APEC Session: Promising Practices in the Assessment of 21st-Century Competencies and Skills

Purpose: Information
Submitted by: United States
APEC Session: Promising Practices in the Assessment of 21st-Century Competencies and Skills: Lessons from the ATC21S

Kathleen Scalise

The ATC21S partnership

- Founding Partners
  - Cisco, Intel, Microsoft
- Founder Economic Jurisdictions
  - Australia, Finland, Portugal, Singapore, England, USA
- Participating Scholars and Educators
- Developers of Scenarios
  - ICT Literacy: UC Berkeley and University of Oregon
  - Collaborative Problem Solving: World Class Arena
- Advisory panel include:
  - OECD
  - IEA
  - UNESCO
  - World Bank
  - Inter American Development Bank
  - U.S. National Academy of Sciences
  - International Test Commission
Communications

Bell to iPhone

Communications

Marconi to satnav
Education when?

Classrooms

http://www.juliangermain.com/projects.php
Classrooms

http://www.juliangermain.com/projects.php
SEOUL, South Korea—A computer class at Gyeseong Elementary School, a Catholic elite school in southern Seoul, 2007.

© Thomas Hoepker / Magnum Photos

YEI, Sudan—At the village school, classes are held outdoors, because the small mud huts cannot accommodate all the children who want to learn to read and write; there are few textbooks, and children learn to write on the dusty ground, copying letters from a blackboard, 1954.

© George Rodger / Magnum Photos
From focus to breadth

- **Realistic** - practical, physical, hands-on, tool-oriented
- **Investigative** - analytical, intellectual, scientific, exploratory
- **Artistic** - creative, original, independent
- **Social** - supporting, helping, healing/nurturing
- **Enterprising** - competitive, leading, persuading
- **Conventional** - detail-oriented, organising, systematic

Holland (1973, 2002)

Important New Findings in Neuroscience

- 60% of synaptic connections (neural pathways) in brain are “pruned” in early childhood through the school-age years. — (UCLA Memory & Aging Research Center)
- Most are *permanently* eliminated. — (Dr. Gary Small, UCLA)
- Neuroplasticity: “What gets fired gets wired.”
Defining 21st Century Skills

- **Ways of thinking**
  - Creativity and innovation
  - Critical thinking, problem solving
  - Learning to learn, metacognition

- **Ways of working**
  - Communication
  - Collaboration (teamwork)

- **Tools for working**
  - Information literacy
  - ICT literacy

- **Living in the world**
  - Citizenship – local and global
  - Life and career
  - Personal, social responsibility

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Collaborative problem solving

- Collaborative problem solving
  - Socio-cognitive skills
    - Participation
    - Perspective taking
    - Social regulation
  - Cognitive skills
    - Task regulation
    - Knowledge building
ICT Literacy Constructs

1. Functioning as a consumer involves obtaining, managing and utilizing information/knowledge from shared digital resources and experts.
2. Functioning as a producer involves creating, developing, and organizing information/knowledge in order to contribute to shared digital resources.
3. Developing and sustaining social capital involves using, developing, moderating, leading and brokering the connectivities within and between social groups in order to marshal collaborative action for learning.
4. Developing and sustaining intellectual capital through social networks involves understanding how tools, media and social networks operate; and using these tools, techniques and resources to build collective intelligence and integrate new insights into personal understandings.
ICT Literacy Task Demonstration

<table>
<thead>
<tr>
<th>Scenario 1: Webspirational</th>
<th>Scenario 2: Arctic Trek</th>
<th>Scenario 3: 2nd Language Chat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Web 2.0 Tools</strong></td>
<td><strong>Team Size</strong></td>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>Concept Mapping, Audio/Video, Podcast Creation, Resource Sites, Screen Recorder</td>
<td>3</td>
<td>Asynchronous within Country</td>
</tr>
<tr>
<td><strong>Constructs</strong></td>
<td><strong>Team Size</strong></td>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>ICT Producer, Consumer, Intellectual Capital</td>
<td>4</td>
<td>Synchronous within Country</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td><strong>Team Size</strong></td>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>Verbal</td>
<td>2</td>
<td>Synchronous between Countries</td>
</tr>
<tr>
<td><strong>Subject Matter</strong></td>
<td><strong>Constructs</strong></td>
<td><strong>Context</strong></td>
</tr>
<tr>
<td>Humanities</td>
<td>ICT Producer, Consumer, Social Capital</td>
<td>Analytic</td>
</tr>
</tbody>
</table>
| **Web 2.0 tools:** Concept mapping audio/video movie creation resource sites screen recording Teaming collaborative suite spreadsheets tagging software chat tool rating guides **Within context of humanities, maths/science and second language acquisition**

Example of a web resource/stimulus

Web 2.0 tools: Concept mapping audio/video movie creation resource sites screen recording Teaming collaborative suite spreadsheets tagging software chat tool rating guides

**Greenhouse Simulation**

- **City**: Tucson, AZ
- **Latitude**: 32° 16' 9"
- **Longitude**: 110° 36' 48"

**Parameters**

- **Temperature**
- **Humidity**
- **Lighting**
- **Watering**
- **Soil pH**

**Data**

- **Solar Radiation**
- **Air Temperature**
- **Nutrient Availability**
- **Shade Blockage**

**Messages**

- **Error Message**
- **Status Message**
Why Assessments?

For Example, U.S. National Science Board:

America's Pressing Challenge — Building A Stronger Foundation

“Experience has shown us, in education, what gets measured gets taught. Science and mathematics are fundamental skills. They teach us to think critically and analytically. Therefore, assessments must measure more than simple recall. They must measure problem-solving skills. Measurements should support student learning that enhances the application of knowledge.”
Jim Collins (e.g. “Good to Great”)

- “People have to switch their psychology from figuring out the 15 ways why something can’t work to the 15 ways that we can MAKE it work. In my classes [at] the Stanford Business School, most of the MBA students are tremendously good at shooting down business ideas. They can say, ‘This is wrong and this is wrong and this is why it won’t work. These are the 15 reasons why these entrepreneurs will fail.’ And so what we need to do is to get people out of this mindset by saying ‘you know, that idea has some promise. Let’s take that idea and turn it into something that’s real.’” - James Collins, Stanford Business School

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### Extensive Assessment Blueprints

#### Table 1.

**Assessment Blueprint ATC215 Demonstration Tasks: ICT Literacy**

<table>
<thead>
<tr>
<th>Levels (Progressive)</th>
<th>Consumer</th>
<th>Producer</th>
<th>Social Capital</th>
<th>Intellectual Capital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>Web5 Arctic4</td>
<td>2LChart7</td>
<td>Web2</td>
</tr>
<tr>
<td>Level 4</td>
<td></td>
<td></td>
<td>Web6 Arctic5</td>
<td>2LChart9</td>
<td>Web18</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>2LChart1</td>
<td>Arctic3</td>
<td>2LChart7</td>
<td>Web9 Arctic4</td>
<td>Web2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2LChart1</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>2LChart1</td>
<td>Arctic2</td>
<td>2LChart7</td>
<td>Web11 Arctic6</td>
<td>Web14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2LChart9</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td></td>
<td>Arctic1</td>
<td>2LChart7</td>
<td>Web11 Arctic6</td>
<td>Web14</td>
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<tr>
<td></td>
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<td></td>
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<td>2LChart9</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2LChart1</td>
<td>Arctic1</td>
<td>2LChart7</td>
<td>Web12 Arctic5</td>
<td>Web25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>104 total item scores</td>
</tr>
</tbody>
</table>

*If CR based (Constructed Response), item measures all levels up through the listed level (top score).
• Use your teaching expertise to advise us.
• Review three scenario ideas that we have for assessing the ICT literacy skills.
• Give us your honest, open feedback so that we can improve the tasks.
• We would like to audiotape the session so that we do not miss any of your input.
Example: Poetry Task (suggested by U.S.)

• Generally, the teachers felt that the design of this task was well aligned to the four ICT literacy constructs targeted.

Consumer & Producer
• “The poem is used as a medium to test capabilities in ICT.”
• “Basic internet skills, click, drag, paste, negotiate pages, make video. One secondary school teacher says of his age 13 and 15 students: ‘The kids will get it faster, all quite simple. The instructions are a bit slow for them but they will get the hang of it very soon.’”
• “Self-learning skills there.”
One economy’s feedback on 2L Chat:

• “Very good task”
• “Interesting for both students and teachers”
• “All will benefit a lot from this kind of a ‘real’ life situation in the task”
• “Chatting also in English is probably well-known and frequently used for the students. For the teachers this was new.”

A different economy’s feedback on 2L Chat:

• One teacher sees task as “pointless, random chat with limited criteria, with no proper connection with the partner.”
• Our age 11 students “will not have a problem facilitating a simple chat topic that seeks to elicit simple information but might have issues eliciting deeper meaning in the conversation.”
• One teacher: Our “students are used to following instructions. It will not make sense.”
# Next Steps

1. **Teacher Task Concept Workshops** are completed and 2011 Task Versions have been released.

2. **Cognitive Laboratories** have launched this month, and are taking place in four economic jurisdictions (Australia, Finland, Singapore, U.S.)

3. Many more regions have asked to join the project and project headquarters in Australia looking at roles for additional economies

4. **Workshops** will be held following AERA (American Educational Research Association) annual meeting in April 2011, with pilot study.

5. **Field Trials** starting in August/September 2011 (extending to Russia, Japan and Costa Rica in addition to the cog lab regions)

6. **Measurement Results across trials** (teacher task concept, cognitive laboratories, pilot study, field trials) and sharing of a Resource Kit for 21st Century Educators expected Berlin & Australia Sept-Dec 2011.