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### Describing and assessing co-design competences

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## Describing and assessing co-design competences

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### Abstract

Graduate innovation courses are still mostly discipline-specific (marketing, design, etc.) and rely on traditional knowledge acquisition. To get a better understanding of the innovation learning process, we adopt a co-design perspective where participants from different disciplines are working simultaneously and collectively to develop an idea. We then propose a set of seven co-design competences and 23 associated observable indicators to guide students in their learning endeavor and to help evaluators in their assessment tasks. We finally briefly discuss a companion portfolio tool to implement this process.

Key words: innovation, co-design, competences, skills, assessment

### 1. Introduction

Almost all students trained in the social sciences and humanities disciplines (economics, sociology, management, law, etc.) will have to demonstrate some kind of innovation competence in their careers, e.g. take the initiative of a new program, lead a project to launch a new service, support organizational change, etc.

However, the traditional teaching methods based on the transmission of disciplinary knowledge, mostly in a classroom setting, are not adapted to the fundamental facets of innovation: the multidisciplinary nature of knowledge, the relationship to risk, uncertainty and failure, the exploration of new fields of knowledge. This is why we must think of new ways to train for innovation at the university level.

Innovation can be defined as the design and dissemination of a novelty (a new product or service, a new organization, new modes of action) that produces value for customers, users or society as a whole. Innovation is not just about science and technology. It is related to major social issues such as health, energy, transportation, etc. To develop innovation competences, it is necessary to understand social change from a broader perspective and take into account their political, economic and managerial dimensions.

This research is conducted through the Promising project, an innovative academic program financed by the French government, which aims at developing training for creativity and innovation within some higher learning institutions in the social sciences and design fields.

Developing innovation competences among students involves identifying what these competences are and how they can be observed and assessed. OECD has done some interesting work in this area and their innovation competences map include technical competences (knowledge, expertise or know-how in the areas affected by the innovation), thinking and creativity competences (critical skills, imagination, curiosity) and social and behavioral competences (self-confidence, energy, passion, leadership, collaboration, persuasion). If this definition emphasizes the know-how and social aspects, it does not identify with enough precision how to develop innovation competences in an education program. The same observation can be made about the Innovation Skills profile 2.0 of the Conference Board of

Canada (Conference Board 2013) or, to a lesser extent, to the ones proposed by Bapat et al. (2013) at Central Michigan University.

In the spirit of Marín-García et al., (2012), we propose a set of 23 observable indicators related to 7 competences in order to characterize and eventually assess students' progress in co-design exercises. We choose to focus on co-design instead of tackling the larger innovation theme for practical reasons: the co-design domain is well defined and can be the subject of numerous empirical investigations.

In the first part of the paper, we characterize co-design exercises in the innovation paradigm in general and justify our approach in light of the literature on creativity and co-design competences. In the second part, we propose a protocol for assessing these competences in the context of a training program and present briefly a portfolio companion tool. We conclude with research avenues on this issue, both in terms of innovation competences and their operationalization.

## **2. Innovation, co-design and co-design competencies**

### **2.1. Teaching co-design and co-design exercises**

We first define innovation as a process for the creation and dissemination of a novelty that produces value for a social group. Innovation problems for which we seek to develop competences are related to the conduct of the collective action facing new challenges. According to Authier (2013), these problems can be classified into five categories:

- Acquisition ( of resources, knowledge or skills )
- Design ( of an innovative system )
- Production (of this system)
- Management ( of relationships and flows needed to implement innovation)
- Dissemination (of new solutions within existing institutions).

We put co-design exercises in the upstream of the innovation process, i.e. the acquisition and design phases. By co-design, we mean “a design approach that highlights collaboration and typically refers to an activity in which potential users are empowered to bring their ideas into the design of new solutions. It is also conceived as a collaborative knowledge sharing and creating process in which the skills experiences of various participants are brought together to reach novel solutions” (Kankainen et al. 2012).

In the tradition of design thinking (Brown 2009), many agencies, training organizations or consulting firms offer co-design workshops. These workshops usually last half a day to a week, bringing together people of diverse backgrounds and seeking to offer an innovative solution/prototype often in response to a problem. For example, HEC Montreal led a one-day co-design workshop on the reengineering of a classroom. Three multidisciplinary groups, bringing together teachers, students, architects, managers, teaching and learning services, media technology support, etc. have collaborated to propose new concepts for an innovative classroom (Achiche et al. 2013).

Training programs aiming at students are obviously different than the actual experiments conducted with experienced people or knowledge experts directly affected by the innovation. The co-design training context for students can therefore be seen as a more artificial activity, where for a limited time, from one day to several months, groups of learners need to produce innovative concepts. However, it remains interesting to enroll students in such co-design workshops:

- Firstly because at the end of their studies, they might consider that they have acquired knowledge and disciplinary skills related to collaborative work.

- Secondly because the problem solving exercises led them to both seek relevant knowledge and practice their capacity for collective creativity.

## 2.2. Co-design and co-design models

Although approaches to conduct a design project are fairly rich and diverse, there is a consensus about the fact that the design thinking approach is based on divergent thinking (to create choices) followed by convergent thinking (to make choices) (Brown 2009). This is also in line with creativity methods, which alternate divergence (to produce ideas) and convergence (to filter and select ideas) (Le Masson *et al.* 2007). For these authors, the stake in creative design is to combine divergent thinking (to get variety and originality expected from creativity) and convergent thinking (required by engineering design).

Finally we can define co-design as an activity articulating divergent and convergent thinking, carried out in groups, addressing complex and multidimensional issues, and leading to the production of a type of prototype or demonstrator.

## 2.3. Co-design competences

According to the European Qualification Framework, a competence is the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations (European Commission 2008).

In light of the definition of co-design suggested above, the co-design competences include creative design competences on the one hand (divergence and convergence) and teamwork competences in an innovation situation on the other hand.

Divergence competences involve the ability to understand the problem, to reformulate and develop internal and external knowledge required and then generate innovative ideas. They must meet two criteria, mainly the variety (lots of ideas generated) and originality (move away from traditional responses) (Le Masson *et al.* 2007).

Convergence competences involve the ability to sort and articulate the ideas generated by mobilizing the knowledge of all the team members to produce intuitive representations of imagined solutions (drawings, prototypes, scenarios). The representation or the storytelling exercises are a test of both global consistency and potential value of the proposed solution.

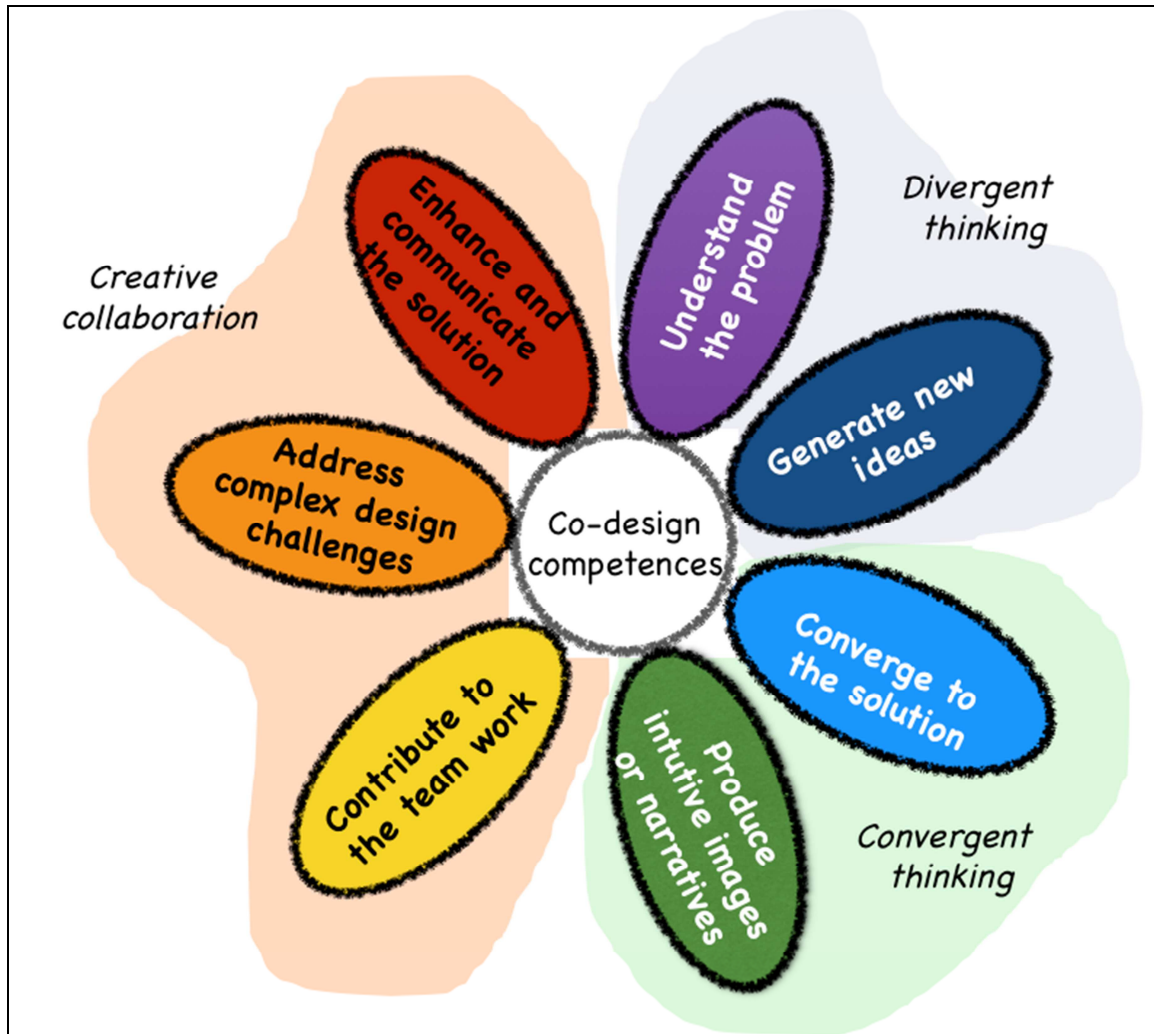
Collaborative and creative work competences are very similar to those found in situations of theater improvisation. In particular, Vera and Crossan (2005) demonstrate how the improvisational theater of “practice”, “collaboration”, agree, accept and add”, “be present in the moment”, and “draw on reincorporation and ready mades” can be used to understand what competences are required to improvise well in innovation teams.

For the collaboration part of co-design, we can identify three types of competences:

- i. a competence to contribute to the smooth functioning of the team;
- ii. a competence to meet the challenges of creativity and complex design, i.e. for which there is no obvious solution;
- iii. a competence to produce an argumentation in relation to the solution proposed.

Overall, our analysis of co-design exercises led us to propose a model of seven co-design competences (see Figure 1) which are in-line with the micro-analysis of the design dynamics illustrated by Dorta *et al.* (2012).

Figure 1: The co-design competences model

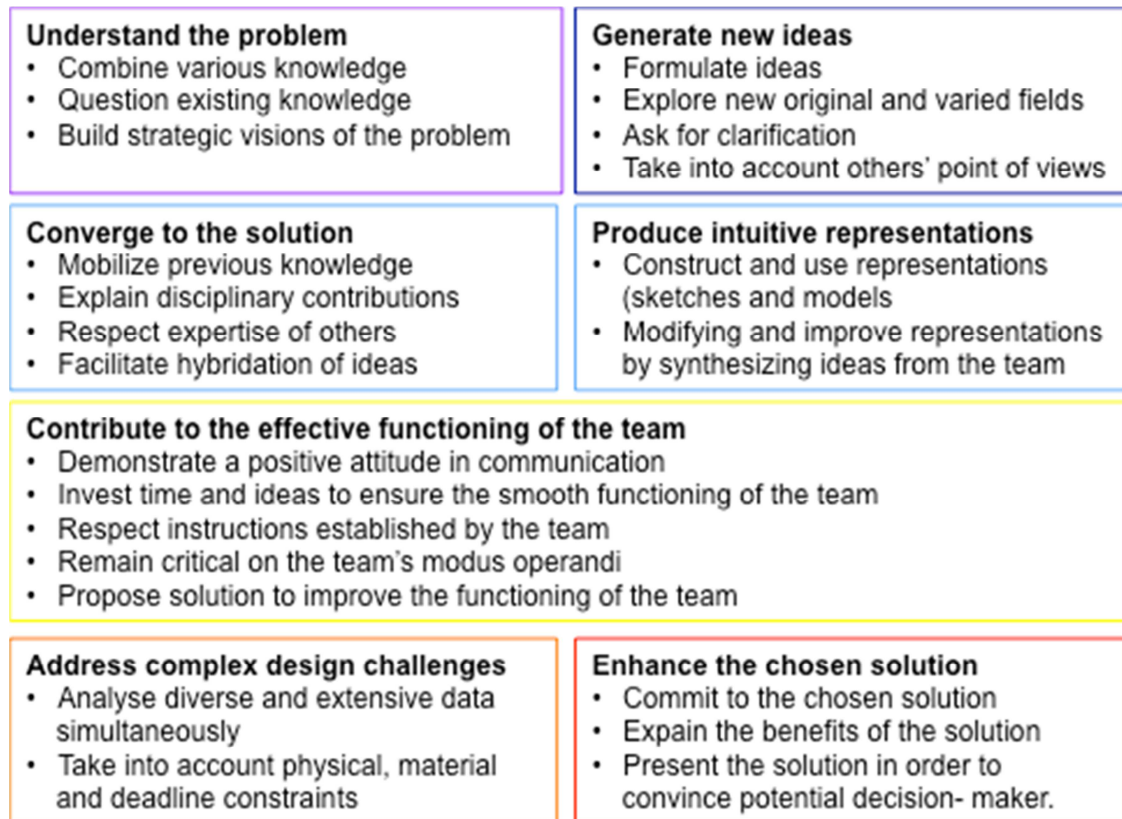


### 3. Putting our co-design competences to work

#### 3.1. Identification of observable indicators

To be operational, this model of co-design competences must be completed by observable indicators. So, students and teachers will be able to identify the actions that foster better co-design outcomes. Figure 1 presents the 23 observable indicators we defined and tested with help of an international team of co-design professionals and instructors guided by an educational specialist. All indicators are formulated using actions verbs. Some of the indicators identified are similar to the one used by Marín-García et al. (2012).

**Figure 1: Co-design competences and indicators**



### 3.2. Companion portfolio tool

To foster a better integration of our indicators in co-design exercises, we have developed a portfolio companion tool to simplify both self-assessment of the students and evaluation by fellow team members or by the instructors. The idea is that the students will provide a self-evaluation of the 23 indicators prior to the co-design exercise according to a simple colour scale (green, yellow, red). They can also provide some comments as well as actions plans. Once this self-evaluation is completed, colleagues and the instructor can input their evaluation. The same exercise could be repeated in the middle of the co-design exercise (if time permits) and at the end. Visual summary tables are also provided. We plan to use this tool in numerous co-design exercises.

## 4. Conclusion

In this paper, we have presented an innovative model of co-design competences and some associated indicators supported by a companion portfolio tool. Linked to the innovation and co-design literature, this approach can provide valuable guidance to document and evaluate student learning accomplishments. One must remain careful in using this approach in a university context as the co-design situations proposed are very different from those found in the professional world: students involved in teams do not necessarily come from a very diverse disciplinary background, nor do they work on very meaningful personal problems. Also, the framework proposed focuses on individual performances and put aside the question of collective competences. Further work is therefore needed to question our framework in various and diverse co-design experiences.

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