5 Back from the future(s): Outcomes, implications and paradoxes

Imagining a future where massive schooling systems have radically transformed or, instead, have completely disappeared can be difficult. Our schools are deeply rooted in our societies and in our current ways of living, seeing and thinking. This closing chapter explores key elements and potential outcomes and implications of the four OECD Scenarios for the Futures of Schooling. It identifies seven tensions and paradoxes that must be considered when using the scenarios. Its aim is to highlight key challenges where further discussion can be most valuable.

Introduction

In all OECD countries, school systems currently employ large numbers of people, deploy vast sums of money, and oversee the education and care of millions of students. Despite the diversity of economic, technological and societal changes in the past decades, "the place called school" is still the dominant model for educating our youth, even if schools and schooling systems look different across the OECD.

Given the omnipresence of this model, imagining a future where massive schooling systems have radically transformed or, instead, have completely disappeared can be difficult. Our schools are deeply rooted in our societies and in our current ways of living, seeing and thinking. This can make using the scenarios an exercise of radical thinking and imagination. At the same time, both historical alternative forms of organising education and the increasingly complex and unpredictable world we live in today encourage us to make the effort. Indeed, we must not only reflect on the future of the system as we know it, we must also challenge ourselves to think of redistributing learning along the lifelong and life-wide dimensions.

Scenarios can help clarify main directions and offer strategic options for schooling over the long-term by exploring the policy issues that arise in different futures. This closing chapter explores the key dimensions and implications of the scenarios, and highlights tensions and paradoxes that must be considered when thinking about the future of schooling. It aims to push the reader to engage precisely with the elements that are most challenging, and where further discussion can be most valuable.

Continuity and disruption: Dimensions and implications of the scenarios

Schooling became the vast institutional system we know today because of its capacity to deliver on a number of important societal goals and functions, from teaching and learning to children's care. There is no better evidence of schooling's success than to see how fundamental schools are in the daily life of our communities. Imagining a future in which the goals and functions that schools serve are met differently can thus only be a demanding exercise.

Nevertheless, the scenarios in this report demonstrate that developments within education itself, government and the wider society may result in other – more or less plausible – structures to address social needs. In the end, the value of schooling and schools is dependent on ongoing subjective evaluations (moral, political, instrumental, aesthetical) and, as such, may evolve along with broader contextual changes (Meynhardt, 2009[1]).

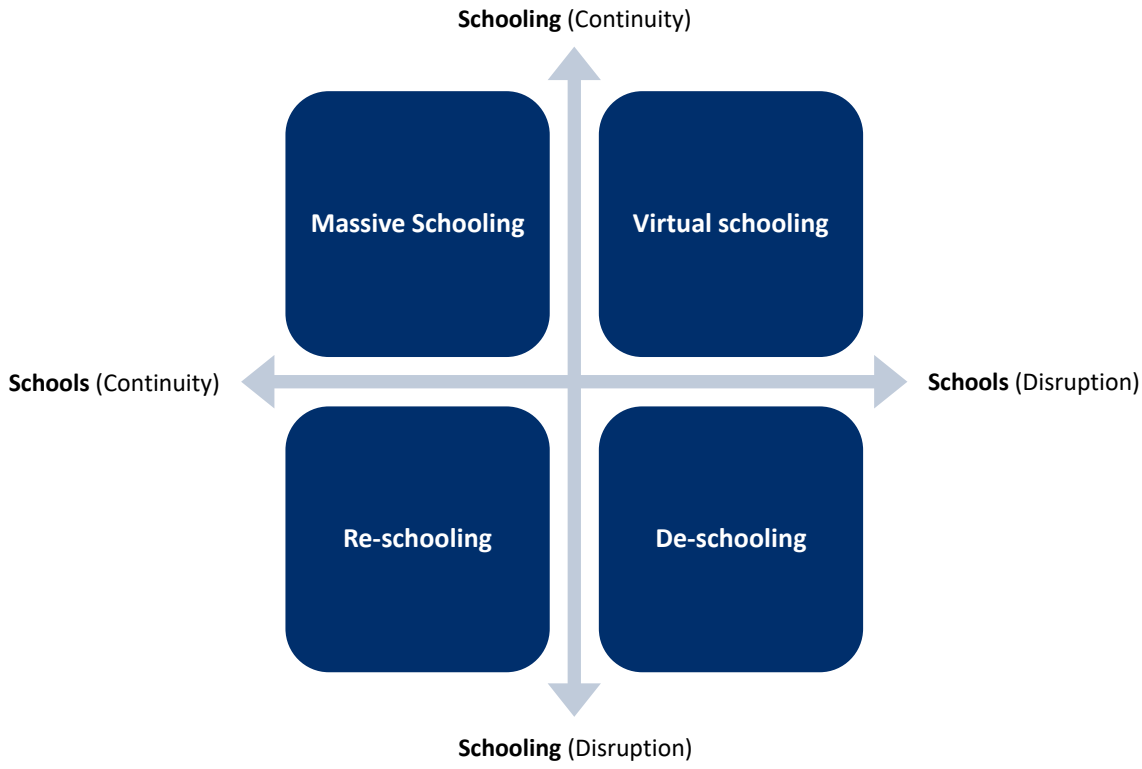
Exploring the dimensions that currently characterise schooling allows for a systematic consideration of how they could be altered and combined in alternative futures. This section explores these dimensions for schooling's organisation and structures, human resources and governance processes.

What future for schools and schooling?

As noted by Selwyn (2011[2]), school and schooling encompass different things. *School* is the institution where learners do their learning and teachers do their teaching, whereas *schooling* refers to the processes of learning or teaching at school. The idea of the school as an institution includes both its physical and cultural structures defined by a series of roles and rules, such as "the hierarchical roles that people assume within the school organisation, the hierarchies of knowledge that constitutes the school curriculum, and the organisation of time that constitutes the school timetable" (Selwyn, 2011, p. 141[2]). The process of schooling, on the other hand, can be understood as including explicit processes such as different combinations of teaching and learning, communication and decision-making as well as implicit processes of socialisation, regulation and control. The scenarios can be analysed against four ideal types emerging from a four-quadrant matrix, where schools and schooling are both defined in terms of continuity or transformation (Figure 5.1).

Figure 5.1. What futures for schools and schooling?

Continuity and discontinuity of education structures (schools) and processes (schooling)



Source: Selwyn (2011[2])

- *Massive schooling*: implies the continuity of both schools and schooling as we know them. Its version of the future is characterised by continuing increase in participation in formal education. Although modernised by technology, learners and teachers continue to operate within rather uniform structures and standardised processes. Open questions are whether and how this could extend beyond traditional schooling (e.g. to early childhood education and care, lifelong learning).
- *Virtual schooling*: Here "virtual" is not restricted to digital learning only. Schooling continues, but learners do their learning and teachers do their teaching outside the confines of conventional physical schools, within a context of flexible relationships and greater choice (of sources for learning, of learning objectives, etc.). But the transformation of the physical space does not automatically imply very different processes of teaching and learning if the choice is to mix and blend components and modules that are mainly standardised (Leadbeater, 2006[3]). It does not automatically follow that innovation would be common either. As noted by Bentley and Miller, an "ironic outcome of private sector firms' experiences with "mass customisation" has been the response of consumers to the immense range of choices they were offered. […] in most cases consumers selected from within a narrow range" (2006, p. 118[4]).
- *Re-schooling*: Schools continue, but schooling changes. The attainment of shared core academic knowledge and skills may endure, but these are not necessarily pursued through common processes. Traditional roles and relationships in schools change, including those of and between teachers and students. This future could fluidly include multiple educational sectors, including

vocational education and training (VET), early childhood education and care, formal tertiary and both formal and informal lifelong learning.

- *De-schooling:* The structures and processes of both schooling and schools are disrupted. This future has completely transformed teaching and learning as we know it and traditional notions of physical infrastructure, curriculum and qualifications are all overridden. Current distinctions between educational sectors (including VET, early childhood education and care, formal tertiary and both formal and informal lifelong learning) are no longer institutionalised.

Using the scenarios: Schools and schooling

Scenarios 1 and 2 of the OECD scenarios (see Chapter 4) extrapolate elements of the status quo, where formal education is delivered through a single organisation framework – schooling systems, virtual or not – and the continuation of traditional processes, such as a pre-eminence of curricula and national and international benchmarking through assessments and formal credentials. While school structures may remain in scenario 2, this proposes combinations of face-to-face and distance relations. In addition, it foresees changes in schooling conventions, such as reworking traditional schedules and the organisation of learning institutions away from hierarchical working organisations.

To an extent, scenario 3 also offers discontinuity of schools, distributing its activity across different virtual and physical spaces, locally and/or internationally. Alternatively, scenario 3 could also be consistent with an extended school housing multiple activities (like many college campuses today) other than those purely academic; this possibility is also present in scenario 1. Nevertheless, unlike scenario 1, the re-schooling of scenario 3 means that traditional categories, divisions and stratification methods and standardised ways of doing in schools have paved the way for increased experimentation. This results in a diversity of arrangements, including pedagogical methods, teacher-student and school-community relations, and highly flexible curricula and grouping strategies.

The idea of de-schooling is also visible in the scenarios. This could be the case in scenario 2, if those individuals leaving traditional schools do not participate in the supply of virtual schooling, as it happens today with those engaged in unschooling. De-schooling is of course most notable in scenario 4, which assumes that modern forms of connectivity and multiple services delivery are powerful enough for the entire school system to disappear.

What futures for teachers and teaching?

The scenarios have different implications for teachers and teaching, ranging from distinct corps in bureaucratic systems and private learning contractors to networked professionals in flexible organisations. Istance and Mackay (2014[5]) offer two useful dimensions with which to explore possible futures for teachers: a) the extent to which those tasked with teaching work within schools and b) the extent to which these practitioners are highly-trained teaching professionals or rather encompass a wider range of professional profiles, careers and expertise. Organised in a four-quadrant matrix (Figure 5.2), they generate four ideal types.

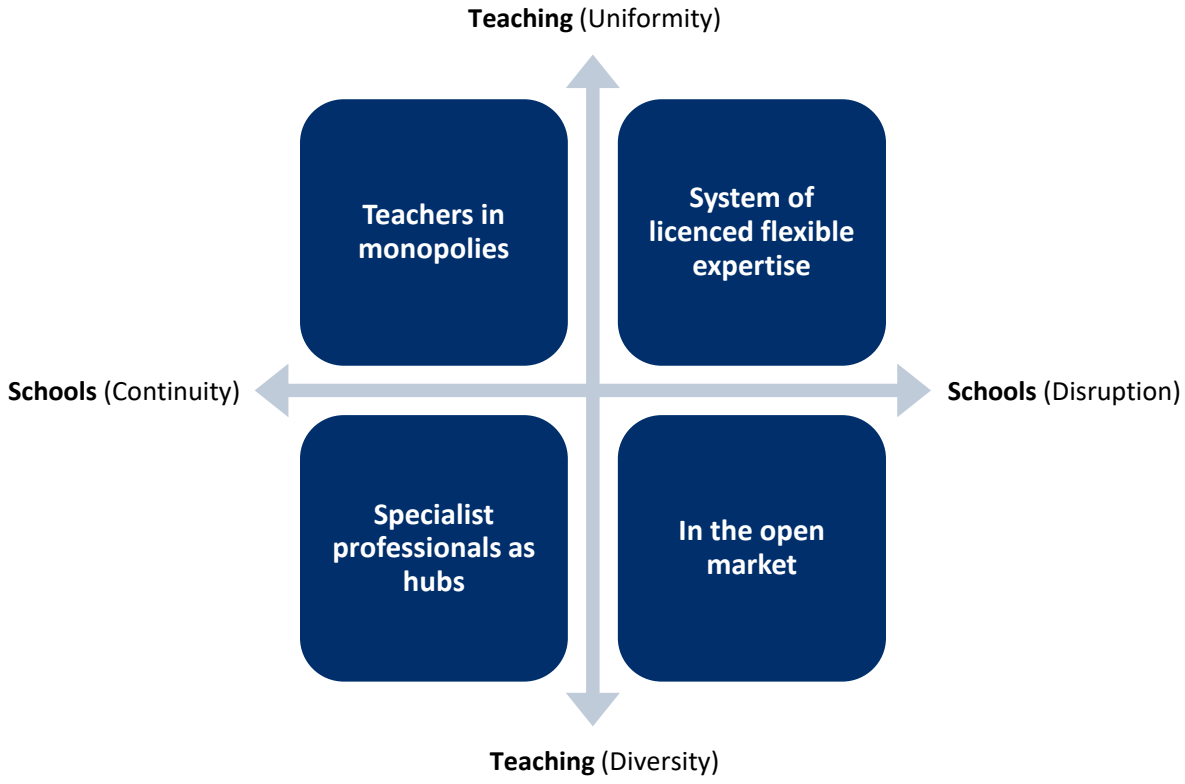
- *Teachers in educational monopolies*: Schools remain the main vehicle for organising teaching and learning and a distinct teacher corps dominates within them. Being able to teach requires the acquisition of teacher status. Trained teachers remain the large majority of the educational workforce within schools, although schools may open to the participation of other adults and professionals in their day-to-day activities.
- *Specialist professionals as hubs in schools*: Schools retain their functions but a wide range of adults and professionals are also involved, including family members, learning professionals other than teachers (such as consultants external to schools), as well as community experts in fields other

than teaching and learning. The nature of participation ranges from volunteering to formal contracts, whether occasional or stable and long-term.

- *A system of licenced flexible expertise*: Liberalisation of the places where teaching and learning take place but strong regulatory control and formal teacher certification is required for teaching. However, different routes to acquiring teacher status may exist, either through significant or low investment in professional education and development. Professional licencing and control become main accountability measures, via direct intervention of the public administration or through strong professional bodies, which may also channel intense teacher networking – in this case outside schools – to avoid professional isolation.
- *In the open market*: This assumes a de-schooling future, where schools and teachers have lost their monopolies. Multiple learning suppliers and contractors are in charge of teaching. They could operate via a form of laissez-faire, with no requirement for formal certification, or also develop within a context where, while teaching and learning methods and means are flexible, a number of tests and credentials still act as quality controls and currency in the learning market.

Figure 5.2. What futures for teachers and teaching?

Mapping the future of teaching across location and the agent of teaching



Source: Istance and Mackay (2014[5])

Using the scenarios: Teachers and teaching

The four OECD scenarios do not align directly with the ideal types presented above. This is reasonable to the extent that these options are already present in the educational landscape today. Distinct teacher corps remain the main source of teaching in schools but new sources of learning are also increasingly present,

with formal academic institutions no longer acting as gatekeepers of knowledge due to an explosion in learning sources across multiple actors and places. Scenario 1 reflects this idea under the assumption of closer links with digital learning providers operating outside schools. Scenario 3 goes one step further in assuming a much wider and flexible diversification of the sources for teaching, situating itself closely to the idea of a teaching that operates through professionals as hubs. In this sense, scenario 3 is an extrapolation of those schools that already make systematic use of learning resources and experts in their environment, from bringing professionals of various fields into the school to talk to students to partnering with using public spaces other than schools (e.g. museums) to conduct lessons.

Scenario 2 remains open on this dimension. A diversity of professionals could operate in (digital) learning platforms, but also these would benefit from trained teachers to do the teaching and participate in the design of the platform itself. Scenario 2, like scenario 4, opens the door to teaching that is not governed by professional arrangements. Occurring "in the open market", it could involve forms of private tutoring and informal lecturing already present today. In scenario 2, however, quality assurance mechanisms such as assessments require the agreement of educational professionals for their design and marking.

An additional element to consider is the impact of digital technology on teaching. Reflecting on education and technology, Selwyn (2011[2]) provides a synthesis of the main views on this issue:

- A first view considers technology's potential to enhance teaching and pedagogy. The increasing ability of technology to automate bureaucratic and administrative workload, increased access to a plethora of instructional tools and ways of delivery, and the new channels and sources to (collaborative) professional development could free-up time for teachers to focus on students' needs while providing powerful tools and the knowledge to do so.
- A second view sees increasingly digitalised and automated education processes leading to the disappearance of the traditional teacher. While not foreseeing the complete replacement of teachers and other forms of tutoring, this implies a substantial reduction in the human resources required to deliver education programmes.
- In between these two perspectives, a third view sees a future where the role of teachers changes. Here, technology facilitates more learner-directed learning, which implies that teaching shifts from directing learning experiences to designing and facilitating them.

These three views are reflected in the scenarios, although they could play out in different ways. Technology could liberate teachers from some non-teaching tasks in scenario 1, although it could also become a source of de-professionalisation, particularly in scenario 1 if teachers are relegated to contingency management in classrooms. Scenario 3 openly assumes the in-between option of shifting roles, roles that could be played similarly by public learning councillors and private contractors in scenario 2. Scenario 4 goes a step further to paint a future where formal teaching is no longer in demand.

What role for education authorities?

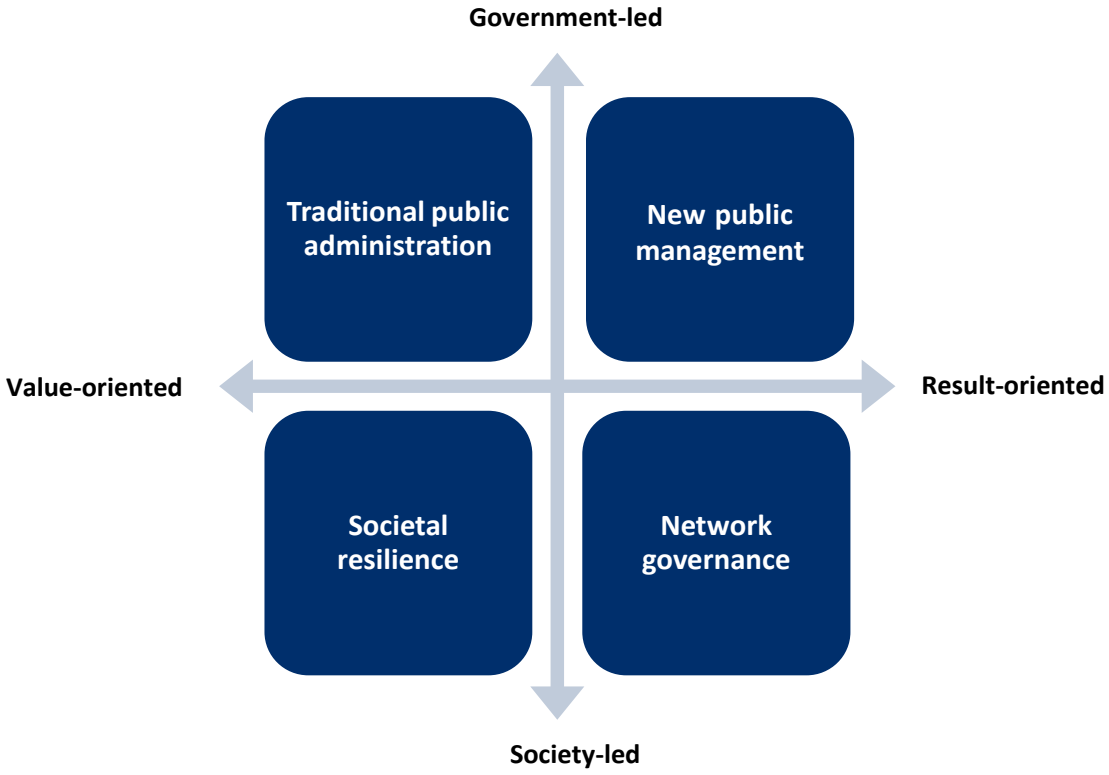
The governance of education is another important dimension, with diverse actors operating on multiple layers of influence and decision-making: local, regional, national and supranational; private and public, with greater voice for parents and other actors in civil society. An analytical framework for exploring the evolution of education governance (Frankowski et al., 2018[6]), yields the four approaches presented as a matrix in Figure 5.3. All of the approaches currently exist in some version in OECD countries, although the last 30 years have seen a move from public administration to new public management, which in turn evolved into network governance in many systems.

- The *traditional public administration* perspective centres the role of government on legality and the rule of law. Public goals are determined in political processes, and policies are formulated for translating political decision into concrete actions. Civil servants execute and perform these policies, ensuring the standardisation of response by government.

- The *new public management* (NPM) perspective is oriented towards efficient and effective policy execution, incorporating corporate-like management ideas into the governance of public services. This view is characterised by tools such as performance targets, deregulation, efficiency, contract management, and financial control.
- A *network governance* view focuses on networks and partnerships. Emerging from increasing decentralisation and the consequently reduced role of central educational authorities, it assumes the participation of multiple stakeholders in decision-making and policy implementation and a civil service that is required to actively work towards building alliances, transcending its "silos".
- The *societal resilience* perspective sees public value emerging within the bounds of government responsibility, but societal actors are the ones primarily responsible for its definition and production, guided by their own preferences and priorities. It works through self-organised networks and cooperatives.

Figure 5.3. What future for education governance?

Governance across roles (government vs society) and the nature of effort (value vs. results)



Source: Frankowski et al. (2018[6])

Using the scenarios: Education governance and the role of public authorities

The OECD scenarios presented in the previous chapter acknowledge that all four governance approaches may continue to be visible and intertwined in the organisation of schooling. Rather, standardised governance approaches, such as massive schooling in scenario 1, can be an effective means to ensure access and quality of education provision for all. A more dynamic education provision landscape, such as that of scenario 2, in fact makes regulatory roles essential to safeguard the right to education. A legalistic

view could also be key to ensuring child rights and inclusiveness in systems where a strong central bureaucracy had lost its influence, such as in scenario 3, or to increase transparency and public value behind the "algorithmocracy" suggested in scenario 4.

Critics of the new public management agenda have highlighted its failure to deliver massive-scale innovation through market-based models and the larger inequities and costs that have come with expanded parental school choice and demand-oriented school planning. However, such criticisms do not imply that the future will inevitably act as a pendulum, bringing systems back to a radical centralised/communitarian perspective (Theisens, 2016[7]). Parental choice, for example, is in many instances considered an intrinsic value rather than simply a means to an end; perhaps increasingly so as highly educated parents become more involved in their children's education, as seen in scenario 2. Growing public and private investment in learning metrics suggests a future in which measuring results plays a larger, not a smaller role.

From providing new digital tools and educational resources internationally in a massive schooling model, for example in scenario 1, to optimising educational infrastructure and professional knowledge in strong local ecosystems, for example in scenario 3, networks and partnerships between multiple actors can continue to be expected as means for education actors to mobilise knowledge and expertise to define and solve their common challenges. This, as suggested by the societal resilience approach, may increasingly occur through the direct involvement and self-organisation of citizens themselves, although alliances with other actors, such as corporate digital services and others, like healthcare providers, may grow increasingly common, as suggested by the network governance perspective.

The future of schooling: goals, tensions and paradoxes

The goals and functions of education are complex and intertwined

The goals of education are intertwined with the daily reality of schools and take different shapes and weights depending on each specific context. Child care and safety are the first priority for many parents who need to balance working and family life, especially for younger children. For others, reduced school hours can work well as long as more flexible working arrangements or sufficient social and financial capital permit them to fulfil this role outside the framework of schooling. These multiple equilibria are in constant mutation as the nature of families itself evolves: with the nuclear family (married heterosexual couple with children) becoming less common; the number of reconstituted and single-parent households rising; overall families becoming smaller and individuals deciding to have children later in life, if at all (OECD, 2016[8]).

Education is also the means for individuals to acquire professional and personal competencies and to develop as independent citizens. This entails building the cognitive, social and emotional skills needed for a world of rapid change where students enter increasingly diverse careers. This is an enormous challenge, as schools face growing demands to provide all students with greater technical skills and an ever-growing base of academic knowledge at the same time as they are expected to help students develop careful reflection, critical analysis and diverse, creative forms of expressivity.

To complicate things further, knowledge and skills acquired through schooling risk becoming quickly outdated in an age where knowledge grows exponentially and labour market expectations are diverse and rapidly shifting. Traditionally, formal assessment, qualifications and career and academic guidance systems have played a key function validating what learners know and can do. These have allowed society to effectively allocate skills in the economy. Increasingly, however, education systems need to move from a front-loaded model – in which individuals develop and acquire skills and knowledge exclusively in their earlier years – to one based on lifelong learning, which allows individuals to pursue diverse learning trajectories throughout their academic and professional lives.

While there is a greater volume and range of participation in adult learning than there used to be, in most countries the goal of lifelong learning is still distant. In addition, despite a recognition that schools are essential to this goal (Faure et al., 1972[9]), at least in the 15-20 year future on which this report focuses, there has yet to be a fundamental re-think of what the distinct role of schools would need to be to meet this challenge.

What we understand as schooling today will continue to exist in the future as long as individuals find it valuable (for academic learning and personal and civic development, care, socialisation and certification). In an increasingly networked and diverse society, the future of institutionalised education will depend on its ability to bridge different worlds, and to remain relevant to the needs of individuals and society.

Seven tensions and paradoxes

Modernising vs. Disrupting

There is a fundamental question about whether our vision for the future of schooling is understood as an incremental process of modernising and/or whether it involves radical disruptive transformation. Consider for example how teaching and learning could evolve in schools and classrooms fully equipped with cutting-edge technology, able to capture body information, facial expressions or neural signals. Would the extremely precise insights on student emotional states generated by these tools be used to transform teaching, reorganise learning, collaborative work and relationships among actors (students, teachers, parents)? Or would it rather be used to incrementally modernise existing practices, feeding in to traditional assessment mechanisms, or even potentially moulding students towards pre-established "norms" of behaviour, for example stereotyped ways of behaving (Knox, Williamson and Bayne, 2019[10])? Although technology is often considered as synonymous with innovation and transformational change, examples of it being used to disrupt, rather than adapt and modernise, are not common in education.

Another, more challenging, example of the modernising vs. disrupting tension is that of lifelong learning. There is a long-standing recognition of the need to integrate school policy and practice into the larger lifelong learning framework, especially as our societies continue to age (Istance, 2015[11]). Despite this, formal education continues to offer more training early in life and career, when an individual is less experienced, while offering less later, when they have more experience. The quality and suitability of this offer is also questioned. The current approach of making incremental changes to existing structures has not yet solved the problem, and in many ways it cannot be expected to, given the difficulty in effectively shifting well-entrenched systems.

So what would it take to really make lifelong learning fit for purpose? Fundamentally different learning approaches? Breaking down barriers between work and "learning" to create a seamless series of opportunities to develop as a professional? Specific assigned periods throughout the lifespan where individuals develop their personal and professional skill set, unrelated to their employment or employer? More equal distribution of and access to quality resources and opportunities early on in life? Changing minds and habits so that individuals have a "thirst for learning" across the lifespan and along the entire continuum between work and leisure (Sivan and Stebbins, 2011[12]; OECD, 2019[13])? The scenarios suggest contrasting possibilities such as shorter, more intensive school careers on one hand and an extended initial education on the other; or greater flexibility in learning paths as opposed to highly focused academic careers.

Cutting-edge technology and lifelong learning are just two examples of the most fundamental tension underlying our thinking about the future of education. Note that there is not one right answer: in some circumstances modernising is called for, while in others real disruption is required. What is important to keep in mind is that modernising can and does masquerade as disruption. If disruption is called for, it will require completely different ways of thinking and engagement to deliver. This is extremely difficult to do well, and requires not just political arguments to free resources and set the stage for potentially radical

structural changes/policies to implement, but also challenging world views and creating new ways of thinking.

New goals vs. Old structures

As the goals and purposes of education evolve, they can become disconnected from the processes and structures under which it operates. One clear example of this is that while there is widespread agreement on the need to personalise learning experiences to individual needs, many also agree that among the skills and attitudes most needed are co-operation and team-work (Deming, 2017[14]; Weidmann, Deming and School, 2020[15]). Indeed, very few students across the OECD can handle problem-solving tasks that require them to maintain awareness of group dynamics, take the initiative to overcome obstacles, and resolve disagreements and conflicts (OECD, 2017[16]). Importantly, the relationship between collaborative capacities and strong academic performance is not direct: while the absence of basic academic skills does not imply the presence of social and emotional skills, social skills are not an automatic result of the development of academic skills either.

Aligning the goals and means in education is necessary if different objectives are to be met. At the same time, we must also acknowledge that more fundamental tensions exist, possibly harder to circumvent. For instance, schooling is often described by its egalitarian aims, including those of access to learning for all and the development of a democratic citizenry. Similarly, education is key to social mobility – despite existing gaps in education and skills across social groups, students from disadvantaged backgrounds benefit more from participation in formal education than their advantaged peers.

Despite their equalising aims, schools are sorting machines, assessing and grouping individuals into formal and informal categories, such as enrolment processes, academic tracks, age grades, classrooms and ability groups and different academic paths. The social categories they construct provide a context for the formation of student identity, but also constitute drivers of inequality insofar as these shape the resources, incentives and expectations for and of students (Domina, Penner and Penner, 2017[17]).

Furthermore, while schooling is seen as an equaliser, its single organisational framework cannot be neutral to those it serves. The expectations around knowledge and skills (curriculum) and about social rules and roles that schools assume cannot be experienced the same way by all learners. Some learners find such expectations aligned with those of home and the community, while others experience them as completely separate worlds. These differences determine the way learners approach and go through their life at school, including academic performance, engagement and sense of belonging at school (OECD, 2018[18]).

A question for the future of schooling and education more broadly thus relates to whether massive schooling systems will be capable of disrupting the inequalities that they contribute to create in the first place, including the decoupling of their dividing lines from later-life outcomes, and whether potential alternatives to schooling would succeed in their stead. Another question is how education is conceived in the wider social, economic and cultural environment, and whether massive schooling or other forms of education are able to make up for the social inequalities that extend well beyond the education system – and that education can only compensate for to a certain extent.

Global vs. Local

The future of schooling will depend on the degree of consensus or conflict over goals, the level of (dis)satisfaction, recognition and esteem in which they are held. Much has been made of the open and participatory governance mechanisms that aim to improve shared vision and ownership by involving a wide variety of stakeholders in the policy-making process. However, because public value creation is dependent on diverging and sometimes conflicting perspectives, tensions and inconsistencies arise around national (or even international) priorities versus local ones. This plays out in multiple ways. One example is accountability, and the processes defining, measuring and evaluating schools' goals and schools' capacity

to meet them. As demands on schools grow, and with them the cost of failure, how can the need for accountability to system-wide goals be assured without its mechanisms undermining the local flexibility and resulting quality of education that they are intended to promote (Burns, Köster and Fuster, 2016[19])?

In addition, although schools in many countries are often evaluated mainly by their academic output, a key function of education is socialisation and the development of citizens. Many systems are implementing accountability systems that hold schools accountable for multiple outcomes beyond the academic, with local actors setting their own priorities and identifying their own needs. However, these must coexist with national goals and expectations, and there is an inherent tension between responsive local flexibility and ensuring national standards for all. Who determines what is measured, and whose voice counts (most)?

Accountability is an integral feature of all the scenarios, although the mechanisms through which it is realised differ across them: from an approach based on the close monitoring of performance and attainment, to the accountability generated in the exercise of user choice, to that exerted by local participation in decision-making as means of quality control. Even scenario 4, where a process of de-institutionalisation has taken place, raises questions about power distribution and accountability with notable ethical and political implications, such as those for privacy and transparency, for data ownership and school funding (Williamson, 2015[20]; 2016[21]).

Another example of the tension between national (or even international) priorities versus local ones is curriculum content, for example in languages. Many systems prioritise the need to learn skills for a changing labour market, strengthening instruction of English and other powerful languages of business and global markets. Yet at the same time, there are concerns about preserving local heritage and worries about languages and cultures disappearing as rural youth migrate to larger cities where they no longer use the language of their ancestors. What is the best way to balance these divergent needs? How will the global reach of the Internet impact on this tension (on the one hand, powerful global languages like English are becoming even more widespread as content is shared digitally; on the other, the Internet also allows for greater sharing of local content, including documenting the remaining speakers of disappearing languages and perhaps protecting their legacy)? This tension is present in all of the four scenarios, whether it plays out on regional and national levels or supranationally.

Innovation vs. Risk avoidance

Improving the functioning of public services requires innovation, and the ability to change and evolve with new circumstances and challenges. Innovation in turn requires risk-taking – trying something new, and possibly, failing. In education, there is a push to make our systems more innovative and our teachers more creative. Yet making this happen is no easy task. Countries must encourage innovation in their education systems at the same time as their accountability systems seek to minimise risk and error. This is an important and difficult tension: Reconciling risk and innovation constitutes a demanding challenge (Burns and Blanchenay, 2016[22]; Brown and Osborne, 2013[23]).

Education systems remain too often stuck in a paradigm of risk minimisation. While understandable, not only does this restrict innovation and change, it also ignores a fundamental truth: that the status quo can be risky to maintain. No change is also a decision that carries consequences. What is the cost of inaction, or of not improving methods/strategies/approaches? Most often, this cost is simply not known, or not calculated. While this might be politically expedient (and the safest path), it transfers the risk and the costs of inaction or failure to those the system is supposed to serve, i.e. the learners.

However, education systems must accept that taking risks means that there is a possibility of failure. This cannot be avoided, and in fact it would be unwise to minimise this possibility, both in the public discussion surrounding policy choices and in the reaction to a failed initiative. Failure can and should be used as a learning tool, both for scientific purposes (understanding what works and what does not) and for political ones (resources can be wasted if the appropriate lessons are not drawn from failures) (Burns and Blanchenay, 2016[22]; Blanchenay and Burns, 2016[24]).

In the scenarios, the continuation of massive schooling of scenario 1 may be seen as a sign of inaction and conservatism. On the other hand, the risks of fragmentation and superficial innovation that could result from the other scenarios should be no less of a concern. One further aspect to consider is the impact of the massive digitalisation of schooling and the resulting constant flow of data from which to assess what works and what does not. How useful would such data be, both in terms of their validity and whether or not they are able to be used, given current disputes and challenges?

Potential vs. Reality

All the scenarios in this volume propose an important role for technology in future articulations of school and schooling, although to various degrees and specificities. Strong tensions lie in this assumption, not least because using technology well for pedagogical purposes has consistently proven to be an elusive task. The key to breaking this pattern requires integrating technology into the complex contexts – and their constraints – where teachers and learners operate.

Technology has historically carried the hopes of many to transform education, by either refining teaching and learning in school or removing the need for schooling entirely. Back in 1920s and 30s, for instance, some saw radio and television as a way to mainstream educational programmes (Novak, 2012[25]). More recently, computers and the Internet have been touted as a solution to a host of educational weaknesses, in particular the ability to overcome long-standing criticisms of rigid and standardised instruction through varied and personalised learning.

However, to date evidence of the ability of technology to effectively transform teaching and learning has been scarce (Escueta et al., 2017[26]; Higgins, Xiao and Katsipataki, 2012[27]). Despite its potential, it has become clear that, irrespective of the sophistication of the technology applied, technology itself has not enhanced learning. One reason for this may be that EdTech programmes and platforms tend to reinforce rather than reframe existing pedagogical approaches. Another is that they are often designed based on developer and market ideas, unconnected to educational and pedagogical goals and learning science research. An additional challenge emerges when technology is promoted for classrooms without appropriate pedagogical consideration (OECD, 2018[28]). A limited use of technology by teachers is not necessarily due to conservatism, but may reflect teachers' expert judgement of the opportunity costs that technology integration entails – in terms of time spent and the perceived effects on learning outcomes.

The emergence of Artificial Intelligence (AI) has renewed the hopes for the transformational promise of educational technology. Today, digital learning systems powered by increasingly 'smart' algorithms and education data mining have the potential to provide all learners with access to almost unlimited instructional strategies while guiding and supporting their learning along the way (Luckin et al., 2016[29]; Luckin, 2018[30]).

However, leaving potential aside, a clear tension lies in the discourse around learning "personalisation", and whether emerging technologies could potentially bring learners to the standardised place from which "edTech" was supposed to liberate them in the first place. Existing "personalised" learning technologies can range from simple customisation of a learning interface to systems that adapt content delivery depending upon user performance (Bulger, 2016[31]). While the latter is not in itself negative, if increased insights on learners' experience are used solely as means to optimise factory-like processes of incremental knowledge acquisition or to diminish teachers' role and thus the quality of education provision (The Institute for Ethical AI in Education, n.d.[32]), there is nothing transformative about it. More clarity is needed on what personalisation means and the extent to which existing forms of technology-enabled learning actually deliver it – and whether they add value to existing forms of teacher-delivered learning personalisation.

Virtual vs. Face-to-face

Just as scenarios push us to think further about the spaces and times for learning, they also help us examine the different physical modalities of teaching and learning. The more learning opportunities

become accessible outside "the walls" of school, the more we must reflect on the role of face-to-face interaction and physical presence.

On the level of instruction, teacher effectiveness; instructor training and conformability with the technology used, support provided to students are key elements regardless of the method of delivery. Effective distance learning systems have the capacity to create the conditions for student-centred content, student-instructor and peer-to-peer interactions (Ellis-Thompson et al., 2020[33]; Abrami et al., 2011[34]).

Socially, however, studies comparing digital and face-to-face communication consistently find that in-person communication is more impactful in strengthening and maintaining relationships (Finkenauer et al., 2019[35]). In schools, this is visible in the warm and supportive relationships between teachers and learners as well as in student peer relations and co-operation, all of which are key to teaching, learning and well-being (OECD, 2019[36]). Yet, the counterfactual is also true: digital connection can also empower disadvantaged groups by enhancing weak ties, and connecting marginalised or minority youth with support that they might not have in their immediate physical community. Similarly, not all forms of physicality are necessarily pleasant: students may well be disengaged during lessons and peer interactions can be harmful, for example in bullying.

The distinction between on and offline will continue to become increasingly blurred. Digital technologies tend to supplement existing face-to-face friendships rather than replacing them, with online communication reinforcing offline friendships (Mesch, 2019[37]). When moving towards more flexible forms of schooling, such as those proposed in digital and blended learning, the tensions related to physicality and distance, autonomy and support, need to be carefully considered (OECD, 2018[38]).

Opening up schooling systems, such as by placing schools in larger learning ecosystems (scenario 3), could be an avenue to optimise resources and provide learners with more situated and deeper learning experiences. Key to consider, however, is the traditional role of physical schools as places where students encounter others very different from themselves. This allows them to experience not just difference, but also learn social scripts, either explicitly or implicitly. Cultivating familiarly and comfort with difference, and the tolerance that emerges with this, is an important role of schools and schooling. How this would be accomplished in virtual spaces where algorithms tend to sort us into groups with similar likes and attitudes is a difficult question.

Learning vs. Education

It has long been recognised that learning does not happen only in schools and other formal educational institutions. Learning also takes place both formally and informally in the context of the family and other social relations; through play, sport and volunteering; in the hands-on tasks of work and even the most casual of conversations. The more knowledge is accessible through multiple forms and channels – such as nowadays being available at the touch of a screen – the less realistic it is to conceive of educational institutions as its sole gatekeeper.

However, ours is a time that has been characterised as one of 'enlightened illiteracy' (Garcés, 2017[39]), where we can know everything about the world and yet do little about it. A key paradox is that the more we "know", the easier it becomes for us to succumb to our biases, using new knowledge just to validate those ideas of the world that we already have. Another paradox is that the more accessible knowledge becomes the more difficult it is to generate our own understanding of the world, resulting in an uncritical adherence to the opinions already available elsewhere.

Of utmost importance to a digitalised information society is to see that what distinguishes opinions from knowledge is not truth or utility. An opinion, a piece of information may be true and useful for decision-making regardless of whether its possessor has an understanding of its logic and applicability. Knowledge requires instead reasons or evidence to be sustained. Acquiring knowledge requires the skills

for exploring, discerning and successfully employing good reasons to sustain a claim; elements that benefit from expert guidance and social interaction in addition to information access.

Beyond improving learners' knowledge of facts and figures in various disciplines, and adaptive learning tools can have a role to play in this, teaching works towards enhancing learners' understanding of knowledge and the ways to develop it (Hofer and Pintrich, 2002[40]) and mobilising the motivational resources necessary for this process to happen. As discussed, disconnecting education's purposes and means can be problematic. The strength of schooling, and certain pedagogies (Paniagua and Istance, 2018[41]; Pellegrino, 2017[42]), lies in its power to transform practices such as inquiry, reflection and cross-examination of ideas into habits, i.e. routine ways of doing, while continuing to promote a baseline of disciplinary and interdisciplinary knowledge on which to ground and develop such practices.

Once this role of teaching and pedagogy is recognised, teaching becomes even more critical to the success of schooling as expectations about quality increase: more demand-oriented approaches and less supply determined; more active and less passive learning; knowledge creation not just transmission. The profile, role, status, and rewards of teachers differ significantly between the scenarios, and some of the scenarios imply changes that may prove uncomfortable to teachers and to society. What impact would it have to massively involve adults other than teachers in the delivery of education, for example in scenario 3, and why has it not happened yet if considered beneficial? On the other hand, to what extent would closing the door to human tutoring (here potentially scenario 2 and 4, but also 1) open multiple windows to exclusion? The narrative of teacher disappearance risks becoming a self-fulfilling prophecy if policies and planning do not take into account all the functions of schooling and the value that teachers generate in them.

Coda

The different aspects of schooling and its goals do not always go together coherently or, in fact, support each other. Quite the contrary. Just as there is no "one" future, there is no single path that can or must be taken towards the futures of education. Each OECD country and community is responsible for defining the way ahead for their schools and their education systems more broadly. Nevertheless, as countries prepare for an increasingly uncertain future, a number of tensions and questions will need to be addressed. Some are long-standing issues, not yet sufficiently addressed, such as the function and place of massive schooling systems. Others are emerging and their impact is still uncertain, such as the role of artificial intelligence in delivering – or determining? – the future of education. This report, and the scenarios presented in Chapter 4, offer an opportunity for policymakers and stakeholders to reflect on these issues.

Underscoring many of the tensions presented in this report is the necessity for resources and investment in education – direct funding, professional expertise, technical infrastructure and facilities, parental and community engagement. Outcomes depend partly on their levels, but also on how such diverse resources are combined, used, and managed. To various degrees, all the scenarios are consistent with a diversification of the resource base. Relevant questions include: are societies willing to invest sufficiently in schools for the tasks expected of them? Can existing resources invested in schools be better integrated and optimised with those invested elsewhere? Could teachers and schools as well as education policy more widely address both formal and non-formal learning together to a greater extent?

Every government needs to prepare for the future. They have to consider not only the future changes that appear most probable, but also the changes that they are not already expecting, and the many ways in which the world could be very different to the one we live in today. They need to complement the evidence with a systematic consideration of future changes that cannot yet be captured in data—such as the unprecedented digital transformation of the global economy and society. They must transcend their own disciplines and silos, and discuss issues that may seem marginal but which in fact have significant potential implications. By systematically exploring different plausible futures and the opportunities and challenges they could present for education, we then use those ideas to make better decisions and act now.

In our rapidly changing world, education cannot rely on lessons of the past to prepare for the future. The future is here, and education systems need to learn from it. Our success will depend on how effectively we use our knowledge to anticipate the future, and how quickly we take action to shape it.

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