DÉVELOPPER ET ÉVALUER LA CRÉATIVITÉ
ET L’ESPRIT CRITIQUE
DANS L’ÉDUCATION

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education for innovation
Skills and education for innovation
« 21st Century Skills »
Critical skills for the most innovative jobs (according to tertiary-educated workers)

<table>
<thead>
<tr>
<th>Skill</th>
<th>Likelihood (odds ratio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>come with new ideas/solutions</td>
<td>3.90</td>
</tr>
<tr>
<td>willingness to question ideas</td>
<td>3.00</td>
</tr>
<tr>
<td>present ideas in audience</td>
<td>2.81</td>
</tr>
<tr>
<td>alertness to opportunities</td>
<td>2.71</td>
</tr>
<tr>
<td>analytical thinking</td>
<td>2.60</td>
</tr>
<tr>
<td>coordinate activities</td>
<td>2.58</td>
</tr>
<tr>
<td>acquire new knowledge</td>
<td>2.51</td>
</tr>
<tr>
<td>mobilize capacities of others</td>
<td>2.42</td>
</tr>
<tr>
<td>make your meaning clear</td>
<td>2.36</td>
</tr>
<tr>
<td>master of your own field</td>
<td>2.36</td>
</tr>
<tr>
<td>write reports or documents</td>
<td>2.35</td>
</tr>
<tr>
<td>write and speak a foreign language</td>
<td>2.20</td>
</tr>
<tr>
<td>use computers and internet</td>
<td>2.19</td>
</tr>
<tr>
<td>work productively with others</td>
<td>2.19</td>
</tr>
<tr>
<td>use time efficiently</td>
<td>2.15</td>
</tr>
<tr>
<td>perform under pressure</td>
<td>2.09</td>
</tr>
<tr>
<td>negotiate</td>
<td>2.08</td>
</tr>
<tr>
<td>knowledge of other fields</td>
<td>2.05</td>
</tr>
<tr>
<td>assert your authority</td>
<td>1.83</td>
</tr>
</tbody>
</table>

Source: Avvisati, Jacotin and Vincent-Lancrin (2013), based on REFLEX and HEGESCO data
What individual skills should education systems foster?

- **Technical skills** (know-what and know-how)
- **Behavioural and social skills** (Self-confidence, energy, perseverance, passion, leadership, collaboration, communication)
- **Creative and critical thinking skills** (Observation, curiosity, making connections, imagination, multiple perspectives...
fostering an assessing creativity and critical thinking
• Need for a common language, social representation and guidance about what some desired skills actually mean

• Skills that are not assessed are not taught consistently, but teachers need to teach what they assess

• There is generally little space for students to develop and demonstrate creativity and critical thinking as part of their usual disciplinary learning

• Start a process of change: pilot, prototype and develop pedagogical resources as a proof of concept for other teachers – before validation and possibly scale up (second phase)
Participation in primary and secondary education

• Participation in 11 countries overall
  – Brazil, France (3), India, Hungary, Netherlands, Russia, Slovakia, Spain, Thailand, United Kingdom (Wales), United States (3)

• 1st round (2015-16, 2016) in 9 countries
  – Brazil, France (3), India, Hungary, Netherlands, Russia, Slovakia, Thailand, United States (3)

• 2nd round (2016-17) in 9 countries
  – Brazil, France, India, Hungary, Russia, Spain, Thailand, United Kingdom (Wales), United States (2)
A pedagogical toolkit

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Dimensions</td>
<td>Specific for each domain</td>
<td>Specific for each domain</td>
<td>For each domain</td>
</tr>
<tr>
<td>Levels of progression</td>
<td>Designed to test dimensions and levels of progression</td>
<td>Designed to prepare for the assessment</td>
<td>As examples of different skill levels</td>
</tr>
</tbody>
</table>
Starting point: 5 creative habits of mind (21st century skills)

Source: Lucas, Claxton and Spencer (2013)
<table>
<thead>
<tr>
<th>INQUIRE</th>
<th>CREATIVITY (Coming up with new ideas and solutions)</th>
<th>CRITICAL THINKING (Questionning and evaluating ideas and solutions)</th>
</tr>
</thead>
</table>
|         | • Feel, empathise, observe, describe relevant experience and information  
         | • Explore, seek and generate ideas                             | • Understand context/frame and boundaries of the problem          
|         |                                                  | • Review alternative theories and opinions and compare/find perspectives on the problem |
| IMAGINE | • Make connections, integrate other disciplinary perspectives  
         | • Stretch and play with unusual/risky/radical ideas            | • Identify strengths and weaknesses of evidence, arguments, claims and beliefs  
|         |                                                  | • Challenge assumptions, check accuracy, analyse gaps in knowledge |
| DO / SHARE | • Envision / Express / Produce / Prototype new product / solution / performance  
            | • Appreciate the novelty of solution and/or possible consequences | • Appraise / Base / Justify opinion/products on logical, ethical or aesthetic criteria/reasoning  
|         |                                                  | • Acknowledge own bias (as perceived by others) and uncertainty/limits of endorsed opinion/solution |
Uses of the rubric

• To develop new pedagogical activities

• To improve existing pedagogical activities

• To develop new rubrics (domain-specific, to assess students, self-assessment, etc.)

• To assess student work

• To keep in mind the importance of these competences
a monitoring framework with a quasi-experimental design
Contextual data collection

**B1. Subject-based assessment**
- Standardised assessment of academic achievement
  - (maths and science; visual arts and music)

**B2. Creativity assessment**
- Standardised test for creativity (EPoC)
  - (domain-specific)

**B3. Survey questionnaires**
- School principals
- Teachers
- Students

**B4. Interviews / focus groups**
- Teachers
- Students
What factors influence the outcomes?

- Pre-tests and questionnaires at the beginning of the intervention:
  - Are differences related to baseline in achievement, creativity, to student beliefs, to pedagogies, to socio-economic background, etc.?

- Observations and discussions within the network
What effects of the intervention?

• Measures after the intervention:
  – Post-tests and questionnaires
  – Qualitative observations of pedagogies
  – Interviews

• Matched control group (with some kind of intervention as well)
examples
effects on teaching, learning
Primary education: I have to use my imagination
Primary education:
I have to make connections between different school subjects

Control  |  Intervention
--- | ---
Pre | Post
-3.4 | +3.2
Primary education: I have to look for several explanations
Primary education: I do NOT only learn what I am interested in
Primary education: interest in maths and science

Increase in the percentage of students interested between pre and post.
Out of school effects
Primary education: I try to explore new things
Primary education:
I am curious about many different things
standardised tests
Primary education:
Performance in maths and science tests

Control

Intervention

Pre

Post

+5.0

+10.9
Primary education: Performance in visual art and music test

- Pre test VAM: 64
- Post test VAM: 66

Difference:
- Control: +1.7
- Intervention: +3.47
examples
• Launch a new strand in tertiary education

• End of pilot phase in 2018

• Design of a validation phase based on developed resources
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THANK YOU

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