The Assessment and Teaching of 21st-Century Skills (ATC21S) is a multi-stakeholder research project that is developing ways of assessing “21st-century skills.” These assessment tools will be incorporated into teaching and learning programs around the world to prepare students to be successful as global citizens in the modern workforce.

In an increasingly global and interdependent world, the quality of a nation’s workforce is more critical than ever. In the evolving 21st century workplace the skills gap is most pronounced in the areas of critical thinking, problem solving, communication, collaboration, creativity, and innovation. Equally critical is knowledge and proficiency with the Information and Communications Technology (ICT) tools that are integral to society as a whole, and almost every industry – from agriculture and manufacturing, to services and finance, to government and national defense.

The evolution of education to meet these new requirements is more critical now than at any other time in the last century. Our children’s futures depend on it.

A GLOBAL PARTNERSHIP
Transforming education for the 21st century requires a worldwide partnership among governments, educators, academics and industry to make a real and sustainable difference.

In 2008, three multinational organizations, which together employ more than 250,000 people worldwide, came together with a university to determine how to bridge this gap. In January 2009, Cisco Systems Inc., Intel Corporation, Microsoft Corporation, and the University of Melbourne formed the Assessment and Teaching of 21st Century Skills (ATC21S) research project.

Each member organization has a long history of supporting education initiatives and believes that together they can apply their collective resources and experiences to improve learning and education. The consortium understands that for this type of reform to be sustained, a multi-stakeholder partnership made up of governments, intergovernmental organizations (IGOs), research and teaching institutions is required.

ABOUT THE ATC21S CONSORTIUM
The ATC21S project is headquartered at the University of Melbourne and led by Professor Patrick Griffin. It includes national governments (Australia, Costa Rica, Finland, Netherlands, Singapore, and the United States), intergovernmental organizations (Inter American Development Bank (IADB), International Association for the Evaluation of Educational Achievement (IEA), Organisation for Economic Cooperation and Development (OECD), United Nations Educational, Scientific, and Cultural Organization (UNESCO), The World Bank), researchers, teaching institutions, and commercial companies.

ATC21S started by defining 21st-century skills internationally as four broad categories:

WAYS OF THINKING
- Creativity and innovation
- Critical thinking, problem-solving, decision-making
- Learning to learn/metacognition (knowledge about cognitive processes)

TOOLS FOR WORKING
- Information literacy
- Information and communication technology (ICT) literacy

WAYS OF WORKING
- Communication
- Collaboration (teamwork)

WAYS OF LIVING IN THE WORLD
- Citizenship – local and global
- Life and career
- Personal and social responsibility – including cultural awareness and competence
“ATC21S is working to give governments the information, procedures and materials that will enable them to address the issue of assessment and teaching of 21st-century skills. Whether they go down this track officially and change the teaching and assessment in schools will be a long-term decision involving the marshaling of resources, materials, training, specialists and technology.”

— Patrick Griffin, ATC21S Executive Director

The ATC21S team is investigating and developing new approaches, methods and technologies that support the teaching and measuring of 21st century learning in classrooms around the world. These efforts will ultimately help prepare students not only for academic success, but more critically, for success in the workplace and in life.

ATC21S has approached this challenge by applying the problem solving and critical thinking skills that the team seeks to exemplify:

- Step 1: Define and understand the problem
- Step 2: Focus and refine the scope
- Step 3: Develop and test prototype solutions
- Step 4: Validate the prototypes
- Step 5: Scale proven results

**ASSESSMENT: A FOUNDATION FOR CHANGE**

To make changes at the classroom level, policy-makers need solid information about the skills of their student population. Gathering that data through assessment is a critical component.

Today’s international and national standards primarily measure core subject performance – math, science and reading. ATC21S is designing new assessment prototypes to help education systems include the 21st-century skills that are essential to performing better in those core subjects.

ATC21S recognizes that assessment is only one piece of the holistic education transformation approach. To make lasting change, educational systems need to develop new curricula, and provide teachers with professional development to teach 21st-century skills effectively in an ICT environment.

All outcomes of the ATC21S will be publicly available for use by governments, school officials, teachers, and local and global assessment organizations.

**PRIVATE SPONSORSHIP, PUBLIC LEADERSHIP**

The success of the ATC21S depends on collaboration across governments, IGOs, industry and academia, including experts in education and economic development.

Four countries are working with ATC21S as Founding Members to ensure the project meets the needs of governments: Australia, Finland, Singapore, and the United States.

These countries were selected based on national education quality, technological advancement in education, geographic and cultural diversity, and experience in international cooperation in education. Costa Rica and the Netherlands have also joined ATC21S as Associate Members.

To ensure that there is a strong voice from the education policy community, the ATC21S project is governed by an executive board, made up of leading academics and industry leaders from around the world, and is guided by an advisory panel, which provides expertise and advice on project direction and implementation.*

* For a list of board members and the advisory panel, visit www.atc21s.org
PROGRESS TO DATE

Step 1: Define and understand the problem
More than 250 researchers, practitioners, and assessment experts from 60 institutions around the world collaborated to prepare five whitepapers that have helped clarify and organize 21st-century learning skills and document the current state of education spanning methodology, technology, custom learning environments, formative evaluations, and policy frameworks.

These papers have been published and reviewed broadly by stakeholders across a variety of education roles around the world, and are viewed as a seminal first step in creating a 21st-century assessment approach. The first whitepaper organized the many 21st-century skills into four categories—Ways of Working, Ways of Thinking, Tools for Working, and Ways of Living in the World (see figure).

Each explores a critical aspect of practical and academic preparation for both the modern workplace, and society in general. Each category also reflects an important aspect of how most employers evaluate job candidates, and hire those with the greatest potential for adding value to their organization. Springer Publishers recently published the aims and scope of this project in a prestigious peer-reviewed volume.

Step 2: Focus and refine the scope
With a clear view of the landscape, the next step was to focus on one or two specific elements and begin the process of creating demonstrable results. The ATC21S team selected Collaborative Problem Solving, and ICT Literacy, which are critical skills for employment recruiters, span all the categories (or have the broadest “reach”), and as a “bonus,” contribute to overall academic success, and greater fulfillment in life.

Collaborative problem solving explores working as a group to solve a common challenge through the contribution and exchange of ideas, knowledge or resources.

ICT literacy—learning in digital networks focuses on learning through digital means such as social networking, information and communications technology literacy, technological awareness, and simulation. These elements enable individuals to function as consumers or producers in social networks, and contribute to the development of social and intellectual capital.

Having established the scope, the ATC21S team moved on to further describe these skills, develop hypotheses, and define the stages of progression from novice to expert. This work underpinned the next steps, and enabled the transition from theory to practice.

Step 3: Develop and test prototype solutions
Having defined, focused, and refined the problem, the team developed prototypes for testing in schools within the member countries. These prototypes include two critical elements: in- and out-of-class teaching resources with integrated formative assessments; and online summative assessments to provide school, regional, and state-level performance data, insight, and analytics.

Teams in Australia (at the University of Melbourne), and the UK (World Class Arena Limited and PIXELearning) are currently developing computer-based assessment tasks aimed at evaluating collaborative problem solving.

HOW ATC21S IS WORKING WITH TEACHERS AND STUDENTS:

Teachers review tasks for relevance, cultural sensitivity, and usefulness.

Researchers hear students share their thoughts aloud in cognitive labs as they work through tasks, to design effective tools for e-assessment.

Classroom pilot studies help field workers and teachers gauge the necessary resources, teaching strategies, and skills.

Wide-scale trials establish how well learning behaviors are captured by the assessment tasks.

WHAT ATC21S IS TRYING TO ANSWER:
1. What is meant by 21st-century skills?
2. How are 21st-century skills measured?
3. What are the implications for the classroom?
4. How is technology dealing with the change to a digital age?
5. What are the policy implications to scale 21st-century teaching and learning sustainability?
Similarly, ICT Literacy – learning in digital networks tasks are being developed centrally at the BEAR Center, University of California – Berkeley.

As part of the development process, the tasks are being translated into Finnish, Spanish, and Dutch, and tested with teachers and students from schools in the member nations. They will also be supplemented with additional resources, including teacher professional development materials.

Each task set is designed to be integrated within the in-class mainstream curriculum of any school, and will enable teachers and administrators to teach, assess, and report on their students’ 21st century skills proficiency.

It is expected that this work will be completed by January 2012, at which time some 8 hours of assessment activities will have been developed, translated, tested (in up to six countries), and documented.

Step 4: Validate the prototypes
Large scale testing and validation is of course critical to widespread adoption; schools will rightly resist implementing new teaching resources without affirming that they were subject to both academic and practical rigor; and only when they can see the differentiated results for themselves, will they implement change in their schools.

To prepare for these broad trials, a scalable web-based delivery platform is required. While they plan to use a platform at the University of Melbourne for the testing in Step 3, the ATC21S team implemented an innovative crowd-sourced approach through which they have identified a potential development partner, with a view to implementing a complete, “production,” multi-national assessment delivery system by April 2012.

In addition, the team is also conducting a political ecosystem analysis and developing a policy guide based on this that will enable states to implement change in an efficient and efficacious manner.

Step 5: Scale proven results
The work does not end when the teaching materials, assessment tools, and delivery platform are completed; it is but the end of the beginning. The next step is to enable and support change in school around the world – no small task.

This is why the ATC21S team prioritized assessments, which play a critical role in setting standards or benchmarks, and influence curricula at local, regional, national and global levels. This makes them an ideal catalyst for change.

But ATC21S also recognizes that a comprehensive approach is critical, with implications at both the teaching and policy levels, and that change is most likely when a system view is considered; they therefore include other resources like teacher training, supplemental learning content, and sample in–class formative assessments.

Moreover, most governments around the world measure the effectiveness of their education systems by comparing them with those of other countries. The most common frameworks for comparison are the OECD Programme for International Student Assessment (PISA), and the IEA International Computer and Information Literacy Study (ICILS).

The ATC21S relationships with OECD and IEA have enabled the partnership to promote the inclusion of 21st century skills within their assessments, and it is very exciting to see that both will include these most vital elements within their 2013 (ICILS), and 2015 (PISA) rounds.
“The benefits to governments (of ATC21S): they will have information, procedures and materials that will enable them to address these issues of assessment and teaching of 21st-century skills.”

– Patrick Griffin, ATC21S Executive Director

“The number of careers today is skyrocketing, and the ability to help students learn how to learn will be critical to their success.”

– Dr. Kathleen Scalise, BEAR and University of Oregon, U.S.

**WHAT ATC21S WILL DELIVER**

The success of the ATC21S depends on collaboration across governments, IGOs, industry and academia, including experts in education and economic development.

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**Policy:**

A comprehensive, peer-reviewed set of whitepapers covering methodological, technical, and policy issues. A policy framework to help transform current schools systems into 21st century skills, learning ecosystems.

**Teaching:**

Formative (teaching resources and assessments), and summative (aggregated system wide competence and gap analysis) assessments.

Multilateral online assessment and reporting system to ensure broad and timely access to content and reporting.

Exemplar tasks and prototypes to describe the assessments.

Learning progressions that define what teachers will see as students’ skills improve, and ways to help them make progress.

Teachers Professional Development program on how to most effectively use the assessment data produced.

**Infrastructure:**

Delivery platform plus guidelines on creating local implementations.

Technical requirements - software, hardware, networking, and administrative services.

Case studies – sharing local and national best practices.

For more information, please visit [www.atc21s.org](http://www.atc21s.org). You can also join in our conversations on LinkedIn and follow our latest news on Twitter.