Participatory Design and Co-Design—The Case of a MOOC on Public Innovation

Dorothée Cavignaux-Bros & Denis Cristol

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Public Innovation

Today, a large body of knowledge exists on Instructional Design, for practitioners as well as for researchers working in Adult Education and Training. However, historical models used for the design of training do not seem to be effective enough in the context of digitalization or multi- and transdisciplinarity. Other fields of research can provide more comprehensive approaches in analyzing the key factor success of training design. In this chapter, we focus on a design case (Howard, 2011) in the field of adult vocational training in France, showing how mix methodologies using participatory design and co-design processes were used to engineer a connectivist Massive Open Online Course (MOOC) (Siemens, 2005). Its purpose is to show how participatory design can be used to design a MOOC and to expose its limits and underlying dimensions.

1. Introduction

The currently vast body of knowledge on instructional design (9907 publications on July 28th, 2019, among ERIC's peer reviewed results) shows how designing education and training has been influenced by the evolution of industrial design, Information and Communications Technology (ICT) developments, and learning theories, such as behaviorism to andragogy, connectivism, socio-cognitivism or other findings in Educational and Training Sciences. Furthermore, learning labs, makerspaces, third places (Oldenburg, 1989), and the import of User Experience Design (UXD) in Educational and Training Sciences are changing the way education and training are designed and produced. We are entering into a "learnance" era (Cristol, 2014, p.13). At last, design thinking and other design methods from design sciences are also being used to address more complex projects like multimodal training programs.

In this chapter, we focus on a design case (Howard, 2011) in the field of adult vocational training in France that demonstrated how a mixed methodology of participatory design and co-design processes were used to engineer a connectivist MOOC. In this context, connectivism is defined as "the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements—not entirely under the control of the individual" (Siemens, 2005). Connectivism's purpose is to show how participatory design can be used to design a MOOC and to expose its limits and underlying dimensions.

2. Theoretical Lens and Context of the Case

2.1. Participatory, Design Thinking and Co-Design

Participatory design was first defined in Scandinavian literature "as a model for involving users and designers on the technology itself in a process of technological development" (Asaro, 2000, p. 257). Participatory design implicitly and explicitly intends to create artifacts while transforming people collectively by taking into account other's perspectives (Könings et al., 2014).

Design thinking was used by Tim Brown from the IDEO agency (2008) as "a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity" (p. 2).

In this chapter, *co-design* refers to "the creativity of designers and people not trained in design working together in the design development process" (Sanders & Stappers, 2008, p. 6). Co-design is collaborative by mixing together designers, users, novices, experts, citizens, or customers with the assumption that anybody is an expert regarding their own experience and mobilizes their practical and experiential knowledge as well as their conceptual knowledge.

2.2. MOOCs

Since their first mention in 2008 and their deployment in France in 2012 (Cisel & Bruillard, 2013), Massive Open Online Courses (MOOCs) have gained in visibility. While the concept has recently been very successful, distance education has more than 20 year history focusing on online learning through videos, forums, and storytelling (Dieumegard & Durand, 2005). What appears to have changed since the first MOOCs is:

- The fluidity and reliability of multimedia technologies,
- A continuing expansion of professional as well as private means of communication (smartphones, computers, tablets),
- Free and easy access to online resources,
- The increasing digital literacy of learners,
- The development of a culture of learning, making everyone responsible and actor of their own learning,
- The generalization of a diversified offer of online and free training by large public operators.

2.3. Context of the Case: A Strategic Project for Change Management in a Training Institution

The Centre National de la Fonction Publique Territoriale (CNFPT), subsequently referred to as *the Institution*, is a French organization dedicated to workplace training of local administration staff. It has a hundred sites all over France and trained 920,000 adults in 2018, implementing more than 68,000 training sessions. 196,000 users registered on the online platform, and 37,000 participants joined webinars in 2018. Its workforce counts 2,392 permanent jobholders including project managers and training consultants that design and organize the training sessions. Trainers are mostly specialists or subject matter experts working in public administrations, external trainers, and consultants. Training consultants working inside the organization sometimes participate in the training as (co-)facilitators during both online and face-to-face sessions.

A few years ago, the Institution decided to transform its activities by introducing what they called "co-design." The main objectives were to develop collaborative learning to accelerate the use of digital tools in both face-to-face and distance learning and to modernize their range of services, including developing a blended learning offer. Collaborative learning was intended to engage participants through addressing real situations and facing challenges together (Dillenbourg et al., in Spada & Reiman, 1995). During this process, online communities emerged along with the opening of a learning lab and co-design rooms.

To facilitate the process (change management), immersion in participatory design and co-design sessions were organized with external consultants (at least two external firms and freelancers). During the first year, one to two training consultants and project managers from seven different implementation sites were identified as expected early-adopters of the project and the method. These early-adopters were placed in charge of training others and facilitating the spread of new practices. Co-design was implemented in dedicated training rooms or co-working spaces like a learning lab equipped with technologies to collaborate and craft material (e.g., Lego bricks, paper, pieces of fabrics, etc.) to stimulate creativity and prototyping (non-technological). The project itself took two to three years to be implemented. The development of co-design methods was progressive, iterative, and linked to the installation of the co-design rooms. Both participatory design and co-design (Figure 1) were used during those training sessions (Sanders & Stappers, 2008, 2014). The learning artifacts and instruments created during these sessions were training scenarios, storyboards for videos, quizzes, programs, MOOC frameworks, etc. For instance, Personal Learning Environments (PLE) were prototyped during a 3 hours co-design workshop; a participatory design session involving learners, experts, and trainers was used to transform a training program on laïcity.
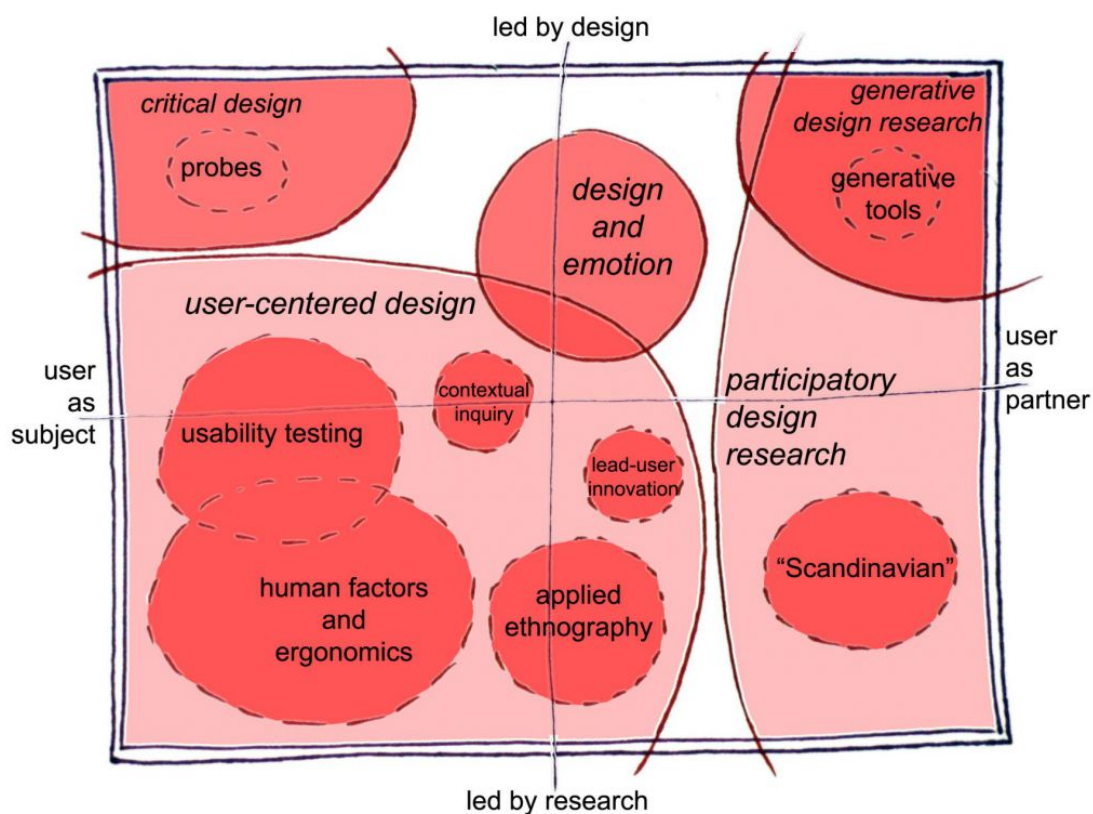

Figure 1

The Current Landscape of Human-Centered Design Research as Practiced in the Design and Development of Products and Services

Note. From Sanders & Stappers (2008, p. 6).

In addition, the authors of this chapter were involved in this design process. The authors are a researcher working in the Institution and a part-time PhD student working outside the Institution. The PhD student spent two years, during the first phase of the project, observing and participating in co-design sessions[1] of public services or training resources with an ethnographic approach.

The main challenge the Institution faced was preparing the second edition of a summer seminar dedicated to innovation and co-design called the University of Public Innovation. During preparatory workshops came the idea of designing a MOOC on public innovation in a collaborative way.

2.4. A MOOC Project Based on Collaborative Learning: Toward a New Generation of MOOCs in the Institution (Basic Assumptions)

Because of their previous MOOC experience, the Institution became a central management hub of territorial and professional physical networks (inter-regional seminar, roadmap seminars, seminar speakers, co-design seminar) as well as digital networks (structuring and managing around thirty professional online communities). The Institution uses its own online platform based on a strategic and well-established partnership with FUN[2] (a French Institutional MOOC Platform). In addition, the Institution applies a digital strategy including documentary, technical and educational resources and tools, a support team, and recently a multimedia-recording studio. MOOCs in the institution are built on co-learning to benefit the Institution's mostly autonomous learners and engineering teams. As a result of receiving less public money, the Institution shifted from distributing knowledge, with all the design costs that entails, to co-building knowledge with professionals and helping them engage with their territory (Inghilterra, 2016).

The Institution's engineering team researched the market's MOOC methodology; they found: a) MOOCs suffer a significant attrition rate (more than 90%), b) most of the market-offered MOOCs were carried out in parallel with traditional educational activities, and c) learners were mostly isolated and sometimes engaged in few collaborative activities. As a result of their research, the engineering team envisioned a MOOC based on collaborative learning and social learning to foster commitment (Bandura, 1997).

Building MOOCs around online collaborative learning had the advantage of being more focused on motivations and teaching dynamics than just simply on content. Another benefit was that the online platform provided the Institution's existing pedagogical know-how a broader range of influence in the local community. As a result, the MOOC would weave and strengthen links with local actors through the recommended real life connections.It would allow the emergence of new teaching formats (Conole, 2013), school communities, and learning visits as well as peer sharing or professional co-development groups. These new generations of MOOCs could combine the training institution's distinctive strengths of national presence and local networking with its capacity to create digital learning paths. Indeed, this would increase training transfer into working situations by focusing on the concrete projects of the participants.

Learners would benefit from peer learning, the territorial frameworks, and sharing operational projects. Promoting online collaborative learning through online communities could foster the creation of a personal learning environment (Dessus et al., 2011; Duplàa & Talaat, 2011), reinforce the desire to learn by oneself, and encourage a culture of self-directed-learning (SDL). Focusing on learning how to learn would be transposable to all activities of the territorial framework. More than simple interactions with online content, the MOOC's hybridization of face-to-face and distance learning would enhance collaborative learning and create local clusters. This collaborative dimension would be another benefit. In such cases the teams would need to learn how to collaborate better.

Though the accessibility of MOOCs embodies the learning principle "When and where I want it", MOOCs struggle to maintain long term commitment from their remote participants. Collaborative learning within a MOOC offers benefits that can mitigate this shortcoming. One benefit was the opportunity to learn from a stronger support for learners to carry out their individual projects. Another benefit was, when the collaborative learning format was inserted in other pedagogical activities, that users derived more personal significance and experienced greater personal motivation (Kennedy & Laurillard, 2019).

3. The Co-Design of the MOOC: Process and Means

After the first edition of the Summer University of Innovation organized by the Institution in 2016, its sponsors decided to enlarge participation and find new ways to prepare participants. Simultaneously, the Institution was implementing co-

design as a new strategy to foster collaboration and the professional development of its staff in instructional design.

3.1. Emergence of the MOOC and Timeline of the Project

The idea of a MOOC on public innovation was born from an opportunity to study connectivism in MOOCs and the urgent need to prepare innovators by giving them methods and strategic tools to become actors and even translators in the process of implementing the next universities. The principles of the actor-network theory and the concept of translation were applied (Alkrich et al., 2006).

A group of 8 to 10 persons working in different entities of the Institution started to team up, based on voluntary basis. The design team, as seen in the timeline below (left side column of Figure 2) evolved from a working team to a participatory team. The team used design thinking, co-design, and participatory design to define the MOOC architecture (central column of figure 2) in an iterative approach (right side column of Figure 2).
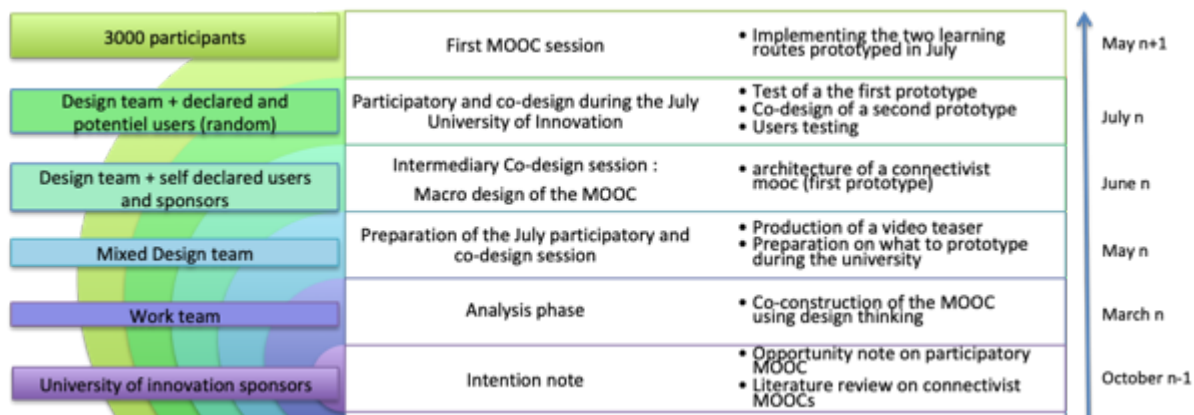

Figure 2

Timeline of the Co-Design of the MOOC from October 2016 to May 2018

The MOOC was designed using different methods of instructional design and project management. From a macro perspective (Desjeux, 2004), the project was led by an iterative and test-and-learn approach. It was sponsored by the Learning Lab team and was part of the participatory design of the second edition of the University of Innovation. On a meso scale, the architecture of the MOOC was built using an instructional co-design process. On a micro scale, participants in the process could be members of the design team (external consultant and an internal work team), self-declared users, and/or sponsors of the project who volunteered to participate in the co-designing of the architecture. Participants came from the University of Innovation and other participants from outside the university.

The first collaborative design session was held in March, during an in-house action-training seminar using co-design to work on various digitalization projects. A team of 8 persons participated in a collaborative workshop to identify the target learners of the MOOC, to choose the pedagogical format, and to organize the design project team. The objective was to prepare the co-design of the MOOC as one of the future challenges of the University of Innovation in July. The group was divided into two teams: a) one sharing its own learning experiences in MOOCs to identify positive and negative users' experience and b) the other working with persona (portraits of potential learners from survey results) to define learner's needs. At the conclusion, the whole group prepared a timeline to organize the project between March and July.

During that period of time, the design team organized participatory and co-design workshops with potential users and learners. One co-design workshop was held in May, a second workshop was held in June, and a final presentation of results workshop in July in which the first prototype of the MOOC's architecture was presented.

After having presented the emergence of the design of the MOOC, we will now focus on two co-design workshops to present the means and methods used, and the artifacts produced.

3.2. The June Session: Co-Design of the MOOC Architecture

The June session was held using co-design methods to help prototype the macro-design of the MOOC. Public administration staff, Institution staff, and consultants were invited to join in a co-design day workshop held in the learning lab of the Institution.

The learning lab (Figure 3) was specifically designed and fitted to promote collaboration, being equipped with mobile furniture and technologies. Technologies supported collaboration (for instance using digital software such as virtual post-it for brainstorming) and gave access to inspiration sources (using the Internet to find sources or to communicate with others).

Figure 3

Mobile Furniture and Collaborative Technologies

During the entire session, participants worked together in teams to produce collective artifacts (Figure 4).

Figure 4

Team Work

Note. One of the teams is defining how to enable face-to face meetings for the participants in the MOOC and finding inspiration from using existing tools from the Internet.

The co-design method focused on producing artifacts in limited time using craft materials, technologies, and creative processes to prototype (Figure 5).

Figure 5

Prototyping Kit 1

Note. Prototyping kit 1 included stickers, labels, colored piece of rough paper, pen, glue, fixing paste, and more.

One of the critical phases of co-design is the testing. In participatory design, users participating in the design make the tests. In our case, the testing phase took place between the team members themselves and also with an external specialist working in Canada, using Skype (Figure 6). The testing phase relied on listening skills and benevolence, testers added ideas by completing those of others (Figure 7); the facilitator's posture and guidance were a key success factor to prevent debates and frustrations.

Figure 6

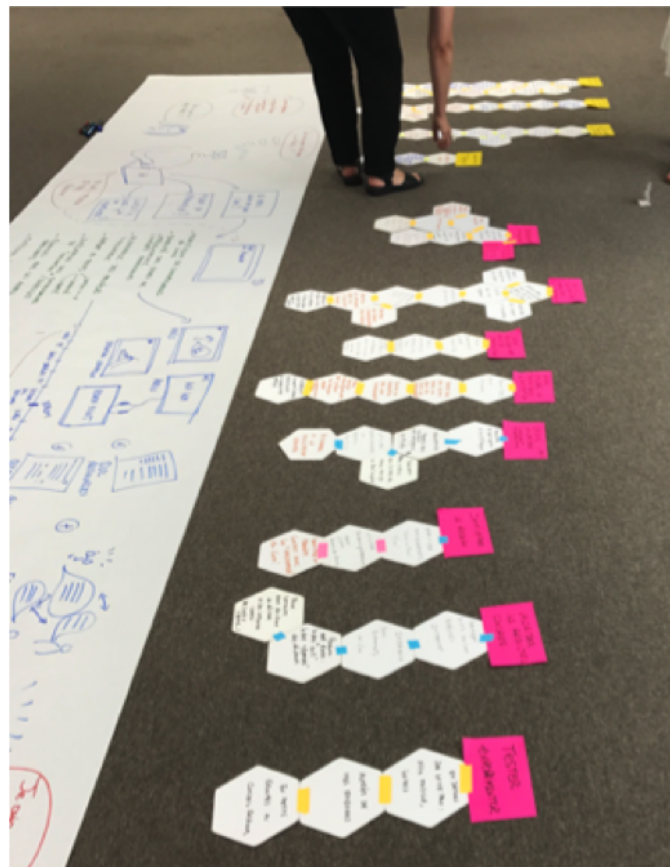*Testing Session With a Specialist in Canada Through Visio-Conference.*

Figure 7

One Team is Testing and Completing Ideas of Another Team

The co-design session was organized to produce and test prototypes. During the afternoon, each team had to produce a final prototype: a storyboard of a teaser presenting the MOOC. One of the teams also imagined the screens the participant of the MOOC would see when they would log in (Figure 8).
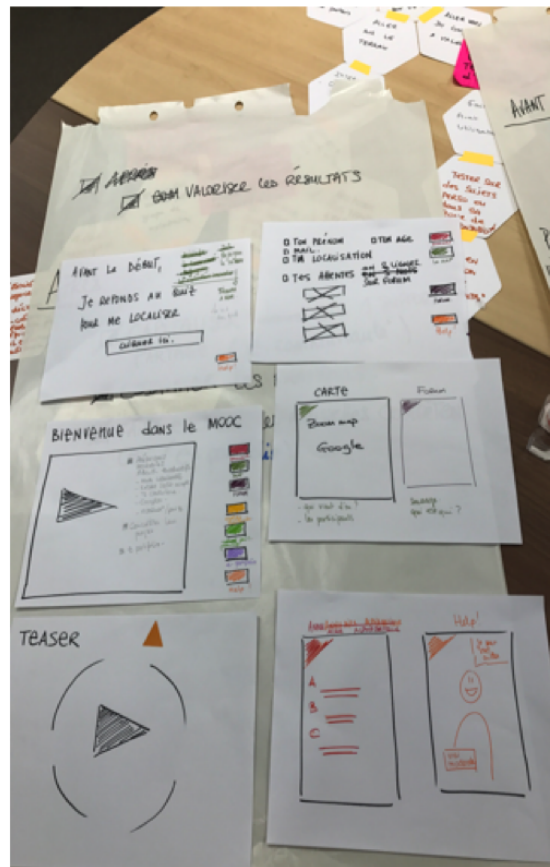

Figure 8

First Screens of the MOOC

The two other prototypes were teasers proposing a general theme to introduce innovation (with one of them using a cooking metaphor). The outcome of that day resulted from the participants' experience as users of MOOCs, the variety of participants, a facilitating environment, and collaborative design methods (rapid collaborative prototyping and testing). After this workshop, the design team used the prototypes to build a visual representation of the MOOC sequences timeline. It was to be tested during the July University's Public Innovation event.

3.3. The July Event: The University of Public Innovation

Civil servants looking to develop skills on public innovation attended the University of Innovation, alongside employees of the Institution itself, external consultants, and other guests (researchers, speakers, etc.). On the first day of the University, guests chose an innovation challenge and formed co-design teams; they worked together during two and a half days.

The group working on the MOOC consisted of 10 participants, half of whom were future users and the other half either employed or freelance designers. The group also included the Canadian specialist in Collective Intelligence Education and Facilitation, who participated in the June workshop. They tested the macro-design using the visual representation of MOOC sequences timeline made from the prototypes produced in June (Figure 9) and further co-designed the MOOC.
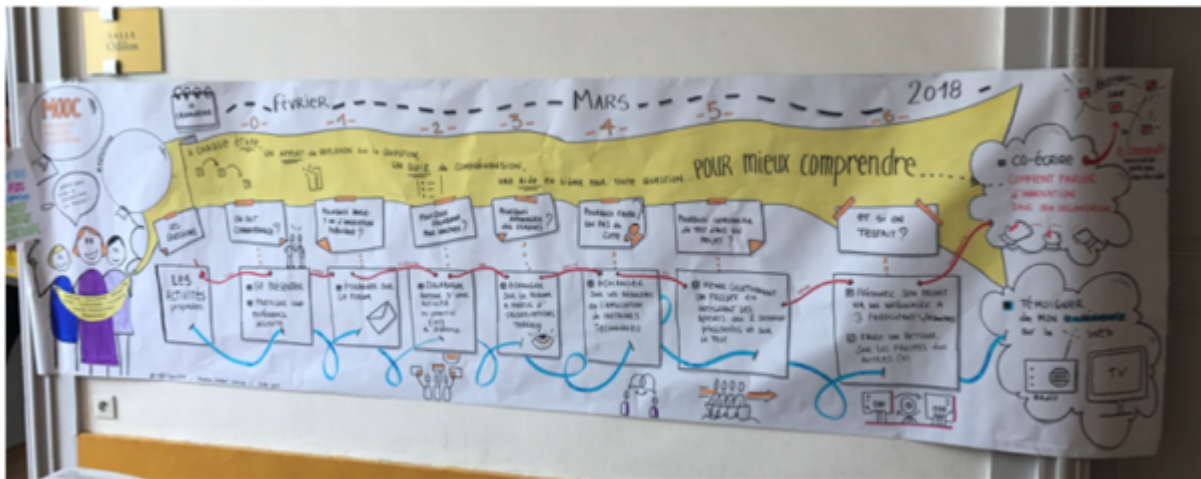
Figure 9

Visual Representation of MOOC Sequences Timeline Made From the Prototypes of June Sessions by a Graphic Designer

The co-design method consisted in producing collective ideas and artifacts in small teams (similarly to the June session). Each production was first presented to the other teams to benefit from their feedback; then the team moved on to the next step of the co-design process. This loop was repeated several times. At the end, new prototypes were built.

3.3.1. Intermediary Productions

During two and a half days, participants were guided towards building new or deeper knowledge on the challenges they faced. For example, participants brainstormed on the main issues they faced in a connectivist MOOC (Siemens, 2005): enabling collaboration/ teamwork and sharing content (Figure 10).
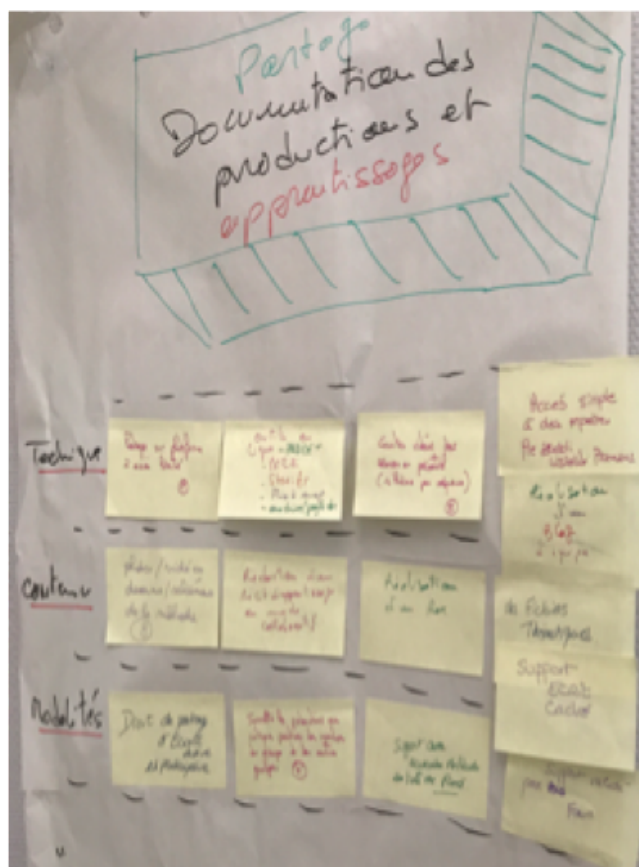
Figure 10

Tools to Collaborate and Share Contents With Other Learners During the MOOC: "Techniques, Contenus et Modalités"
(Techniques, Content and Modalities)

The MOOC features were discussed on a technical basis that both limited and inspired creativity. The participants challenged the project leaders' vision. They were worried that a cooperative model would be too time consuming and implied too much commitment for the learners, whereas the project leaders had the idea of building a co-learning MOOC (cf. *supra*).

Participants then chose what was relevant to prototype in order to move forward in the design of the MOOC and identify its functionalities. Two critical points were addressed: stakeholders of the MOOC on the one hand and expectations of users on the other hand.

3.3.2. Collaborative Prototyping

Two new prototypes were produced during this session: a description of the stakeholders as personas (Figure 11) and some functionality tests. Those tests featured learners' objectives and their role in the MOOC: either reading, contributing, or recruiting other participants.
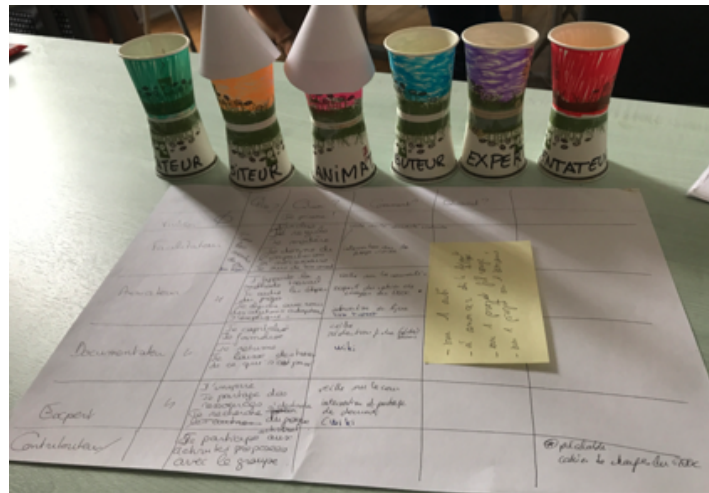
Figure 11

Persona: Facilitator, Visitor, Documenter, Expert, Contributor, Animator and Their Role in the MOOC

3.3.3. User Testing

The July co-design session ended with a final test conducted using all current attendees of the University. The team disrupted the pre-established program of the University of Innovation. Instead of just preparing an exhibition of the MOOC prototypes as initially planned, they asked visitors to take a stand on the features and objectives of the MOOC. Most of the testers chose the objective: "activate a process of collaborative innovation" (Figure 12 and Figure 13).

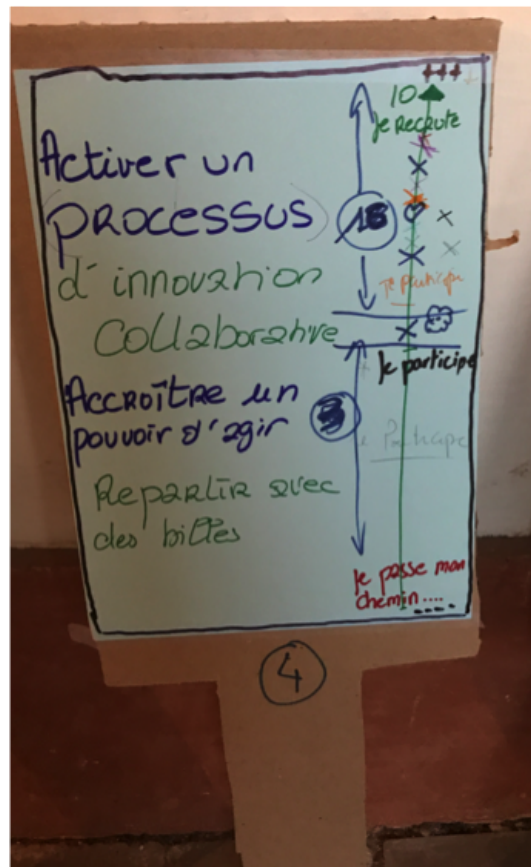**Figure 12**

Testing the Prototype

Figure 13

Positioning Oneself Among Three Objectives: "Activate a Process of Collaborative Innovation," "Increase One's Empowerment," and "Get Some Useful Tips."

After the University of Innovation, the design team of the MOOC further adjusted the final design while developing the pedagogical resources. They also organized a few more end-users testing just before implementing and opening the MOOC in May.

4. The Final Production Stage -- Reflections From a Professional Development Perspective

4.1. The MOOC Course Itself

We here describe the final product and design of the MOOC that were developed in June and July codesign sessions. The learning goals of the MOOC focused on public innovation. More specifically, after completion of the MOOC course, participants were be able to:

- Encourage and share local public innovation with people from various horizons,
- Experiment face-to-face or conduct remote collaborative work with peers and stakeholders,
- Advance projects using individual or collective innovation initiatives,
- Acquire the main benchmarks of an innovation approach and associated digital tools.

At the beginning of the MOOC, the course design offered participants to choose the discovery learning path or the collaborative learning path and organized themselves in project teams. The MOOC lasted 8 weeks, each week being a learning session (Session 1: Onboarding; Session 2: Territorial Public Innovation; Session 3: Collaborate, an innovative stance; Session 4: Innovate in context; Session 5: Learning from users; Session 6: Mobilizing Creativity; Session 7: Test

your project; Session 8: Presenting your project (Figure 14). The MOOC was hosted on the FUN platform (Figure 15). About 3800 people registered for the MOOC, and 7% received a completion certificate (Tcheng Blairon, in press).
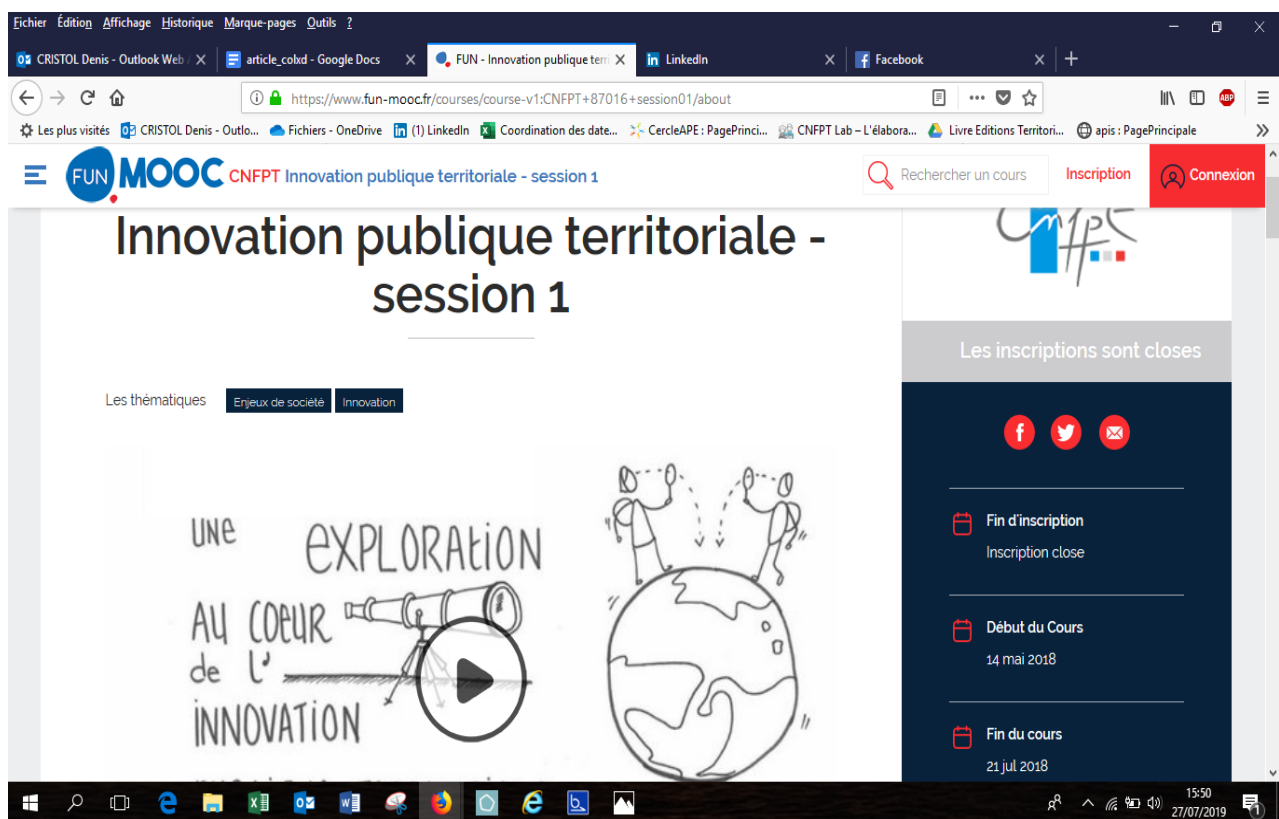

Figure 14

Teaser Access, https://edtechbooks.org/-Emv

Figure 15

Une Exploration au Coeur de l'innovation/An Exploration at the Heart of Innovation

4.2. The Design Teams' Reflection on Learner Experience Design (LXD) From a Professional Development Perspective

Using a co-design and a participatory design process (Sanders & Stappers, 2008, 2014) enhanced the learner experience in three ways: a) by creating a pre-tested learning environment that used co-design and co-construction of the MOOC architecture, b) by committing that future learners who participated in the design would be influencers in the MOOC, and c) by changing the facilitators and designer's mindset through their involvement in the co-design sessions working with users as partners (cf. The University of Innovation).

The team design built the co-design session's program focusing on conditions of participations (Clement & Van den Besselar, in Kensing & Blomberg, 1998), following these concepts:

- Access to relevant information (inspirations sources, information on MOOCS, etc.),
- Possibility to have one's point of view (benevolent guidance),
- Participation in the decision (testing others productions and prototypes),
- Communicate the method (participatory design thinking method),
- Possibilities to alternative technical/organizational arrangement (no specific constraints during the macro-design and possibilities to adjust the features).

The enlarged design teams learned from one another through collaborative work and testing. End-users (learner and promoters of the MOOC, in our case), being part of the design, were able to express their need during the sessions and throughout the process. Project managers and designers adjusted their design to the learners who participated actively in the design. For this participatory-co-design method, we applied adapted facilitation methods and tools to favor oral communication, to develop listening skills, and to help stakeholders engage in the process. It included design materials and collaboration tools as well as a dedicated space to move and interact.

From our perspective, learner experience design (LXD) is not only based on the learning experience related to technology (ergonomic, design, etc.) or the learning process of the MOOC, but also implies a participation in the design process itself that can drive change. In our case, LXD resulted in the decision to create two training courses within the MOOC: a discovery MOOC and a cooperative /enhanced MOOC involving work on a team project. The team design initially planned to focus the design on a connectivist MOOC that allowed learners to build up their knowledge working on team projects.

5. Discussion

5.1. Has This Process Encountered Some Pitfalls, How They Were Overcome?

The co-design of this MOOC played a role in exploring new, hybrid end-users' learning practices and situations that contributed to the design team's change of pedagogical format.Some difficulties arose and dealing with them played a part in this change.

First, participatory design and co-design sessions need a sufficient number and variety of participants in order to share information and practices while building up collaboration. Both May and June sessions were planned as participatory design sessions. However, in May, only one external person joined the MOOC project team. The call for volunteers did not work for this session. The one person who joined the two designers did not have sufficient information to contribute. The designers spent most of their time explaining rather than testing their ideas with her. The project had therefore to be adjusted; it required the design team to be flexible enough and to adapt the June session's program.Second, regarding the method and means, some adjustments also had to be made. During the June session, one of the teams met some difficulties in prototyping a teaser and was not able to use the kit at their disposal. Finally, they were able to catch up and ended with a proposal. However, they expressed frustration, which had to be addressed by the facilitator. Participation of users who are not familiar with co-design can lead to tensions; the facilitator's role is therefore crucial to lead them into the process of experimenting. Experimenting and prototyping suppose an ability to accept making mistakes (test and learn) and using something new (prototyping kit). Third, changes regarding graphic and technical aspects lead to updating the final features of the MOOC, giving up the initially chosen supplier, and integrating collaborative and group-building activities into the FUN platform.

5.2. Implications

The findings of this case allow us to offer some implications and project design recommendations for researchers and practitioners when using co-design and a participatory process:

- It is important to have enough people to participate in the co-design sessions and a minimum of 8-9 people to organize more than two working teams.
- It is important to have a variety of backgrounds, domains, and experience knowledge. This knowledge can also be nourished through online resources.
- Participation need to be facilitated and regulated by a professional facilitator, to support social learning (Bandura, 1997)
- It is best to provide a variety of working means so everyone can contribute. Not everyone is comfortable with making visuals or writing things down on post-its (using the tool kit).
- Changing existing design processes in an organization can be hard. It's important for all participants to be open-minded and willing to try new things.
- Given the often-limited functionality of online learning platforms, it's important for participants to design with those constraints in mind so they don't develop ideas that are difficult or impossible to realize in the implementation phase such as highly collaborative activities.
- For those facilitating these workshops, time management is key. Allow for the unexpected to occur and build in more time for explanations than you think you need.

5.3. The Complexity of the Issues Related to the Design of a Blended or Hybrid MOOC

Creating a new training product with users generated various consequences, which could not be anticipated but led to more flexibility in the design of the MOOC. The complexity of the project consisted in managing a variety of issues and actors. Incorporating users in the design process led to longer delays, higher budgets, and different teaching practices than those commonly accepted. Actors and sponsors who did not participate in the design, but who had a decision power in the project (over technical resources, budget, communication, organization of face-to-face courses), asked for more details than usual.

Through the process, participants in the co-design became partners and actors in the participatory process and influencers during the MOOC implementation. The broadening involvement of participants demonstrates the conclusion of research showing the participatory design effect is noticeable far beyond the design itself (Hansen et al., 2019). Co-design has other benefits; research shows that users becoming partners in the co-design can improve the "self-sustain" of a MOOC (Kennedy & Laurillard, 2019).

6. Conclusion

The MOOC was expected to give the rudiments of knowledge on the topic of *public innovation* and to enrich the ecosystem of the French public service. The second season of the MOOC intended to promote the recruitment of participants and to give them elements of common language. As a result of the MOOC's influence, the numbers of participants in the University of Innovation rose from 170 people in the second edition of the University, to 1000 during the third edition. and to more than 2000 during the fourth.

The co-design practices have been delivered to several units within the Institution, the consultation of users made it possible to qualify e-learning activities (in terms of learner experience) and to enrich the practices of the training team of the Institution. Indeed, new techniques like forum controversies, face-to-face workshops, weekly webinars, and online workshops in collective intelligence were added to the panel of activities of designers and public officers in charge of developing MOOCs in the Institution.

Our case demonstrates that instructional/UX designers using participatory/co-design methods can powerfully achieve two goals: a) Enhancing the learning experience of end-users and b) contributing to the professional development of the design team involved in the project (e.g., project managers, training consultants, and instructional designers) (Cavignaux-Bros, 2018; Cavignaux-Bros & Cristol, 2018; Cristol & Cavignaux-Bros, 2019).

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[1] 12 sessions individually lasted between half a day to three days. During the session data was collected by taking notes and pictures and focused on the human and material resources used and on productions.

[2] https://www.fun-mooc.fr

Dorothée Cavignaux-Bros

Paris-Nanterre University

PhD Student at the University of Paris Nanterre, in the field of Education and Training Sciences, specialized in Adult Learning and Instructional Design. Thesis project on Capabilities and Skills Development in Instructional and Digital Learning Design. Learning Experience Designer and Project Manager. Lecturer at the University of Paris Nanterre.

Denis Cristol

Paris-Nanterre University

Denis Cristol. PhD Research associate at the University of Paris Nanterre. Coach, author of 20 books on leadership, management and professional training. Specialist in informal learning issues and learning communities. Blogger.

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