

Supporting the effective assessment and teaching of 21st-century skills

ATC21S

Introduction

Assessment and Teaching of 21st Century Skills (ATC21S), formed in January 2009 by Cisco Systems Inc., Intel Corporation, Microsoft Corporation and the University of Melbourne, is a multi-stakeholder research project that has investigated and developed cutting-edge approaches, methods and technologies to support the assessment and teaching of 21st-century skills. These efforts will ultimately help prepare students not only for academic success but also for success in the workplace and in life.

Headquartered at the University of Melbourne, ATC21S is a collaborative venture involving more than 260 international researchers, developers, education specialists, practitioners and other experts. It includes national governments (Australia, Costa Rica, Finland, the Netherlands, Singapore and the United States), as well as intergovernmental organisations such as the Inter-American Development Bank (IADB), the International Association for the Evaluation of Educational Achievement (IEA), the Organisation for Economic Co-operation and Development (OECD), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Bank. It also includes researchers, teaching institutions and commercial companies.

Ensuring common international standards, assessments and terminologies

ATC21S represents an international effort to broker common standards, assessments and terminologies in 21st-century skills around the world.

- It fills a critical gap between existing basic research on assessment design and methodologies and the implementation of large-scale assessments that provide reliable data at reasonable cost.
- It provides a system for understanding, measuring and reporting 21st-century skills and for helping teachers teach to them, whether at the individual, class or system level.
- The assessments evaluate student achievement, identify gaps in development or competence and can potentially be used to pinpoint where curriculum change is needed.
- The assessment structure will allow for fast feedback that will potentially shorten timeframes for policy and curriculum decisions while also allowing for monitoring system-level achievements in 21st-century skills.

- ATC21S has already played a groundbreaking role in producing assessment and reporting tools that are at once effective, scalable and translatable across national, cultural and linguistic borders.

This integrated system of assessment, reporting and teaching includes not only computer-based assessment tasks but also a set of powerful, interrelated formative assessment tools and support materials. For example, a set of cloud-based tasks is used to assess and measure current skill levels as well as learning progressions in collaborative problem-solving and information and communication technology (ICT) digital literacy; collaborative problem-solving explores working as a group to solve a common challenge through the contribution and exchange of ideas, knowledge or resources; and ICT digital literacy focuses on learning through digital means such as social networking, 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. Behind-the-scenes data analysis takes all the work done on the tasks and links the data into a report module that provides reports for students and teachers and, where applicable, to systems.

Reporting modules show skill assessments at the individual, class and system levels rather than reporting grades or scores. Learning progressions explain skill level advancement and link to strategies for helping students to progress; professional development materials support effective use of the assessment data and are a basis for designing classroom activities for 21st-century skills; and case studies offer examples from participating countries on the impact of the project, as well as suggestions on local and national best practices for implementing the assessment and teaching materials.

There is a policy framework with recommendations for effective policy changes to support 21st-century skills initiatives. Countries involved with ATC21S have been working to adopt curriculum goals emphasising skills such as problem-solving, critical and creative thinking, collaboration, communication and technology literacy. They also support professional learning for teachers and, in a few cases, demonstrate some of these abilities in assessment systems. Depending on their policy contexts, partner countries envision strategies for incorporating the ATC21S model into local or national assessments; duplicating and designing similar tasks; using the tasks and learning progressions to inform the development of instructional materials; supporting formative professional development for teachers; and continuing research on both task design and the influences of these kinds of tasks on student learning. The ATC21S project is a vehicle for extending

these efforts, and the policy framework details how this can potentially be done.

Support materials also focus on technical requirements, including suggestions on bandwidth, software, hardware and administrative procedures.

What are the outcomes of the ATC21S research?

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).

In early 2012, PISA announced that it would assess collaborative problem-solving skills in 2015. At that time, Andreas Schleicher, the Special Advisor on Education Policy to the Secretary-General and Head of the Indicators and Analysis Division at the OECD, acknowledged the leadership and research of the ATC21S team when he said:

ATC21S has played an essential pathfinder role to move the assessment agenda forward. It fills a critical gap between existing basic research on assessment design and

methodologies, on the one hand, and the implementation of large-scale assessments that provide reliable data at reasonable cost, on the other. Its latest venture, the piloting of tasks to assess collaborative problem-solving skills, provides important insights for OECD's efforts to broaden future PISA assessments to encompass interpersonal skill dimensions.

The project has also received high praise from Dr Robin Horn, the Education Sector Manager of the World Bank's Human Development Network (see Box 1).

The countries involved conducted wide-scale fieldwork trials and worked tirelessly to research how students thought and worked through the tasks that the ATC21S team developed. They also collected data on how teachers help students to develop their competencies. Both teachers and students have reacted favourably to the structured collaborative problem-solving and learning through digital means (see Box 2). The Costa Rican, Dutch and

Box 1

Kudos for the innovative approach of the ATC21S project

As I see it, this remarkable [ATC21S] initiative appears to have succeeded in operationalising what had been heretofore consigned to rhetoric, and has done so in a truly remarkable way. It has cracked the code on how to set standards for, and assess the acquisition of, 21st-century skills. Measuring the so-called 21st-century skills, such as critical thinking, problem-solving, collaboration and teamwork, ICT competencies, and information literacy in a rigorous and pragmatic way has been totally out of reach until now. The ATC21S initiative harnesses ICT tools to both present complex, multi-step, cognitively challenging problems to pairs of students in real time, and also to then assess how each and both of these students collaborate and solve these problems, even when separated from one another in different desks, rooms, or even countries. The data generated from these assessments may one day even be in the 'big data' category due to their depth, breadth, imagery, and completeness, since they appear to be tracking every step and decision taken, every instant and online communication exchanged, and every character typed. This is time-stamped and recorded digitally, for each participant in every pair, and in comparison with multiple pairs of students taking the same test at the same time. [This assessment programme] is a harbinger of a wholly new approach to standards and assessment for the 21st century and may lead to schools that succeed in engaging the 21st century 'turn on, tune in, and drop out' digitally native generation in exciting new ways to make learning for all a more achievable reality.

Dr Robin Horn, Education Sector Manager, Human Development Network, World Bank.

Box 2

Some comments from the field

Students:

There are activities that you and your partner do and you see different things on the screen.

You've got to type in the chat and tell your partner what you see so they can understand how you do the tasks.

At first it was hard to not get frustrated ... but it's getting easier as we do more of it.

We explain things if we don't get it or we ask each other questions.

Teachers:

No guesswork, no assumptions. We're gathering empirical evidence and we're using technology to do it.

The students weren't given exactly the same problems and information, so they really had to rely on each other to help solve the problems.

I found using the ATC21S skill progressions really challenged my thinking about the learning experiences I plan for my students. They helped me to ensure that the tasks planned are rich, providing real opportunities for deep learning across multiple subjects. Being able to assess student learning against the social and cognitive progressions provides data around how students are developing in areas teachers previously found difficult to assess. These skill progressions and resources offer teachers accessible tools and an easy-to-use framework for planning learning experiences that are appropriate for contemporary classrooms.

What excites me about using the development of the social and cognitive problem-solving progressions is that it makes conscious something that has always been a crucial part of learning, yet always pushed to the margins of curriculum planning and assessment. It offers the potential for teachers to understand students and their interrelations in a whole new light, focusing on how they are doing things, not just what they are producing.

It was great to see their reaction once they solved the task. It was like 'woohoo!' And they were able to move on to the next task.

Finnish teams translated the tasks into the respective languages of their countries and also examined how language and culture affected the 21st-century teaching and assessments.

The team has produced five conceptual white papers covering 21st-century skills, methodical issues, technological challenges, classroom and formative evaluation, and policy frameworks. These are available for immediate download on the ATC21S website at <http://atc21s.org/> or may be purchased in a peer-reviewed, edited book (Griffin et al., 2012). The ATC21S team will also release a policy report, based on experiences in and with the participating countries, with recommendations on implementing the project materials and findings.

Next steps

The work does not end when the assessment tools, teaching materials and delivery platform are completed; this is only the end of the beginning. The next step is to enable and support change in schools and education systems around the world. ATC21S recognises 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. It therefore includes other resources such as professional development materials for teachers, supplemental learning content and sample in-class formative assessments.

ATC21S resources are placed in the public domain via the project website. In this way, they can be accessed and incorporated into

teaching and learning programmes around the world. Each task set is designed to be integrated into the mainstream curriculum of any school and will enable teachers and administrators to teach, assess and report on their students' 21st-century skills proficiency. Government policy-makers, teachers, school systems and assessment institutions will be able to use and modify the existing research and materials.

ATC21S is interested in pairing with curriculum designers, school administrators and government officials in their efforts to formally include 21st-century learning and assessments in their school systems and assessment development agencies. The ATC21S model could also be used to build additional 21st-century skills. Taken as a whole, it is the team's hope that this system for assessing and teaching to 21st-century skills will produce a shift in education systems worldwide.

Reference

Griffin, P., McGaw, B. and Care, E. (eds.) (2012). *Assessment and Teaching of 21st Century Skills*. New York: Springer. Available at: <http://www.springer.com/education+%26+language/book/978-94-007-2323-8?changeHeader>

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MICHAEL IMOUDU NATIONAL INSTITUTE FOR LABOUR STUDIES



Background

Michael Imoudu National Institute for Labour Studies (MINILS), Nigeria's foremost labour institution, was established in 1986 by a statute of the Federal Government of Nigeria.

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To be a regional centre of excellence in labour studies and a globally renowned Labour Institution.

Mission statement

Building the capacity of workers, employers and government officials in Labour and Industrial Relations through Training, Research, Education and Inter-Institutional linkages to promote Labour Management Relations Best Practices and Industrial Harmony for Sustainable Development.

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Institutional network

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- International Training Centre, Turin
- National Labour College, Maryland, USA
- American Center for International Labour Solidarity
- Organization of African Trade Unions Unity
- West African Management Development Institutes Network
- Nigeria Labour Congress
- Trade Union Congress of Nigeria
- Nigerian Employers Consultative Association



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