et al. (2003), "Uncertainty During Organizational Change: Types, Consequences, and Management Strategies", *Journal of Business and Psychology*, Vol. 18/4, pp. 507-532, http://dx.doi.org/10.1023/b:jobu.0000028449.99127.f7. [122]

Boser, U., M. Chingos and C. Straus (2015), *The Hidden Value of Curriculum Reform Do States and Districts Receive the Most Bang for Their Curriculum Buck?*, https://cdn.americanprogress.org/wp-content/uploads/2015/10/06111518/CurriculumMatters-report.pdf. [16]

Braun, A., M. Maguire and S. Ball (2010), "Policy enactments in the UK secondary school: examining policy, practice and school positioning", *Journal of Education Policy*, Vol. 25/4, pp. 547-560, http://dx.doi.org/10.1080/02680931003698544org/10.1080/02680931003698544. [6]

Bryk, A., E. Camburn and K. Louis (1999), "Professional Community in Chicago Elementary Schools: Facilitating Factors and Organizational Consequences", *Educational Administration Quarterly*, Vol. 35/5, pp. 751-781, http://dx.doi.org/10.1177/0013161x99355004. [70]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, Educational Research and Innovation, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264255364-en. [83]

Burns, T. and F. Köster (eds.) (2016), *Governing Education in a Complex World*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264255364-en. [89]

Burns, T., F. Köster and M. Fuster (2016), *Education Governance in Action: Lessons from Case Studies*, Educational Research and Innovation, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264262829-en. [50]

Carless, D. (2009), "Trust, distrust and their impact on assessment reform", *Assessment & Evaluation in Higher Education*, Vol. 34/1, pp. 79-89, http://dx.doi.org/10.1080/02602930801895786. [123]

Castro Superfine, A., A. Marshall and C. Kelso (2015), "Fidelity of implementation: bringing written curriculum materials into the equation", *The Curriculum Journal*, Vol. 26/1, pp. 164-191, http://dx.doi.org/10.1080/09585176.2014.990910. [3]

Cave, P. (2016), *Schooling Selves*, University of Chicago Press, http://dx.doi.org/10.7208/chicago/9780226368054.001.0001. [27]

Cerna, L. (2014), "Trust: What it is and Why it Matters for Governance and Education", *OECD Education Working Papers*, No. 108, OECD Publishing, Paris, https://dx.doi.org/10.1787/5jxswcg0t6wl-en. [149]

Cheung, A. and P. Wong (2012), "Factors affecting the implementation of curriculum reform in Hong Kong: Key findings from a large-scale survey study", *International Journal of Educational Management*, Vol. 26/1, pp. 39-54, http://dx.doi.org/10.1108/09513541211194374. [20]

Chingos, M., G. Russ and ". Whitehurst (2012), *CHOOSING BLINDLY Instructional Materials, Teacher Effectiveness, and the Common Core Getty Images*, https://www.brookings.edu/wp-content/uploads/2016/06/0410_curriculum_chingos_whitehurst.pdf. [15]

Clausen, K. (2015), *Annual Conference Proceedings*, The Canadian Association of Action Research in Education, Ottawa, https://journals.nipissingu.ca/public/journals/1/files/CAARE_Conference_Proceedings_2015_FINAL.pdf (accessed on 10 September 2018). [125]

Coburn, C. (2006), "Framing the Problem of Reading Instruction: Using Frame Analysis to Uncover the Microprocesses of Policy Implementation", *American Educational Research Journal*, Vol. 43/3, pp. 343-349, http://dx.doi.org/10.3102/00028312043003343. [91]

Coburn, C. (2003), "Rethinking Scale: Moving Beyond Numbers to Deep and Lasting Change", *Educational Researcher*, Vol. 32/6, pp. 3-12, http://dx.doi.org/10.3102/0013189x032006003. [143]

Coburn, C. (2001), "Collective Sensemaking about Reading: How Teachers Mediate Reading Policy in Their Professional Communities", *Educational Evaluation and Policy Analysis*, Vol. 23/2, pp. 145-170, http://dx.doi.org/10.3102/01623737023002145. [71]

Conner, D. (1993), *Managing at the speed of change : how resilient managers succeed and prosper where others fail*, Villard Books, New York. [79]

Covin, T. and R. Kilmann (1990), "Participant Perceptions of Positive and Negative Influences on Large-Scale Change", *Group & Organization Studies*, Vol. 15/2, pp. 233-248, http://dx.doi.org/10.1177/105960119001500207. [87]

Cowie, B., R. Hipkins and et al (2009), *Curriculum Implementation Exploratory Studies: Report to the Ministry of Education*, New Zealand Council for Educational Research , Wellington, http://www.educationcounts.govt.nz/publications. (accessed on 28 August 2018). [43]

Creed, W. and R. Miles (1996), "Trust in Organizations: A Conceptual Framework Linking Organizational Forms, Managerial Philosophies, and the Opportunity Costs of Controls", in *Trust in Organizations: Frontiers of Theory and Research*, SAGE Publications, Inc., 2455 Teller Road, Thousand Oaks California 91320 United States , http://dx.doi.org/10.4135/9781452243610.n2. [159]

Darling-Hammond, L. (2017), "Teacher education around the world: What can we learn from international practice?", *European Journal of Teacher Education*, Vol. 40/3, pp. 291-309, http://dx.doi.org/10.1080/02619768.2017.1315399. [137]

Darling-Hammond, L. (2012), "Teaching and the change wars: The professionalism hypothesis", in *Leading Professional Practice in Education*, SAGE Publications Inc., http://dx.doi.org/10.4135/9781473915152.n12. [147]

Desimone, L. (2002), "How Can Comprehensive School Reform Models Be Successfully Implemented?", *Review of Educational Research*, Vol. 72/3, pp. 433-479, http://dx.doi.org/10.3102/00346543072003433. [130]

Desimone, L. et al. (2002), "Effects of Professional Development on Teachers' Instruction: Results from a Three-year Longitudinal Study", *Educational Evaluation and Policy Analysis*, Vol. 24/2, pp. 81-112, http://dx.doi.org/10.3102/01623737024002081. [146]

Donaldson, G. (2015), *Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales*, https://gov.wales/docs/dcells/publications/150225-successful-futures-en.pdf. [139]

Earl, L. and S. Katz (2006), *Leading Schools in a Data-Rich World: Harnessing Data for School Improvement*, Corwin Press. [164]

Eden, D. and A. Aviram (1993), "Self-Efficacy Training to Speed Reemployment: Helping People to Help Themselves", *Journal of Applied Psychology*, Vol. 78/3, pp. 352-360, http://dx.doi.org/10.1037/0021-9010.78.3.352. [81]

Enzle, M. and S. Anderson (1993), "Surveillant intentions and intrinsic motivation.", *Journal of Personality and Social Psychology*, Vol. 64/2, pp. 257-266, http://dx.doi.org/10.1037/0022-3514.64.2.257. [158]

Erss, M. et al. (2014), "Teachers' Views of Curriculum Policy: The Case of Estonia", *British Journal of Educational Studies*, Vol. 62/4, pp. 393-411, http://dx.doi.org/10.1080/00071005.2014.941786org/10.1080/00071005.2014.941786. [166]

Eshuis, J. and C. Van Woerkum (2003), "Trust and monitoring in governance processes: lessons from landscape management by farmers in a Dutch municipality", *Journal of Environmental Policy & Planning*, Vol. 5/4, pp. 379-396, http://dx.doi.org/10.1080/1523908032000171620. [157]

Estonian Ministry of Education and Research (2015), *The Estonian Lifelong Learning Strategy 2020*, https://www.hm.ee/sites/default/files/estonian_lifelong_strategy.pdf. [47]

Estyn (2019), *A National Resource for School Improvement*, https://www.estyn.gov.wales/self-evaluation-and-school-improvement-project. [155]

Estyn (2018), *Curriculum innovation in primary schools*, http://www.estyn.gov.wales. [46]

European Commission (2017), *Networks for learning and development across school education: Guiding principles for policy development on the use of networks in school education systems*, European Commission , Brussels, https://ec.europa.eu/education/sites/education/files/networks-wg_en.pdf. [117]

Fairhurst, G. and R. Sarr (1996), *The art of framing : managing the language of leadership*, San Francisco (Calif.) : Jossey-Bass, http://lib.ugent.be/catalog/rug01:000717060. [23]

Figlio, D. et al. (2010), "Chapter 8 - School Accountability", *Handbooks in Economics*, Vol. 3, pp. 383-421, http://dx.doi.org/10.1016/S0169-7218(11)03008-5. [151]

Fullan, M. (2015), *The New Meaning of Educational Change, Fifth Edition*, Teachers College Press, https://books.google.fr/books?id=YxGTCwAAQBAJ. [2]

Fullan, M. (2011), *Choosing the wrong drivers for whole system reform*, https://michaelfullan.ca/wp-content/uploads/2016/06/13501655630.pdf. [153]

Furlong, J. (2015), *Teaching Tomorrow's Teachers: Options for the Future of Initial Teacher Education in Wales*, https://gov.wales/sites/default/files/publications/2018-03/teaching-tomorrow%E2%80%99s-teachers.pdf. [140]

Garet, M. et al. (2001), "What Makes Professional Development Effective? Results From a National Sample of Teachers", *American Educational Research Journal*, Vol. 38/4, pp. 915-945, http://dx.doi.org/10.3102/00028312038004915. [144]

Gay, G. (2002), "Preparing for Culturally Responsive Teaching", *Journal of Teacher Education*, Vol. 53/2, pp. 106-116, http://dx.doi.org/10.1177/0022487102053002003. [97]

Gilbert, R. (2010), "Curriculum Reform", in *International Encyclopedia of Education*, Elsevier, http://dx.doi.org/10.1016/b978-0-08-044894-7.00103-2. [14]

Gouëdard, P., B. Pont and R. Viennet (2020), "Education responses to COVID-19: shaping an implementation strategy", *OECD Education Working Papers, No. 224*, https://doi.org/10.1787/8e95f977-en. [129]

Gray, S., D. Scott and E. Auld (2014), *Curriculum Development: A Report for the International Baccalaureate Organization (IBO)*, Institute of Education , London, https://www.ibo.org/globalassets/publications/ib-research/curriculumdevelopmentfinalreport.pdf (accessed on 8 September 2018). [51]

Gueudet, G. et al. (2017), *Curriculum in France: A National Frame in Transition*, https://hal.archives-ouvertes.fr/hal-01599059. [118]

Hälinen, I. and A. Holappa (2013), "Curricular balance based on dialogue, cooperation and trust - The case of Finland", in Kuiper, W. and J. Berkvens (eds.), *Balancing Curriculum Regulation and Freedom across Europe*, CIDREE Yearbook 2013, Enschede, http://www.cidree.org/fileadmin/files/pdf/publications/YB_13_Balancing_Curriculum_Regulation_and_Freedom.pdf (accessed on 14 September 2018). [163]

Hargreaves, A. and M. Fullan (2012), *Professional Capital: Transforming Teaching in Every School*, Teachers College Press, New York, NY. [66]

Hargreaves, A. and M. Fullan (2012), *Professional Capital: Transforming Teaching in Every School*, Teachers' College Press. [76]

Holzman, S. (2012), "Collective Trust: Why Schools Can't Improve without It", *Journal of Educational Administration*, Vol. 50/2, pp. 255-257, http://dx.doi.org/10.1108/09578231211210611. [162]

Hooge, E., T. Burns and H. Wilkoszewski (2012), "Looking Beyond the Numbers: Stakeholders and Multiple School Accountability", *OECD Education Working Papers*, No. 85, OECD Publishing, Paris, https://dx.doi.org/10.1787/5k91dl7ct6q6-en. [152]

Hudson, C. (2011), "Evaluation – the (not so) softlysoftly approach to governance and its consequences for compulsory education in the Nordic countries", *Education Inquiry*, Vol. 2/4, pp. 671-687, http://dx.doi.org/10.3402/edui.v2i4.22006. [154]

IBE-UNESCO (2017), *Developing and implementing curriculum frameworks; Training tools for curriculum development*, IBE-UNESCO, Geneva, http://unesdoc.unesco.org/images/0025/002500/250052e.pdf (accessed on 4 September 2018). [54]

IBE-UNESCO (2013), *Training tools for curriculum development a resource pack*, IBE-UNESCO, Geneva, http://www.ibe.unesco.org/sites/default/files/resources/ibe-crp-2014_eng.pdf. [55]

Jackson, A. and G. Andrews (2000), *Turning Points 2000: Educating Adolescents in the 21st Century*, Teachers College Press. [114]

Kärner, A. and E. Krull (2016), "Enhancing teachers' curriculum ownership via teacher engagement in state-based curriculum-making: the Estonian case", http://dx.doi.org/10.1080/00220272.2016.1186742. [107]

Kauko, J. and J. Varjo (2008), "Age of Indicators: changes in the Finnish education policy agenda", *European Educational Research Journal*, Vol. 7/2, http://dx.doi.org/10.2304/eerj.2008.7.2.219. [39]

Kelchtermans, G. (2009), "Who I am in how I teach is the message: self-understanding, vulnerability and reflection", *Teachers and Teaching*, Vol. 15/2, pp. 257-272, http://dx.doi.org/10.1080/13540600902875332. [94]

Kennedy, A. (2005), "Models of Continuing Professional Development: a framework for analysis", *Journal of In-service Education*, Vol. 31/2, pp. 235-250, http://dx.doi.org/10.1080/13674580500200277. [142]

Ketelaar, E. et al. (2012), "Teachers' positioning towards an educational innovation in the light of ownership, sense-making and agency", *Teaching and Teacher Education*, Vol. 28/2, http://dx.doi.org/10.1016/J.TATE.2011.10.004. [106]

Kirk, D. and D. MacDonald (2001), "Teacher voice and ownership of curriculum change", *Journal of Curriculum Studies*, Vol. 33/5, pp. 551-567, http://dx.doi.org/10.1080/00220270010016874. [111]

Kisa, Z. and R. Correnti (2015), "Examining Implementation Fidelity in America's Choice Schools: A Longitudinal Analysis of Changes in Professional Development Associated With Changes in Teacher Practice", *Educational Evaluation and Policy Analysis*, Vol. 37/4, pp. 437-457, http://dx.doi.org/10.3102/0162373714557519. [65]

Klem, A. and J. Connell (2004), "Relationships Matter: Linking Teacher Support to Student Engagement and Achievement", *Journal of School Health*, Vol. 74/7, pp. 262-273, http://dx.doi.org/10.1111/j.1746-1561.2004.tb08283.x. [95]

Kuiper, W. and J. Berkvens (2013), *Balancing Curriculum Regulation and Freedom across Europe*, SLO, Enschede, the Netherlands, http://www.cidree.org (accessed on 27 August 2018). [49]

Lähdemäki, J. (2019), "Case Study: The Finnish National Curriculum 2016—A Co-created National Education Policy", in Cook, J. (ed.), *Sustainability, Human Well-Being, and the Future of Education*, Springer International Publishing, Cham, http://dx.doi.org/10.1007/978-3-319-78580-6_13. [104]

Langfred, C. (2004), "TOO MUCH OF A GOOD THING? NEGATIVE EFFECTS OF HIGH TRUST AND INDIVIDUAL AUTONOMY IN SELF-MANAGING TEAMS.", *Academy of Management Journal*, Vol. 47/3, pp. 385-399, http://dx.doi.org/10.2307/20159588. [161]

Larmer, J., J. Mergendoller and S. Boss (2015), *Setting the standard for project based learning*, Alexandria, VA: ASCD. [98]

Leat, D. (2014), "Curriculum regulation in England – giving with one hand and taking away with the other", *European Journal of Curriculum Studies*, Vol. 1/1, pp. 69-74, http://pages.ie.uminho.pt/ejcs/index.php/ejcs/article/view/18/16 (accessed on 9 August 2018). [37]

Leat, D., K. Livingston and M. Priestley (2013), "Curriculum deregulation in England and Scotland - Different directions of travel?", in Kuiper, W. and J. Berkvens (eds.), *Balancing curriculum regulation and freedom across Europe*, CIDREE. [69]

Lemke, A. and J. Harris-Wai (2015), "Stakeholder engagement in policy development: challenges and opportunities for human genomics", *Genetics in Medicine*, Vol. 17/12, pp. 949-957, http://dx.doi.org/10.1038/gim.2015.8. [84]

Little, J. (2002), "Professional community and the problem of high school reform", *International Journal of Educational Research*, Vol. 37/8, pp. 693-714, http://dx.doi.org/10.1016/s0883-0355(03)00066-1. [74]

Little, J. (1993), "Teachers' Professional Development in a Climate of Educational Reform", *Educational Evaluation and Policy Analysis*, Vol. 15/2, pp. 129-151, http://dx.doi.org/10.3102/01623737015002129. [141]

März, V. and G. Kelchtermans (2013), "Sense-making and structure in teachers' reception of educational reform. A case study on statistics in the mathematics curriculum", *Teaching and Teacher Education*, Vol. 29, pp. 13-24, http://dx.doi.org/10.1016/j.tate.2012.08.004. [93]

Matthes, M. et al. (eds.) (2018), *The new educational curriculum in Finland*, http://www.allianceforchildhood.eu/files/Improving_the_quality_of_Childhood_Vol_7/QOC%20V7%20CH06%20DEF%20WEB.pdf (accessed on 22 October 2019). [135]

McGinn, N. and T. Welsh (1999), "Decentralization of education: why, when, what and how?", *Fundamentals of Education Planning*, Vol. 64, http://unesdoc.unesco.org/images/0012/001202/120275e.pdf. [88]

McLaughlin, M. and J. Talbert (2001), *Professional Communities and the Work of High School Teaching*, University of Chicago Press, Chicago, IL. [73]

Mellegård, I. and K. Pettersen (2016), "Teachers' response to curriculum change: balancing external and internal change forces", *Teacher Development*, Vol. 20/2, pp. 181-196, http://dx.doi.org/10.1080/13664530.2016.1143871. [36]

Miller, V., J. Johnson and J. Grau (1994), "Antecedents to willingness to participate in a planned organizational change", *Journal of Applied Communication Research*, doi: 10.1080/00909889409365387, pp. 59-80, http://dx.doi.org/10.1080/00909889409365387. [86]

Ministry of Education and Research, Estonia (2014), *National Curricula 2014*, https://www.hm.ee/en/national-curricula-2014. [25]

Ministry of Education and Skills, Ireland (2018), *Curriculum & Syllabus*, https://www.education.ie/en/Schools-Colleges/Information/Curriculum-and-Syllabus/. [119]

Ministry of Education, Singapore (2012), *The Case of Singapore Rethinking Curriculum for the 21 st Century*, https://curriculumredesign.org/wp-content/uploads/Paris2012_SingaporeCase_Final-Read-Only-Compatibility-Mode.pdf. [105]

Mølstad, C. and B. Karseth (2016), "National curricula in Norway and Finland: The role of learning outcomes", *European Educational Research Journal*, Vol. 15/3, pp. 329-344, http://dx.doi.org/10.1177/1474904116639311. [40]

Mulder, M. (2001), "Competence development - some background thoughts", *The Journal of Agricultural Education and Extension*, doi: 10.1080/13892240108438822, pp. 147-158, http://dx.doi.org/10.1080/13892240108438822. [32]

Mulder, M., T. Weigel and K. Collins (2007), "The concept of competence in the development of vocational education and training in selected EU member states: A critical analysis", *Journal of Vocational Education and Training*, Vol. 59/1, pp. 67-88, http://dx.doi.org/10.1080/13636820601145630. [35]

National Center on Education and the Economy (2017), *Finland: Teacher and Principal Quality*, http://ncee.org/what-we-do/center-on-international-education-benchmarking/top-performing-countries/finland-overview/finland-teacher-and-principal-quality/ (accessed on 7 August 2019). [138]

Nieveen, N. and W. Kuiper (2012), "Balancing Curriculum Freedom and Regulation in the Netherlands", *European Educational Research Journal*, Vol. 11/3, pp. 357-368, http://dx.doi.org/10.2304/eerj.2012.11.3.357. [168]

Norman, N. (1998), "Prescription and autonomy in modern language curricula and materials in Great Britain and Germany", *The Language Learning Journal*, Vol. 17/1, pp. 48-56, http://dx.doi.org/10.1080/09571739885200101. [169]

O'Donnell, C. (2008), "Defining, Conceptualizing, and Measuring Fidelity of Implementation and Its Relationship to Outcomes in K–12 Curriculum Intervention Research", *Review of Educational Research*, Vol. 78/1, pp. 33-84, http://dx.doi.org/10.3102/0034654307313793. [21]

Oates, T. (2014), *Why textbooks count. A policy paper*, University of Cambridge, https://www.cambridgeassessment.org.uk/Images/181744-why-textbooks-count-tim-oates.pdf (accessed on 10 October 2019). [62]

OECD (2020), *Achieving the New Curriculum for Wales*, Implementing Education Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/4b483953-en. [61]

OECD (2020), "An implementation framework for effective change in schools", *OECD Education Policy Perspectives*, No. 9, OECD Publishing, Paris, https://dx.doi.org/10.1787/4fd4113f-en. [9]

OECD (2020), *Education in Ireland: An OECD Assessment of the Senior Cycle Review*, Implementing Education Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/636bc6c1-en. [112]

OECD (2020), *OECD Future of Education and Skills 2030: International Synthesis Report on Curriculum Redesign*, OECD Publishing, Paris. [68]

OECD (2020), *TALIS 2018 Results (Volume II): Teachers and School Leaders as Valued Professionals*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/19cf08df-en. [63]

OECD (2019), *A Flying Start: Improving Initial Teacher Preparation Systems*, OECD Publishing, Paris, https://dx.doi.org/10.1787/cf74e549-en. [134]

OECD (2019), "Draft Change Management: Facilitating and Hindering Factors of Curriculum Implementation", *OECD Future of Education and Skills 2030: Curriculum analysis*, OECD Publishing, Paris, https://www.oecd.org/education/2030-project/contact/Change_management_for_curriculum_implementation_Facilitating_and_hindering_factors_of_curriculum_implementation.pdf. [116]

OECD (2019), *PISA 2018 Results (Volume I): What Students Know and Can Do*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/5f07c754-en. [53]

OECD (2019), *TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/1d0bc92a-en. [128]

OECD (2018), *Curriculum Flexibility and Autonomy in Portugal - an OECD Review*, OECD Publishing, Paris, https://www.oecd.org/education/2030/Curriculum-Flexibility-and-Autonomy-in-Portugal-an-OECD-Review.pdf. [45]

OECD (2018), *Developing Schools as Learning Organisations in Wales*, Implementing Education Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264307193-en. [101]

OECD (2018), *Education Policy in Japan: Building Bridges towards 2030*, Reviews of National Policies for Education, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264302402-en. [44]

OECD (2018), *The future of education and skills: Education 2030*, OECD Publishing, Paris, http://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf. [1]

OECD (2017), *Systems Approaches to Public Sector Challenges: Working with Change*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264279865-en. [18]

OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264267510-en. [67]

OECD (2016), *Supporting Teacher Professionalism: Insights from TALIS 2013*, TALIS, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264248601-en. [77]

OECD (2016), "What can governments do to implement education policies effectively?", in *Teaching Excellence through Professional Learning and Policy Reform: Lessons from around the World*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264252059-5-en. [85]

OECD (2015), *Education Policy Outlook 2015: Making Reforms Happen*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264225442-en. [48]

OECD (2015), *PISA Country note: Japan*, OECD, https://www.oecd.org/pisa/PISA-2015-Japan.pdf (accessed on 5 September 2017). [133]

OECD (2015), *Students, Computers and Learning: Making the Connection*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264239555-en. [126]

OECD (2013), *Synergies for Better Learning: An International Perspective on Evaluation and Assessment*, OECD Reviews of Evaluation and Assessment in Education, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264190658-en. [148]

O'Neill, G. (2010), "Initiating curriculum revision: exploring the practices of educational developers", *International Journal for Academic Development*, Vol. 15/1, pp. 61-71, http://dx.doi.org/10.1080/13601440903529927. [57]

Ozga, J. (2009), "Governing education through data in England: from regulation to self-evaluation", *Journal of Education Policy*, Vol. 24/2, pp. 149-162, http://dx.doi.org/10.1080/02680930902733121. [165]

Penuel, W. et al. (2011), "Organizing Research and Development at the Intersection of Learning, Implementation, and Design", *Educational Researcher*, Vol. 40/7, pp. 331-337, http://dx.doi.org/10.3102/0013189x11421826. [102]

Penuel, W., R. Phillips and C. Harris (2014), "Analysing teachers' curriculum implementation from integrity and actor-oriented perspectives", *Journal of Curriculum Studies*, Vol. 46/6, pp. 751-777, http://dx.doi.org/10.1080/00220272.2014.921841. [7]

Peus, C. et al. (2009), *Leading and Managing Organizational Change Initiatives*, https://www.jstor.org/stable/41783612. [82]

Pierce, J., T. Kostova and K. Dirks (2003), "The State of Psychological Ownership: Integrating and Extending a Century of Research", *Review of General Psychology*, Vol. 7/1, pp. 84-107, http://dx.doi.org/10.1037/1089-2680.7.1.84. [108]

Pierre, J. and B. Peters (2005), *Governing Complex Societies*, Palgrave Macmillan UK, London, http://dx.doi.org/10.1057/9780230512641. [150]

Pietarinen, J., K. Pyhältö and T. Soini (2017), "Large-scale curriculum reform in Finland – exploring the interrelation between implementation strategy, the function of the reform, and curriculum coherence", *The Curriculum Journal*, Vol. 28/1, pp. 22-40, http://dx.doi.org/10.1080/09585176.2016.1179205. [22]

Pieters, J., J. Voogt and N. Pareja Roblin (eds.) (2019), *Collaborative Curriculum Design for Sustainable Innovation and Teacher Learning*, Springer International Publishing, Cham, http://dx.doi.org/10.1007/978-3-030-20062-6. [110]

Pinar, W. (ed.) (2013), *The Internationalization of Curriculum Research*, Routledge, http://dx.doi.org/10.4324/9780203831694. [30]

Pont, B., D. Nusche and H. Moorman (2008), *Improving School Leadership, Volume 1: Policy and Practice*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264044715-en. [115]

Porter, A. et al. (1988), "Content determinants in elementary school mathematics", in Grouws, D., T. Cooney and M. Working Group on Effective Mathematics Teaching (1987 : Columbia (eds.), *Perspectives on research on effective mathematics teaching*, Lawrence Erlbaum Associates. [132]

Priestley, M. and G. Biesta (2013), *Reinventing the Curriculum: New Trends in Curriculum Policy and Practice*, Bloomsbury Academic. [72]

Priestley, M. and S. Minty (2012), *Developing Curriculum for Excellence: Summary of findings from research undertaken in a Scottish local authority*, University of Stirling, https://www.youthlinkscotland.org/media/1169/stirlingcferesearch-report_march2012-1.pdf. [124]

Roehrig, G. and R. Kruse (2005), "The Role of Teachers' Beliefs and Knowledge in the Adoption of a Reform-Based Curriculum", *School Science and Mathematics*, Vol. 105/8, pp. 412-422, http://dx.doi.org/10.1111/j.1949-8594.2005.tb18061.x. [64]

Rousseau, D. et al. (1998), "Not So Different After All: A Cross-Discipline View Of Trust", *Academy of Management Review*, Vol. 23/3, pp. 393-404, http://dx.doi.org/10.5465/amr.1998.926617. [160]

Rowntree, D. (1974), *Educational Technology in Curriculum Development*, Harper & Row. [58]

Saavedra, A. and J. Steele (2012), "Implementation of the Common Core State Standards: Recommendations for the Department of Defense Education Activity Schools". [12]

Sargent, C. et al. (2010), *Curriculum review in the INCA countries*, National Foundation for Educational Research, http://webarchive.nationalarchives.gov.uk/20130220111913/http://www.inca.org.uk/Curriculum_review_probe_final_01_dec_2010.pdf (accessed on 28 August 2018). [52]

Schein, E. (2010), *Organizational Culture and Leadership*, Jossey-Bass. [99]

Schiro, M. (2013), *Curriculum theory : conflicting visions and enduring concerns*, SAGE Publications, Thousand Oaks, Calif. [31]

Schweiger, D. and A. Denisi (1991), "Communication with Employees Following a Merger: A Longitudinal Field Experiment", *Academy of Management Journal*, Vol. 34/1, pp. 110-135, http://dx.doi.org/10.5465/256304. [120]

Snyder, J., F. Bolin and K. Zumwalt (1992), "Curriculum Implementation", in Philip W. Jackson (ed.), *Handbook of Research on Curriculum*, New York: Macmillan, https://stars.library.ucf.edu/cirs/2212. [5]

So, K. and J. Kang (2014), "Curriculum Reform in Korea: Issues and Challenges for Twenty-first Century Learning", *The Asia-Pacific Education Researcher*, Vol. 23/4, pp. 795-803, http://dx.doi.org/10.1007/s40299-013-0161-2. [34]

Spillane, J. (2000), "Cognition and Policy Implementation: District Policymakers and the Reform of Mathematics Education", *Cognition and Instruction*, Vol. 18/2, pp. 141-179, http://dx.doi.org/10.1207/s1532690xci1802_01. [90]

Spillane, J., B. Reiser and T. Reimer (2002), "Policy Implementation and Cognition: Reframing and Refocusing Implementation Research", *Review of Educational Research*, Vol. 72/3, pp. 387-431, http://dx.doi.org/10.3102/00346543072003387. [92]

Steiner, D. (2017), *Curriculum Research: What We Know and Where We Need to Go*, https://standardswork.org/wp-content/uploads/2017/03/sw-curriculum-research-report-fnl.pdf (accessed on 23 August 2018). [17]

Stein, M. and C. Coburn (2008), "Architectures for Learning: A Comparative Analysis of Two Urban School Districts", *American Journal of Education*, Vol. 114/4, pp. 583-626, http://dx.doi.org/10.1086/589315. [75]

Stenhouse, L. (1975), *An introduction to curriculum research and development*, London: Heinemann Educational. [59]

Stoll, L. et al. (2006), "Professional Learning Communities: A Review of the Literature", *Journal of Educational Change*, Vol. 7/4, pp. 221-258, http://dx.doi.org/10.1007/s10833-006-0001-8. [11]

The New Zealand Curriculum (2007), *The New Zealand Curriculum for English-medium teaching and learning in years 1-13*, Learning Media Limited. [24]

Thompson, S., L. Gregg and J. Niska (2004), "Professional Learning Communities, Leadership, and Student Learning", *RMLE Online*, Vol. 28/1, pp. 1-15, http://dx.doi.org/10.1080/19404476.2004.11658173. [113]

Trucano, M. (2016), "SABER-ICT Framework Paper for Policy Analysis: Documenting national educational technology policies around the world and their evolution over time", *SABER-ICT Technical Paper Series*, No. 01, World Bank Education, Technology & Innovation, http://saber.worldbank.org. [127]

Tyack, D. and L. Cuban (1997), *Tinkering toward Utopia: A Century of Public School Reform*, Harvard University Press. [19]

Tyler, R. (1949), *Basic principles of curriculum and instruction*, Chicago: University of Chicago Press. [56]

Unterhalter, E. (2013), "Education targets, indicators and a post-2015 development agenda: Education for All, the MDGs, and human development", *The Power of Numbers: A Critical Review of MDG Targets for Human Development and Human Rights*, Institute of Education , London, https://cdn2.sph.harvard.edu/wp-content/uploads/sites/114/2017/12/Education-MDGs-Draft-4_Working-Paper.pdf (accessed on 19 September 2018). [41]

van den Akker, J. (2010), *Curriculum Design Research*, SLO: Netherlands Institute for Curriculum Development. [10]

van Schaik, M., J. Voogt and N. Nieveen (2017), *Onderwijs 2032 : Onderzoek naar werkwijze en opbrengsten van de maatschappelijke dialoog Het proces van visie-ontwikkeling naar een toekomstgericht curriculum*. [96]

Velde, C. (1999), "An alternative conception of competence: Implications for vocational education", *Journal of Vocational Education and Training*, Vol. 51/3, pp. 437-447, http://dx.doi.org/10.1080/13636829900200087. [33]

Viennet, R. and B. Pont (2017), "Education policy implementation: A literature review and proposed framework", *OECD Education Working Papers*, No. 162, OECD Publishing, Paris, https://dx.doi.org/10.1787/fc467a64-en. [8]

Viirpalu, P., E. Krull and R. Mikser (2014), "Investigating Estonian Teachersí Expectations for the General Education Curriculum", *Journal of Teacher Education for Sustainability*, Vol. 16/2, pp. 54-70, http://dx.doi.org/10.2478/jtes-2014-0011. [170]

Vitikka, E., L. Krokfors and E. Hurmerinta (2012), "The Finnish National Core Curriculum", in *Miracle of Education*, SensePublishers, Rotterdam, http://dx.doi.org/10.1007/978-94-6091-811-7_6. [103]

Volante, L. et al. (2017), "The OECD and Educational Policy Reform: International Surveys, Governance, and Policy Evidence", *Canadian Journal of Educational Administration and Policy*, Vol. 184, pp. 34-48, https://files.eric.ed.gov/fulltext/EJ1165322.pdf (accessed on 19 September 2018). [42]

Voogt, J., J. Pieters and A. Handelzalts (2016), "Teacher collaboration in curriculum design teams: effects, mechanisms, and conditions", *Educational Research and Evaluation*, Vol. 22/3-4, pp. 121-140, http://dx.doi.org/10.1080/13803611.2016.1247725. [109]

Wanberg, C. and J. Banas (2000), "Predictors and Outcomes of Openness to Changes in a Reorganizing Workplace", *Journal of Applied Psychology*, Vol. 85/1, pp. 132-142, http://dx.doi.org/10.I037//0021-9010.85.1.132. [78]

Wedell, M. and L. Grassick (2017), "Living with Curriculum Change: An Overview", in *International Perspectives on Teachers Living with Curriculum Change*, Palgrave Macmillan UK, London, http://dx.doi.org/10.1057/978-1-137-54309-7_1. [4]

Wesselink, R. et al. (2010), "Using an instrument to analyse competence-based study programmes: experiences of teachers in Dutch vocational education and training", *Journal of Curriculum Studies*, Vol. 42/6, pp. 813-829, http://dx.doi.org/10.1080/00220271003759249. [28]

Wette, R. (2010), "Product-process distinctions in ELT curriculum theory and practice", *ELT Journal*, Vol. 65/2, pp. 136-144, http://dx.doi.org/10.1093/elt/ccq022. [60]

Wylie, C. (2016), *Communities of Learning | Kāhui Ako: The Emergent Stage - Findings from the NZCER National Survey of Primary and Intermediate Schools 2016*, New Zealand Council for Educational Research, Wellington, https://www.nzcer.org.nz/system/files/NZCER%20COL%20Report%20final.pdf (accessed on 9 September 2018). [156]

Žakelj, A., A. Barle and F. Cankar (2013), "Slovenia - Between the school system's decentralization, curriculum autonomy, and teachers' professionalism", in Kuiper, W. and J. Berkvens (eds.), *Balancing Curriculum Regulation and Freedom across Europe*, CIDREE Yearbook 2013, Enschede, http://www.cidree.org (accessed on 12 September 2018). [167]