



# ASSESSMENT & TEACHING of 21st CENTURY SKILLS

## Status Report as of January 2010

How we live, work, play and learn has been dramatically transformed by technology over the past 20 years. We need different skills today than we did in the 20th century, and educational institutions have a critical role to play in developing those skills. But by and large, primary and secondary schools have not kept pace with the changing skill sets that students need to succeed. In fact, there's nothing broad-based in place right now to determine whether our schools are doing well at teaching these skills. Governments as well as schools need to know what works and what doesn't.

Cisco Systems Inc., Intel Corporation and Microsoft Corp. unveiled plans in January 2008 to sponsor a project to research and develop new approaches, methods and technologies for measuring the success of 21st-century teaching and learning in classrooms around the world. The Assessment and Teaching of 21st Century Skills (ATC21S) project is focused on defining those skills and developing ways to measure them.

School officials and global assessment organizations such as the Organisation for Economic Cooperation and Development (OECD) and the International Association for the Evaluation of Educational Achievement (IEA) will be able to use these methods of assessment to evaluate how well schools are teaching 21st-century skills.

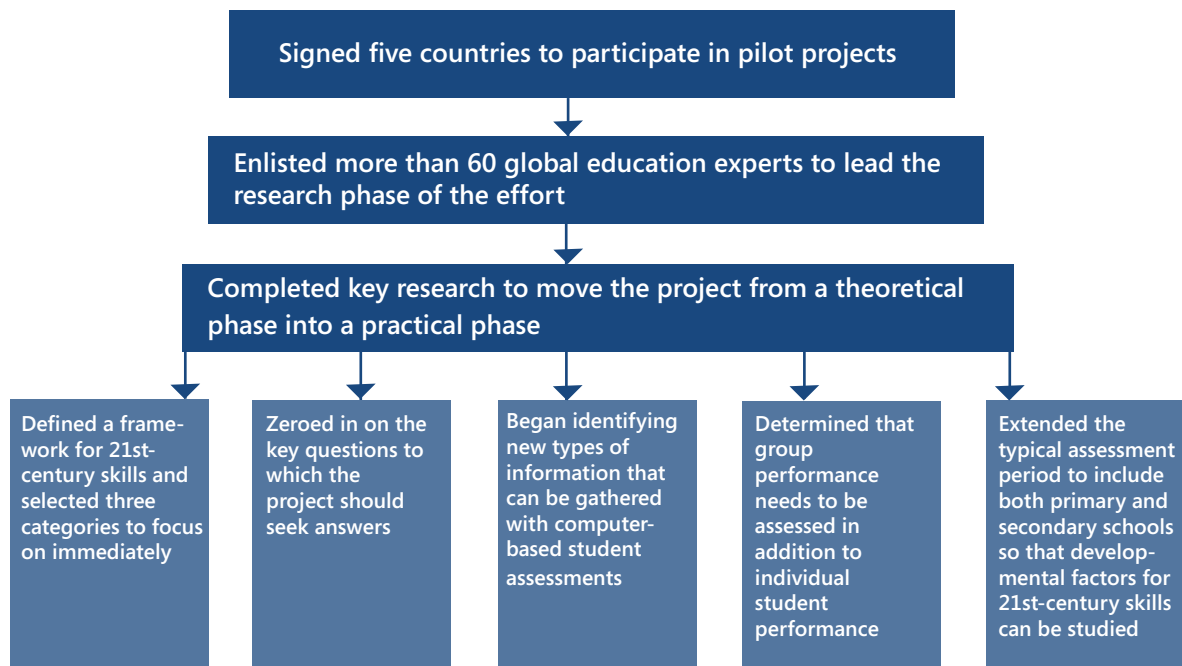
Assessment plays a critical role in setting standards and influencing curricula at the local, regional, national and global level, so it is expected that these new assessments will motivate schools to do more to instill 21st-century skills.

In announcing the project, the three companies stated, "What is learned, how it is taught and how schools are organized must be transformed to respond to the social and economic needs of students and society as we face the challenges of the 21st century."





## 2009 Progress Highlights:



Five “founder countries” have agreed to take part in the research and will deploy ATC21S pilot projects in schools as early as February. The five are Australia, Finland, Portugal, Singapore and the United Kingdom.

Barry McGaw, a professorial fellow at the University of Melbourne and a former education director at OECD, was the executive director of the project in 2009.

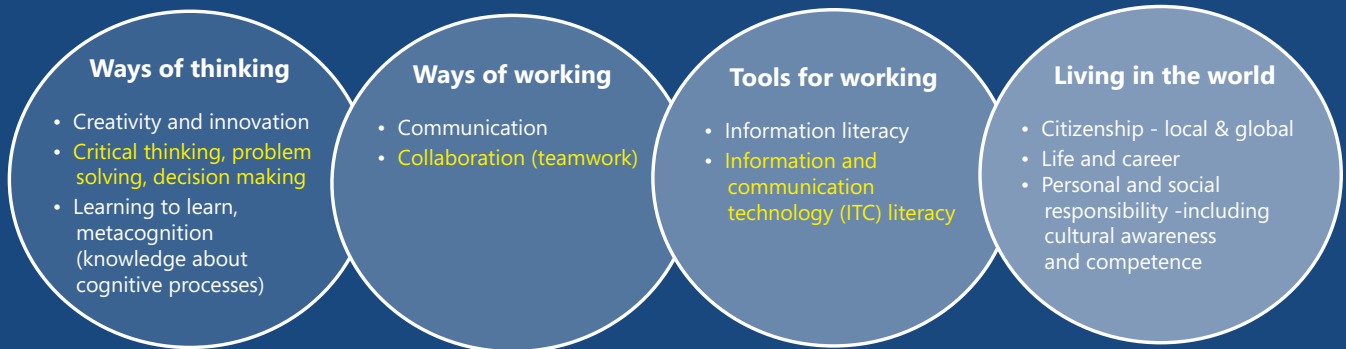
The ATC21S project is operating through five working groups, each of which will review the current state of development and propose research and development activities to address current deficiencies. Together, the working groups comprise individuals from more than 60 research institutions. Each working group produced an end-of-year status report. Those papers are available on the project Web site, <http://www.atc21s.org>.

# GROUP 1:

## Working Group on 21st-Century Skills

Led by Senta Raizen of WestEd (U.S.), this group agreed upon the following framework and list of 21st-century skills.

### 21st-Century Skills:



\*\*Skills in yellow will be the focus of work in 2010.

# GROUP 2:

## Working Group on Methodological Issues

This group is being led by Mark Wilson of the University of California, Berkeley (U.S.). Unlike well-documented learning progressions in reading, mathematics, science and other standard curriculum areas, developmental progressions in 21st-century skills are not yet known. What collaboration skills should we expect of students at the primary and secondary school levels? How do students become better collaborators as they age — or do they? How should we measure a student's creativity, innovation, critical thinking, or ability to solve problems or make decisions? Is problem solving a generalized skill, or is it different depending upon whether you are trying to solve, say, a math problem or a political problem? And how do you assess how students think, not just their performance? The only way to answer these questions is by making serious attempts to measure the skills and then analyzing the results.

Pilot studies to answer these questions will focus on digital literacy and problem solving for mathematics, science and everyday skills, and they will, in large part, use computer-based assessments, which offer benefits over paper-based testing, such as the ability to capture the processes by which students arrive at their answers, and to personalize assessments for each student.

# GROUP 3:

## Working Group on Technological Issues

Led by Benő Csapó of the University of Szeged (Hungary), the group is looking at the many ways technology can be used to improve assessment, such as the following:

- Detecting and recording students' psychomotor, cognitive and emotional characteristics
- Enabling adaptive or personalized testing, in which students are presented with a unique set of tasks focused on their individual performance levels
- Administering dynamic problems that change the conditions, information or instructions as the student is working
- Evaluating not just students' answers, but how fast they arrived at them and the processes they used — what the working group called making the students' thinking visible

This last approach — looking at student's paths to an answer — is particularly useful when students get an answer wrong, because it allows teachers to understand exactly where the student went wrong, what he or she is not understanding, and where his or her grasp of the problem domain breaks down. Teachers can then consider whether adjusting their teaching methods would be helpful.

The project plans to complement the knowledge gained about technology-based assessments by soliciting information from pilot schools that are already experimenting with computer-based assessments and using that empirical evidence to strengthen the theoretical base.



## GROUP 4:

### Working Group on Classroom Environments and Formative Evaluation

Co-led by Marlene Scardamalia of the University of Toronto (Canada) and John Bransford of the University of Washington (U.S.), this group sees collaborative knowledge building — how individuals work together to understand new material — as a key feature of modern workplaces and an important 21st-century skill. It noted that assessments in the future need to look not only at individual performance, but also at group performance.

It is possible to map patterns of both social interaction among students and, more importantly, the interactions among their ideas. These techniques will play an important role in the 2010 research and development work on collaborative problem solving.

## GROUP 5:

### Working Group on Policy Frameworks for New Assessments

This group, led by Linda Darling-Hammond of Stanford University (U.S.), is focusing on the system-wide adoption of new approaches to assessment, since in the past there have been many successful R&D projects in education that have not been able to make the transition from small-scale experimentation to wide-scale implementation. It is also analyzing variations in practices across countries. This will include identifying the policy implications and governmental requirements related to implementing new assessments.

## Overall Key Challenges for the ATC21S Project:

- Developing new kinds of psychometrics (educational and psychological assessments)
- Making students' thinking "visible" (being able to see students' mental processes, including how they draw on their own experiences)
- Accounting for new modes of communication
- Ensuring the validity of standards on which assessments are based

## Next Steps:

In 2010, the project will set up new working groups to develop and pilot fresh approaches to assessing individual and collaborative problem solving and digital literacy in primary and secondary schools. This work will be done in collaboration with OECD and IEA, the leading global assessment agencies. Both intend to use the research findings in their next major rounds of assessments: OECD in Program for International Student Assessment (PISA) 2012 and IEA in 2013.

More information is available at: <http://www.atc21s.org>

