Learning and Assessments for the age of Artificial Intelligence
Mission Statement

Help humanity meet its potential via deep redesign of Education
First global organization to focus on the *What* of Education in an age of A.I

Standards/ Curriculum + Assessments*

* Scorecards drive behavior...
with key global players

<table>
<thead>
<tr>
<th>International Organizations</th>
<th>Asia Society</th>
<th>SSATB</th>
<th>NAIS</th>
<th>OECD</th>
<th>UNESCO</th>
<th>World Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdictions</td>
<td>Finland</td>
<td>South Korea</td>
<td>Canada</td>
<td>China</td>
<td>Singapore</td>
<td>Australia</td>
</tr>
<tr>
<td>Academia</td>
<td>Harvard</td>
<td>MIT</td>
<td>Olin College</td>
<td>Penn</td>
<td>Stanford</td>
<td></td>
</tr>
<tr>
<td>Foundations &amp; Non-Profits</td>
<td>Fondation Henri Moser</td>
<td>Bill &amp; Melinda Gates Foundation</td>
<td>Argosy Foundation</td>
<td>Ellen Koshland Family Fund</td>
<td>ACARA</td>
<td>AT&amp;T Foundation</td>
</tr>
<tr>
<td>Corporations</td>
<td>area9 Learning</td>
<td>Google</td>
<td>IBM</td>
<td>Intel</td>
<td>Microsoft</td>
<td>Promethean</td>
</tr>
</tbody>
</table>
A FAILURE OF EDUCATION...

Technological disruptions

Global Warming

Financial instability

Income inequities

Political partisanship

Pollution (plastic etc.)

Antibiotic Resistance

Religious intolerance

Personal privacy

Overpopulation
What will we/our children need to be successful in that (A.I.) world?
Cognitive Domain and Algorithms

<table>
<thead>
<tr>
<th>Cognitive Domain</th>
<th>Example Images</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATING</td>
<td>The Painting Fool</td>
</tr>
<tr>
<td>Synthesizing</td>
<td>Invention Machine</td>
</tr>
<tr>
<td>EVALUATING</td>
<td>Medal Leaderboard</td>
</tr>
<tr>
<td>ANALYZING</td>
<td>Lex Machina</td>
</tr>
<tr>
<td>APPLYING</td>
<td>Google Translate, Skype</td>
</tr>
<tr>
<td>UNDERSTANDING</td>
<td>DRAGON Naturally Speaking</td>
</tr>
<tr>
<td>REMEMBERING</td>
<td>Facebook</td>
</tr>
</tbody>
</table>

Source: Bloom/Anderson
# Affective Domain and Algorithms

<table>
<thead>
<tr>
<th>INTERNALIZING</th>
<th>ORGANIZING</th>
<th>VALUING</th>
<th>RESPONDING</th>
<th>RECEIVING</th>
</tr>
</thead>
</table>

Source: Krathwohl, Bloom, Masia
## Psychomotor Domain and Algorithms

<table>
<thead>
<tr>
<th>ORIGINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAPTATION</td>
</tr>
<tr>
<td>COMPLEX OVERT</td>
</tr>
<tr>
<td>RESPONSE</td>
</tr>
<tr>
<td>MECHANISM</td>
</tr>
<tr>
<td>GUIDED RESPONSE</td>
</tr>
<tr>
<td>SET</td>
</tr>
<tr>
<td>PERCEPTION</td>
</tr>
</tbody>
</table>

Source: Simpson
# PIAAC Literacy: OECD Adults vs. AI

<table>
<thead>
<tr>
<th>Proficiency Level</th>
<th>OECD Adults</th>
<th>AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 and below</td>
<td>53%</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>35%</td>
<td>Close</td>
</tr>
<tr>
<td>4-5</td>
<td><strong>11%</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

Skills Required

1. Creativity
2. Critical Thinking
3. Communication
4. Collaboration
SUCCESS AROUND THE WORLD


Figure 3  Most Frequently Identified 21st Century Skills

- Communication: 30 countries
- Creativity: 23 countries
- Critical Thinking: 20 countries
- Problem Solving: 19 countries
SUCCESS AROUND THE WORLD

BIAC Survey 2015: Character Qualities for the Workplace

Q5: Do you see character qualities for the workplace becoming a more important issue for your organization in the future?
BIAC Survey 2015: Character Qualities for the Workplace

Employers consider the following character qualities as being of “very high” importance to the workplace (in descending order):

1. Ethics
2. Leadership
3.= Resilience = Curiosity
4. Mindfulness
5. Courage
What is holding us back?

University Entrance Requirements
Higher Ed Biases Assessments!

- Work
  - Incomplete and changing

- LIFE
  - Unclear and changing

- Higher Education
  - Clearer but outdated

- School (preK-12)
  - HUGE impact on Standards & Assessments
And a Sobering Reality

“...there is nothing... more dangerous to manage than a new system. For the initiator has the enmity of all who would profit by the preservation of the old institution and merely lukewarm defenders in those who gain by the new ones.”

Nicolo Machiavelli

“The Prince”
What is holding us back?

Assessments
Logically - Our Responsibility

“All men are mortal. Socrates is a man \(\rightarrow\) Socrates is mortal”

“Lack of/poor education is at the root of human problems. Assessments define the education we get. \(\rightarrow\) Assessments are the root of human problems”
“What gets measured gets managed”
Lord Kelvin
The science of assessments is lagging

“The Emperor has no clothes!”  Source: Hans Christian Andersen “The Emperor's New Clothes” (1835)
Education Research is Lagging

Public expenditures in education and health as % of GDP (2014)

Share (%) of public research budget on education and health (2014)

Source: Andreas Schleicher, OECD

5X lower R&D!
Needs large and *patient* capital
At a time of critical need

- Lack of unifying framework $\rightarrow$ imprecise outcomes
- Fragmentation $\rightarrow$ lack of critical mass to tackle complexity
- Assessment gap $\rightarrow$ preventing scaling of transformation:

$\rightarrow$ VERY slow progress worldwide!
Pre-competitive R&D consortium

• 20+ years, >50% of world semiconductor capacity
• IBM, Intel, AMD, T.I., Toshiba, Samsung, Micron, TSMC, etc.
• “We reduce cost and risk”
Pre-competitive R&D consortium

“To collate, curate and host datasets for use by the entire research community”

Other examples:
- Innovative Medicines Initiative
- Biomarkers Consortium
- Predictive Safety Testing Consortium
- Coalition Against Major Diseases
ARC’s Mission Statement

To catalyze the development of systems of assessments for Knowledge, Skills, Character, and Meta-Learning competencies, by

• Aligning stakeholders behind a common framework

• Rapidly advancing and disseminating research, development and practice (R&D+P)
Focus on “21st Century Skills”, “Social-Emotional Learning”
Granting Organizations to date

ARGOSY FOUNDATION

Ellen Koshland Family Fund

nellie mae education foundation

OAK FOUNDATION

PORTICUS
Members & Advisory Board

ACT
National Association of Independent Schools
NZQA
New Zealand Qualifications Authority
Mana Tohu Matauranga O Aotearoa

The University of Melbourne

The Enrollment Management Association
Yield Your Best

The World Bank

OECD

The Conference Board

© Center for Curriculum Redesign
Value for Members

1. Accelerate/expand their own products and services by participating in/benefiting from joint R&D *funded by grants*

2. Help the world of education progress much faster, for everyone’s sake
Workforce Assessments for the 21st Century: What do we actually measure?

March 25th, 2016
contact: info@curriculumredesign.org


Evolving Assessments for a 21st Century Education

Maya Bialik
Jonathan Martin
Merrilea Mayo
Bennie Trilling

February 15th, 2016
contact: info@curriculumredesign.org


Draft:
• Curiosity
• Metacognition

© Center for Curriculum Redesign
Scorecard Drives Behavior

Excuses

Responsibility
Thank You

“What should students learn for the 21st century?”

www.curriculumredesign.org
Twitter: @CurrRedesign #4DEdu
Charles@curriculumredesign.org