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Reforming Education

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ABSTRACT

Technology-based innovations in education reshape the environments in which schools operate. In general, they tend to open up learning environments, both to the digital world and the physical and social environment. They also bring new actors and stakeholders into the educational system, not least the education industries, with their own ideas, views and dreams about what the future of education can hold. The problem of productivity and efficiency in education is even more striking when education is compared with other public policy sectors, which have realised enormous productivity gains in past decades. In sectors such as health, technology has been a major driver of increased productivity and efficiency with much improved outcomes even if the cost has also gone up. Many observers wonder why enormous advances in technology has not yet led to similar improvements in education.

Keywords: Environments, technology, digital world, educational system

Schools and education systems are not yet ready to realise technology's potential. Gaps in the digital skills of both teachers and students, difficulties in locating high-quality digital learning resources and software, a lack of clarity over learning goals, and insufficient pedagogical preparation on how to blend technology meaningfully into teaching, have driven a wedge between expectations and reality. Schools and governments must address these challenges or technology may do more harm than good. Although they cannot transform education by themselves, digital technologies do have huge potential to transform teaching and learning practices in schools and open up new horizons. The challenge of achieving this transformation

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is more about integrating new types of instruction than overcoming technological barriers. Digital technology can facilitate:

- Innovative pedagogic models, for example based on gaming, online laboratories and real-time assessment, which have been shown to improve higher-order thinking skills and conceptual understanding and in many cases have enhanced students' creativity, imagination and problem-solving skills.
- Simulations such as remote or virtual online laboratories, providing relatively low-cost flexible access to experiential learning.
- International collaborations, overcoming barriers of geography and formal classroom hours. These give students insight into other cultures and experience multicultural communication, and closely emulate the collaborative nature of today's professional environments.
- Real-time formative assessment and skills-based assessments, allowing teachers to monitor student learning as it happens and adjust their teaching accordingly. It may also enable the active participation of more students in classroom discussions. Technology supported assessment enables skill development to be monitored in a more comprehensive way than is possible without technology.
- E-learning, open educational resources and massive open online courses, mainly aimed at autonomous learners.

Why Innovation in Education Matters

How could innovation add value in the case of education? First of all, educational innovations can improve learning outcomes and the quality of education provision. For example, changes in the educational system or in teaching methods can help customise the educational process. New trends in personalised learning rely heavily on new ways of organising schools and the use of ICT. Second, education is perceived in most countries as a means of enhancing equity and equality. Innovations could help enhance equity in the access to and use of education, as well as equality in learning outcomes.

Finally, education should remain relevant in the face of rapid changes to society and the national economy. The education sector should therefore introduce the changes it needs to adapt to societal needs. For example, education systems need to adopt teaching, learning or organisational practices that have been identified as helping to foster "skills for innovation".

Reforming Education

Reform is only one way of producing change; it implies a special approach to problem solving. Sometimes changes in organisations are key parts of a reform but other reforms may produce

little or no change. Change may be an intended or unintended phenomenon, whereas reform is a structured and conscious process of producing change, no matter its extent. Reforms can occur in political, economic, social and administrative domains and contain ideas about problems and solutions and are typically understood as initiatives driven from the top of a system or organisation. Improvements in education can be perceived differently depending on which objective is examined or on the point of view of the observer. Moreover, cultural values, social policies and political goals can mean countries prioritise these objectives differently. Priorities can also change over time as circumstances and citizens' expectations change. This has consequences for the validity and limitations of the indicators that need to be gathered. Ideally, innovation indicators in the education sector should be linked to specific social and educational objectives such as learning outcomes, cost efficiency, equity or public satisfaction. Innovation should also be measured at different levels and, where no objective measurement can be made, according to different stakeholders' perspectives.

Innovation in Education: A Measurement Challenge

Measuring Innovation in Education is a pioneering attempt to provide indicators based on existing international datasets. It aims to provide education policy makers with an estimated order of magnitude of innovation and change in education. It offers two broad approaches to measuring innovation in education: (1) assessing the perceptions of recent tertiary graduates, including those working in education, about innovation in their workplace; and (2) analysing organisational changes through teacher-student surveys."*How would you characterise the extent of innovation in your organisation or your workplace?"* in reference to three types of innovation identified in the Oslo Manual (OECD/Eurostat, 2005): (1) products or services (such as new syllabuses, textbooks or educational resources); (2) technology, tools or instruments (new processes for delivering services such as use of ICT in e-learning services, new learning management systems, new online courses, or new pedagogic tools, such as maps, anatomy models, e-labs); and (3) knowledge or methods (such as new pedagogies, new administrative management systems for admissions or other formalities, or the use of ICT to communicate with students and parents). On a scale of 1 (very low) to 5 (very high), "High innovation" corresponded to scores of 4 and 5. The indicators presented below capture innovation as a significant change in key practices.

Measuring Innovation in Education analysed the effect sizes of changes between 2003 and 2011 in the TIMSS databases on various pedagogic and organisational variables. It concluded:

- There have been large increases in innovative pedagogic practices across all countries covered in areas such as relating lessons to real life, higher order skills, data and text interpretation, and personalisation of teaching.

- Teachers have innovated in their use of assessments and in the accessibility and use of support resources for instruction.
- Educational organisations have innovated in the areas of special education, the creation of professional learning communities for teachers, evaluation and analytics, and building relationships with external stakeholders, such as parents.
- In general, countries with greater levels of innovation have seen increases in certain educational outcomes, including higher (and improving) 8th grade mathematics performance, more equitable learning outcomes for students of all abilities and more satisfied teachers.
- Innovative educational systems generally have higher levels of expenditure than non-innovative systems but their students are no more satisfied than those in less innovative systems.
- Overall, there has been more innovation in classroom practices than school practices between 2000 and 2011.

Key Messages for Innovation Policies In Education

As a system, education would benefit from having a well-designed innovation strategy. Contrary to common belief, education is not innovation averse: the amount of change in education is comparable to similar public sectors, and education professionals consider their workplaces to be as innovative as the economy at large. Despite this, education has not managed to harness technology to raise productivity, improve efficiency, increase quality and foster equity in the way other public sectors have. Innovation policies in education have often focused on fragmented issues or on the wrong goals, sometimes driven by a concern for quick wins, but without sustainable gains in the long run. Well-designed innovation strategies in education could leverage the potential of new technology and, with the right kind of policy mix, can contribute to both more efficiency and better outcomes for quality and equity.

- Improved measurement must be the foundation of innovation in education. Based on a solid definition of "improvement" at different levels in the system, regular data collection should assess changes over time in improved pedagogical and organisational practices.
- Education needs a strong and efficient system of knowledge creation and diffusion, extending from scientific research into teaching and learning, to the more applied bodies of knowledge in the teaching profession and knowledge entities in the system.
- While innovation in education is not synonymous with the introduction of digital technology, innovation strategies should include the smart implementation and use of technology in a way that leverages their potential for better teaching and learning practices. This will be dealt with in subsequent chapters of this book.

- Effective innovation strategies in education must include an appropriate governance model: identifying key agents of change and champions, defining the roles of stakeholders, tackling pockets of resistance, and conceiving effective approaches for scaling and disseminating innovations.
- Finally, innovation in education requires strong evaluation. Without a broad and widely shared culture of evaluation, innovation in education will remain stuck at the level of well-intended but isolated pioneering efforts. Finding out what really works, what doesn't and why is key to developing a body of knowledge that can guide future innovations.

CONCLUSION

Besides being a field of innovation in its own right, education has also a key relationship to innovation at large: as a system developing the skills for innovation in economies and societies. Recent accounts of innovation and innovation strategies have emphasised the importance of the skills needed to start, disseminate and implement innovation. Critical thinking, creativity and imagination, on top of strong subject-based, and social and emotional skills, are key to the success of innovation. Education policies need to cover developing these skills as a matter of key importance. Entrepreneurship education is a good example of a setting in which such skills can be fostered and nurtured.

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