TWG 6: 21st century learning

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Introduction

This paper specifically addresses the EDUsummIT 2009 Call to Action:

- To establish a clear view on the role of ICT in 21st century learning and its implications for formal and informal learning.

Research update

What should be learned and why

The globalisation and internationalisation of economy along with the rapid development of information and communication technologies (ICT) are continuously transforming the way in which we live, work and learn. While the need for routine production workers has decreased, the need for service and knowledge workers has grown. Studies increasingly indicate the need for creative and innovative workers. Advances in ICT have created jobs that did not exist a decade ago, and young people need to be educated for careers that do not yet exist. These developments require drastic changes in what has to be learned and how.

An analysis of different frameworks for 21st century learning show consensus about the skills that are needed for living and working in the 21st century. The 21st skills that are considered essential are:

- collaboration, communication, digital literacy, citizenship, problem solving, critical thinking, creativity, productivity.

Some skills evolved from the 20th century and have been studied for some time (problem solving, critical thinking), while others (creativity, digital literacy) are new and unfamiliar.

An important change has taken place in the way new digital tools and collaborative environments have enhanced learning, from an emphasis on reproducing information and content to content creation and sharing in virtual environments, which some describe as a remixing culture. In the Nordic European countries, the concept of 'digital bildung', or what it means to be literate in contemporary culture, is emphasized.

Digital literacy is a broad concept that has different aspects:

- *Technological literacy*: to be aware of the interplay between technology and society and to understand the technological principles needed to develop relevant solutions and achieve goals;
- *ICT literacy*: the skills needed to make effective and efficient use of ICT;
- *Information literacy*: the capacity to access information efficiently and effectively, to evaluate information critically, and to use information accurately and creatively.

21st century skills in educational practice

The Second Information Technology in Education Study (SITES) revealed that, when findings from 1998 are compared with findings from 2006 and across the participating education systems, the perceived presence of 21st century learning in schools, according to their principals, had increased. However, it was also observed that school principals in a number of Asian countries (Hong Kong, Japan, Taiwan, Thailand, Singapore) reported an increase in 21st century learning in their school, while principals in some European countries (e.g. Denmark, Norway) reported a decrease. The importance addressed to 21st century skills is also confirmed by the development of new courses in several Asian countries (e.g.. Integrated Practice Activity in China; Life wide learning in Hong Kong) However, the SITES study also showed that perceived presence of 21st century learning by school principals is not always reflected in teacher and student practices..

Implementation issues

The implementation of 21st century skills requires a restructuring of the curriculum. It is not only a matter of trading 20th century content and goals for those of the 21st century, but a matter of redefining what has to be considered as core in the 21st century curriculum and considering the implications of a 21st century curriculum for the current school system.

Consensus is found in the pedagogy needed to teach 21st century skills. In particular, a constructivist approach to learning is adhered to for skills such as problem-based learning, cooperative learning, experiential learning, and formative assessment. In addition. comprehensive use of ICT to enhance student learning and the mastery of 21st century skills is advocated. ICT applications such as Web 2.0 tools, multi user virtual environments, and augmented reality can contribute to the development of 21st century skills.

For the assessment of 21st century skills, new assessment frameworks are needed. Most frameworks argue the need for an emphasis on formative assessment to allow for individual guidance of students in their learning process. Performance assessment strategies are required to be able to understand students' progress in mastering the 21st century skills. Few studies focus on the development of online performance assessments for assessing (some) 21st century skills, e.g. information and computer literacy skills and scientific inquiry (problem solving, critical thinking and collaboration and communication skills).

Scalability

Beyond making 21st century skills a part of education, using ICT to shift our educational structures from industrial era schools to new types of 21st century formal educational models is important. Societies can no longer afford a labor-intensive model of education that uses expensive human resources inefficiently. This is not a temporary financial dislocation due to an economic downturn, but a permanent sea-change that has already happened in every other service sector of our economy. In K-12 schooling, our stellar illustrations of success are based on personal heroism, educators who make sacrifices in every other part of their lives in order to help their students. These are wonderful stories, but such a model for educational improvement is unscalable to typical teachers. We have not found a way to be effective and affordable at scale. The U.S. Department of Education's 2010 National Educational Technology Plan presents a transformational vision for 21st century education that builds on insights about modern interactive media gained from other parts of the economy, but also depicts new processes and structures that recognize the unique challenges of helping students learn, lifelong and lifewide.

Major issues

- Most frameworks seem to assume that 21st century skills are acquired in formal educational settings, but there is a lot of potential to learn 21st century skills in informal learning settings. It is important to know students learn from their involvement with ICT and how these skills relate to 21st century skills.
- The role of non formal and informal education contexts in supporting the acquisition of 21st century skills should be acknowledged but is not yet clear. The way we conceptualize learning environments online and offline becomes important. We need strategies to link what is learnt *in* and *outside* the school. 21st century skills are often discussed disconnected from core school subjects. It seems important to provide models and examples on how 21st century skills can be related to core subject domains to help policymakers, school leaders, and teachers implement 21st century skills in the school curriculum.
- The need for different types of literacy in the knowledge society must be acknowledged. Digital literacy should not be regarded as a separate set of skills, but instead embedded within and across the other 21st century skills and core subjects. Because of the ubiquitous use of technology in our society, schools and universities often assume that their students are digitally literate, but it is becoming increasingly clear that students differ greatly in their use of technology and therefore in their technology skills.
- To be able to measure student learning of 21st century skills, a better understanding of alternative forms of assessment that comply with the demands of valid, reliable and fair testing. This seems an important prerequisite for the implementation of 21st century skills at a large scale. Also we must include change as a dynamic factor over time as part of our understanding of skills and how they develop.
- A new approach to teacher professional development -based on 21st century skills- should be adopted. Teachers should be given the opportunity to develop 21st century skills themselves and to experience how these skills can be brought into the classrooms. This also relates to school leadership programs in the way schools develop as learning organization to support learning of 21st century skills.
- Globalization implies that the development of 21st century skills in young people is important worldwide. It is important to understand how developments of 21st century skills reproduce or create new knowledge divides within and across countries and cultures. The latter implies a need for cultural understanding of the conception of 21st century skills.

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