12 EVALUATION: FROM ONE-DIMENSIONAL TO MULTIDIMENSIONAL
Demonstrating that the desired outputs, outcomes and impact were successfully achieved is a critical yet difficult task. The shifts in the learning landscape reported in this publication fundamentally challenge the traditional ways of evaluation and assessment. When education is driven by the acquisition of information on a specific subject contained in textbooks, then assessments can be easily standardized and scaled in the form of exams. However, as in the case of CIE, when outputs include physical artifacts, outcomes are competence-focused and the impact is presumed to reach society-at-large, and so evaluation becomes extremely complicated. Furthermore, evaluation needs to carefully consider the collaborative and self-determined nature of learning, as well as the learning journey itself.

According to Mulgan and colleagues, any assessment of learning outcomes must begin with the setting of two critical parameters: (1) the scope of learning, that is, what is it that a student of a particular subject/domain should learn? (2) the mode of assessment, that is, how can we ascertain the extent to which the student has actually acquired the requisite knowledge of the subject/domain? Importantly, assessments should have a clear value to the learners, and these values should be clearly communicated to them. As another report aptly puts it, assessments should be “educational experiences themselves, ... composed of ‘worthy’ authentic learning tasks” and should be accompanied by “supportive and actionable feedback based on the results.”

Some universities have already been experimenting with assessments. For example, Stanford University introduced a “PBL model” that denotes Problem, Project, Product, Process and People-Based Learning. This model uses a cross-disciplinary knowledge framework to grade engineering students partially on the basis of their understanding of other related fields as well as on other soft factors such as teamwork, presentation of the product and process and system integration thinking.

Similarly, McMaster Medical School actively discourages “learning for the test” and instead encourages a collaborative learning environment. It has developed an approach defined as “GRADE” (Grading of Recommendations, Assessment, Development and Evaluation) that is based on grading of the quality of evidence and was developed in a collaborative effort by “methodologists, guideline developers, clinicians and other interested members with the aim of developing and implementing a common, transparent and sensible approach to grading the quality of evidence and strength of recommendations in health care.” Such approaches, however, are not yet widespread.
To maintain quality control in fields with such highly context-specific knowledge, skills and competencies, the job market is likely to see a shift away from traditional examinations toward what can be called evidence-based learning. Technological advancements make it increasingly possible “to evaluate how people think and not just what they know.” For this purpose, tests can be “designed to measure such things as whether applicants can work in teams, communicate and make good decisions.”

In our research we identified one framework that is particularly helpful in capturing the multidimensional aspects of learning involved in evaluating creativity, innovation, entrepreneurship programs. Developed by Charles Fadel and colleagues this framework considers the following four dimensions: (1) knowledge: “what we know and understand” (Interdisciplinarity, Traditional, Modern, Themes); (2) skills: “how we use what we know” (Creativity, Critical Thinking, Communication and Collaboration); (3) character: “how we behave and engage in the world (Mindfulness, Curiosity, Courage, Resilience, Ethics and Leadership) and (4) meta-learning: “how we reflect and adapt” (Metacognition, Growth Mindset).

Building on this report and drawing on our empirical material and additional literature, we present in Table 3 some aspects that we believe could be used in the evaluation of CIE learning programs. We find the OECD’s conceptual framework on attitudes and values, in which these are defined as “principles and beliefs that influence one’s choices, judgements, behaviors and actions on the path toward individual, societal and environmental well-being” particularly useful to consider in the design, delivery and evaluation of CIE programs. Needless to say, these aspects have to be carefully woven into the learning journey and be evident in the delivery and outputs expected. Although evaluation is presented as the final element in our learning landscape, it is absolutely critical and there is much need for further research on this topic.

_Tell me and I forget. Teach me and I remember. Involve me and I learn._ (Benjamin Franklin)
<table>
<thead>
<tr>
<th>Multidimensional evaluation; holistic view of the learner</th>
<th>Description</th>
<th>What exactly is evaluated?</th>
<th>How?</th>
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</table>
| Knowledge                                                | What we know and understand | Understanding of CIE theories and methodologies (e.g., ethnography, design thinking) Understanding of the topic and complexities on the challenge at hand (e.g., climate change) | – Presentations  
– Research papers |
| Skills and Competencies                                  | How we use this knowledge | Creativity, innovation, entrepreneurship in action Critical thinking, collaboration, communication and self-management | Above +  
– Ideas/solutions prototypes  
*Observations of:*  
– Workshops  
– Fieldwork  
– Teamwork  
– Team evaluations  
– Personal reflections |
| Values and attitudes                                     | How we behave and engage with others and in the world | Empathy, responsibility, sustainability and grit | – Coaches observations of all the above  
– Team evaluations  
– Personal reflections |
| Meta-learning                                            | How we reflect and adapt; learning to learn | Reflexivity and growth mindset | – Coaching session observations  
– Journey observations  
– Personal reflections |