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Service design and activity theory for the meta-design of collaborative design processes

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Abstract

This paper explores how the approach, logic and tools of Service Design could support the development of a digital platform that enable the collaborative design of open and collaborative design processes. By integrating Service Design, Activity Theory and Meta-Design, such platform could foster community building and management providing concepts and visualizations that help users in the conscious and reflexive design of the activities constituting their community-based collaborative design processes. How could Service Design enable the meta-design of collaborative design processes on digital platforms? This paper elaborates a proposal for integrating Service Design concepts and tools into a meta-design digital platform for the design and management of collaborative design processes, by providing 1) a reflection on the theoretical connections between Service Design, Activity Theory and Meta-Design, 2) a proposal of a meta-design platform that represents a proof of concept of such connections and 3) a proposal of evaluation strategies for validating such platform.

KEYWORDS: meta-design, visualization, process, collaboration, activity theory

Introduction

In the recent decades ICT technologies have shaped new ways of working, participating in and assessing projects, which in turn have contributed to shaping these technologies even further. Such technologies have had an impact on design on all the activities and actors of the Design ecosystem (discussion, research, manufacturing, distribution, ...) at any scale, from desktop software to digital online platforms, from single actors to whole ecosystems. Consequently, the Design discipline has changed in several ways, for example by increasingly moving its scope from single users to local and online communities, from isolated projects to system of solutions. This direction has sometimes been based on learning from trends in software development and web-based technologies that have created tools and strategies that enable mass-scale and remote and distributed interactions, especially with community-based organizations (examples are open source and peer-to-peer initiatives). In turn, this has

increased the interest in the role of design researchers and practitioners in being able to organize collaborative design processes, especially through meta-design approaches that focus on the management and visualization of their intangible aspects and social dynamics. By adopting a meta-design perspective, new possibilities have emerged in making designers active in the organization and management of collaborative and distributed processes, especially design ones and with multiple stakeholders, especially in their social dimension.

This paper explores how the approach, logic and tools of Service Design could be part of this trend by supporting the development of a digital platform that enable the collaborative design of open and collaborative design processes and therefore the management of the communities behind them. By integrating Service Design, Activity Theory and Meta-Design, such digital platform could foster community building and management through a meta-design activity that enable the emergence of communities as organizations that arise from the networks of interactions generated in designing and deciding the collaborative efforts with all the actors involved. The collaborative process of designing collaborative design processes enables digital platform to be places for a community to form and self-organize. Such approach would extend the adoption of the Service Design logic and tools from designers to any kind of stakeholder participating in such open collaborative ecosystems. This can also be considered the result of the digitalization of the design of services through the increasing role of software development and data modeling on facilitating but also influencing available visualization tools. Therefore, this research might also advance our understanding of the connections between design tools and the software and data supporting them.

This paper therefore focuses on how the Service Design logic and tools can be adopted for visualizing, understanding, discussing and designing collaborative design processes and the communities that manage and implement them over time. Furthermore, the role of software and digital platforms in influencing both communities, collaborative processes and service design tools and practice is another key part of this paper. The specific context of this paper is one where communities of formally trained and informal amateurs collaboratively design and produce artifacts, the Maker movement (Anderson, 2012; Gershenfeld, 2005). Here in this context communities can be found on three levels:

1. a global community of local events and laboratories with a complex social structure (Menichinelli, 2016b);
2. local communities that form in and around local laboratories such as Fab Labs (Ghalim, 2013; Maldini, 2014);
3. the communities that form around the development of projects, especially the ones that are shared openly as Open Design, which then become community-based initiatives (Menichinelli, 2017).

These communities are often integrated as participation in the Maker movement takes place in activities that can span between them; this paper focuses on the community around specific projects (3) but that can extend also to local (2) and global dimensions (1). Following these specific kind of communities, here collaborative design is intended especially in the development of shared projects within the Maker movement: in this direction, the initiatives inspired by open source and peer-to-peer software seems promising (Abel, Evers, Klaassen, & Troxler, 2011; Cruickshank, 2014) especially for their ability to generate community-based initiatives around the sharing of projects but also for fostering several different potential social dynamics for both design and meta-design practice and research (Menichinelli, 2016a).

This paper elaborates a proposal for integrating Service Design concepts and tools into a meta-design digital platform for the design and management of collaborative design processes, by providing a) a reflection on the theoretical background behind the connections between Service Design, Activity Theory and Meta-Design, b) a proposal of a meta-design platform that represents a proof of concept of an implementation of the possibilities emerging from such connections and c) a proposal of evaluation strategies for validating such platform with users. This meta-design platform is based on four interconnected dimensions: conceptual, data, design, software; its research might advance or understanding

of 1) how Service Design might be connected with Activity Theory and Meta-Design in the development of community-based processes and organizations and 2) the relations among design and software, data, processes and organizations. The main research question (**RQ0**) could be structured in more research sub-questions in order to be addressed more easily:

1. **RQ0:** How could Service Design enable the meta-design of collaborative design processes on digital platforms?
 1. **RQ1:** How could the Service Design logic and tools be adopted in the design of community-based and collaborative design processes?
 2. **RQ2:** How could the Service Design logic and tools be integrated in digital platforms in order to help communities design, document, visualize, manage, share and understand their collaborative design processes?
 3. **RQ3:** How could we evaluate this integration of Service Design logic and tools into meta-design platforms?

RQ1 focuses on the theoretical background, **RQ2** focuses more on the development of a meta-design platform emerging from it and **RQ3** focuses on the validation of such platform. This organization of research questions is mirrored in the structure of the paper:

RQ1 is addressed in the *Service Design, Meta-design and Activity Theory for Open and Collaborative Design* section, **RQ2** is addressed in the *A meta-design platform based on service design tools* section and **RQ3** is addressed in the *Validation and future research* section. The *Conclusions* section resumes how each of the three previous sections has replied to the research questions proposed in the first section.

This paper represents a further improvement of previous researches in this direction (Menichinelli, 2015; Menichinelli & Valsecchi, 2016) but that were missing the Service Design logic and tools, here developed with more focus especially in the conceptual and design dimensions. The data and software dimensions have been also explored recently in other publications (Menichinelli, Forthcoming).

Service design, meta-design and activity theory for open and collaborative design

Collaborative dynamics in design processes are not a new phenomenon, since teamwork has always been a common practice among designers, and it has been approached in several different ways, from practitioners recollecting techniques and experiences (Brown, 2013) to researchers analysing practitioners through cognitive psychology (Goldschmidt, 2014). The focus of this paper is especially on design processes enabled or influenced by the adoption of ICT technologies and with wider communities of participants. The aim of this section is to establish through literature review how Service Design can approach the design of collaborative design processes through Activity Theory and Meta-Design by framing, analysing and designing collaborative processes as ecosystems of activities with the help of digital platforms:

- Activity Theory provides the conceptual basis for framing, understanding and designing activities;
- Service Design provides the operational basis for designing activities as services with the help of service design tools and logic;
- the Meta-Design approach provides the conceptual basis for designing collaborative design processes (*designing design processes and organizations*) and the operational basis for designing the platforms that enable such task (*designing design tools, environments, spaces for participation*).

Activity Theory is a framework for orienting researchers in understanding complex socio-technical phenomena and, especially in the version elaborated by Engeström (1987), it

provides a way for understanding the dialectic contradictions and continuous development of individual contributions to collaborative initiatives taking into consideration all the elements that mediate all the activities and their contexts. Activity Theory has been adopted and elaborated inside Human Computer Interaction research and practice since the 1980s' in several directions (Kaptelinin & Nardi, 2012, 2009), for example in order to improve the theoretical background of Human Computer Interaction or as a potential strategy that evolves from Human-Centered Design (Norman, 2005). Kaptelinin and Nardi (2012) identify three ways Activity Theory has been integrated into Human Computer Interaction:

1. as a theoretical re-framing of concepts;
2. as a provider of conceptual tools for design and evaluation;
3. as a theoretical lens in empirical studies.

Activity Theory has also been adopted in Service Design in order to extend Human Computer Interaction beyond individual digital artefacts to the analysis and design of services (Kaptelinin & Uden, 2012), for example by elaborating “an activity based approach that could be used as an analytical tool for communication design practitioners to improve the design of service communication interfaces” that “generates a shift from a service (and communication) design to what we call the design of activity systems” (Maffei & Sangiorgi, 2006, p. 2). Services can be then understood and designed as activities (and thus activities designed as services), and Service Design provides several tools for completing this task in a more intuitive way. Especially when services are considered as the outcome of complex systems of people, artifacts and organizations, they usually have a very limited visual evidence that benefits from visualizations. Services (and therefore activities) can be represented with several tools following four main visual archetypes (maps, flows, images and narratives) with different level of iconicity and representation of time and that, however, cannot render what a service is with just one representation (Diana, Pacenti, & Tassi, 2009). Beside Human Computer Interaction, Activity Theory has also been directly applied to collaborative design by researchers that analyzed the design practice in collaborative settings in order to understand teams' interactions and relative collaborative evolution and its dynamics (Zahedi, Tessier, & Hawey, 2017) and also in the design of communities (Barab, Schatz, & Scheckler, 2004). Activity Theory has also been implemented not just in analyzing but also in redesigning activities through the creation of a shared vision thanks to the identification of contradictions (Engeström, 2000). Activity Theory can be applied not only in the understanding of activities but also in their designing, and this paper suggests that the introduction of the Meta-Design approach (Fischer & Scharff, 2000; Giaccardi, 2003) would be a promising strategy along two main directions:

1. for enabling both professional designers and untrained or amateur designers and users to work together in collaborative design processes thanks to the conscious and reflexive design of the activities constituting such collaborative design processes;
2. for the generation of guidelines for the development of the digital platforms that enable the former point; the importance of a platform here lays in its abilities to enable the participation and networking of a potentially large scale pool of users.

This paper therefore proposes to use digital platforms for exploring how Activity Theory and Service Design could be integrated in order to enable participants in the design of the collaborative design processes they are part of. Meta-Design can provide a complex perspective in this direction since it has several meanings: for example, Giaccardi (2003), crossing etymological facts with extensive literature review identifies three different declinations of Meta-Design where *meta-* is regarded as:

- *behind* (or *designing design*): “Design of Design processes” / “Design of the generative principle of forms” / “Design of the Design tools”;
- *with* (or *designing together*): “Design of media and environments that allow users to act as designers” / “Design of the organization of flows”;
- *between/among* (or *designing the "in-between"*): “Designing the spaces of participation” / “Design of relational settings and affective bodies”.

In the context of this paper, these three directions could be then elaborated into a meta-design framework with these characteristics:

1. *behind* (or *designing design*): a focus on design tools that generate the design of processes;
2. *with* (or *designing together*): a digital platform that allow users to design the organization of interactions and flows between activities;
3. *between/among* (or *designing the "in-between"*): a focus on collaboratively designing the organization of participation in processes through an open discussion.

Therefore, Activity Theory can be then integrated in design along three directions:

1. as a design research tool, in order to identify the problems and contradictions related to a specific project or context;
2. as a qualitative analytical framework for understanding and describing design processes;
3. as a framework for meta-design approaches that adopt the understanding of design processes in order to consciously design them collaboratively in a custom designed digital platform: meta-design of design processes and meta-design of digital platforms that support the former.

Furthermore, an activity-centred approach could represent a systematic view also for understanding business models extending the focus from one single organization (a firm, for example, but in collaborative design initiatives there could be different forms of organization involved) to a system of interdependent activities. Here the focus would be not just on one organization but on one organization and on its network of partners, and all their activities that enable them to create and appropriate value (Zott & Amit, 2010). As an example of this direction, Activity Theory has been adopted also in the exploration of business models of Open Design initiatives by analysing the work of digital maker-entrepreneurs on the Thingiverse platform that enable the sharing of 3D printing projects (Troxler & Wolf, 2017). This research then also points out to possible applications of Service Design, Activity Theory and Meta-Design also to the business dimensions of collaborative design processes.

As a conclusion of this section, Figure 1 highlights the main traits of the framework here elaborated, a Meta-Design approach based on digital platforms that would emerge from Activity Theory and Service Design:

1. Service Design and Activity Theory provide the concepts and tools for understanding and designing activities;
2. Meta-Design provides the concepts for applying the former point to the reflexive and conscious design of design processes;
3. Meta-Design provides the concepts and providing guidelines for developing digital platforms that enable the former two points; such platforms are based on concepts, data formats, a visualization format that renders the data and a software layer that binds together data, visualization, graphical user interface and collaborative editing; the following section focuses on the visualization dimension;
4. such platforms can be applied to the design of, at least, any processes (whether design processes or any processes, whether individual processes or collaborative processes) and especially collaborative design processes but also business models and business ecosystems.

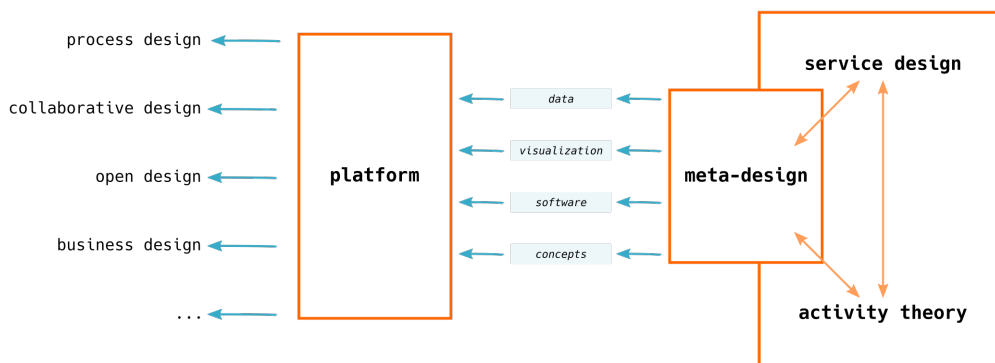


Figure 1 – The framework of the meta-design platform based on the connections among Service Design, Activity Theory and Meta-Design

A meta-design platform based on service design tools

The previous section highlighted how collaborative activities could be designed both conceptually and operationally, especially into a digital platform that facilitates the participation of users. This section focuses on the visualization dimension of such meta-design framework elaborated in the previous section, proposing a visualization format that could embed the Service Design logic in a digital platform in order to help communities design, document, visualize, manage, share and understand collaborative design processes. This is, ultimately, a task of democratizing Activity Theory to users who are not familiar with it, transforming (at least partially) from a complex research framework to a more intuitive digital platform with a design focus. The need for a democratization and simplification of Activity Theory emerged in previous workshops with students, that found it too complex to use without a previous knowledge or proper visualization (Menichinelli, 2015). Therefore this visualization proposal has three main characteristics:

1. it simplifies the application of Activity Theory in order to make it more understandable; a first step in this direction was taken by simplifying the visualization of an Activity System, with a process that lead to a simpler representation with the use of icons, and that itself could be represented as an icon in the main visualization (Figure 2, 5);
2. it integrates Activity Theory with several other design tools in order to provide a more comprehensive and intuitive understanding of the several dimensions of collaborative design processes;
3. it represents a proposal to be tested, validated and further improved (this will be developed in the following section).

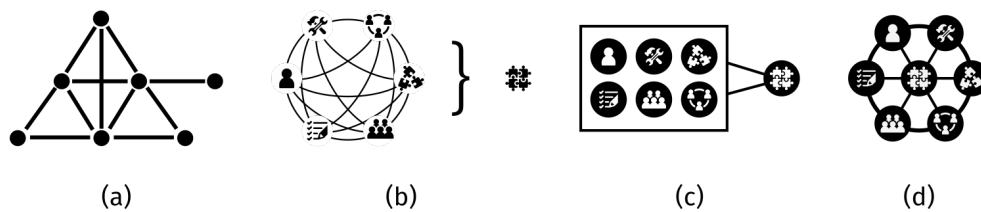


Figure 2 – Simplification of the Activity System representation, from the traditional representation (a) to the one eventually adopted in the meta-design platform (d) (Icons under CC-BY license by Gregor Cresnar, <https://thenounproject.com/grega.cresnar/>)

The tools considered and integrated in the meta-design platform, based on previous experimentations (Menichinelli, 2015; Menichinelli & Valsecchi, 2016), are listed in Table 1, where they are classified by discipline of origin (three of them are from Service Design); these tools work focusing on these elements that they provide a visualization of (Figure 3):

1. activity,
2. time,
3. participation,
4. boundaries,
5. resources
6. flows.

These elements and tools constitute the architecture of the visualization here presented, which can be described as Gantt chart of Activity Systems with flows of resources among them as in a System Map organized according to a Service Blueprint (Table 1, Figure 3). More tools are included or can be potentially included in the visualization beside these main ones (Table 1). The visualization (Figure 4) consists of these visual and interface elements:

1. *Title*: title of the collaborative design process described in the current document.
2. *Version*: version number that shows the evolution of the current document.
3. *Project Description*: description of the collaborative design process of the current document.
4. *Community Description*: description of the main community that the collaborative design processes is meta-designed with / for.
5. *Created / Updated at ...*: quick overview of time and user of the creation and last update of the document.
6. *Edits over time*: a chart plotting the edits of the document over time.
7. *Processes*: activities can be added under four categories as in a service blueprint: Customer processes, Front-Office processes, Back-Office Processes, Support Processes.
8. *Tooltips on buttons*: all the buttons in the interface have tooltips for showing indications to the users, and open modal windows with more in-depth details about the visualization.
9. *Activity description*: visualization of an activity with its flows, contradictions, levels of participations and so on.
10. *Buttons for editing an activity*: these are the main buttons for editing and discussing an activity and all its components.
11. *Participation*: this element visualizes how much an activity is done by the community i.e. the users who are less active or not active in the meta-designing. Results are then plotted in a customer journey chart (15), along with the feedback of the users.
12. *Contradictions*: contradictions of activities according to Activity Theory. Quaternary contradictions are visualized like flows (13), other kind of contradictions can be edited and visualized in a modal window.
13. *Flows*: flows of resources between activities, like in a system map.

14. *Time span of an activity*: This line depicts the time span of an activity
15. *Journey*: users can give a feedback to each activity (this can be easily extended with more options). Results are then plotted in a customer journey chart, along with the participation levels.
16. *Other visualizations of the project*: the platform enables the rendering of other perspectives of the same visualization, for example a list of activities, flows, contradictions and so on, in order to help users in the navigation of the visualization and of its data.

| Tools | Source | Activity | Time | Participation | Boundaries | Resources | Flows |
|---------------------|--------------------|----------|------|---------------|------------|-----------|-------|
| Activity Theory | Psychology | X | | | | | X |
| Gantt | Management | X | X | | | | |
| Service Blueprint | Service Design | X | X | X | X | | |
| System Map | Service Design | X | | | X | X | X |
| Customer Journey | Service Design | | X | X | | | |
| Participation level | Urbanism | | | X | | | |
| User activity | Data visualization | X | | X | | | |

Table 1 – Tools integrated in the meta-design visualization

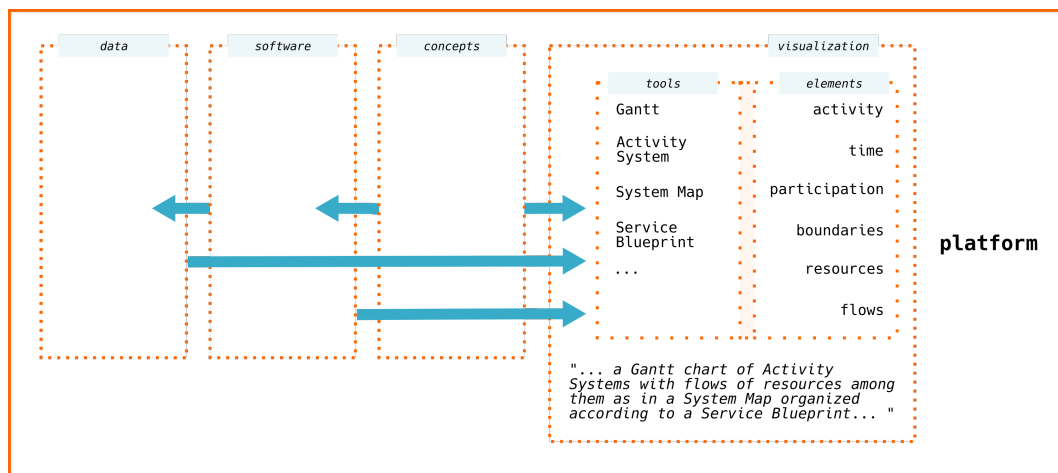


Figure 3 – The dimensions of the meta-design platform, with a focus on the visualization dimension and of its tools and elements

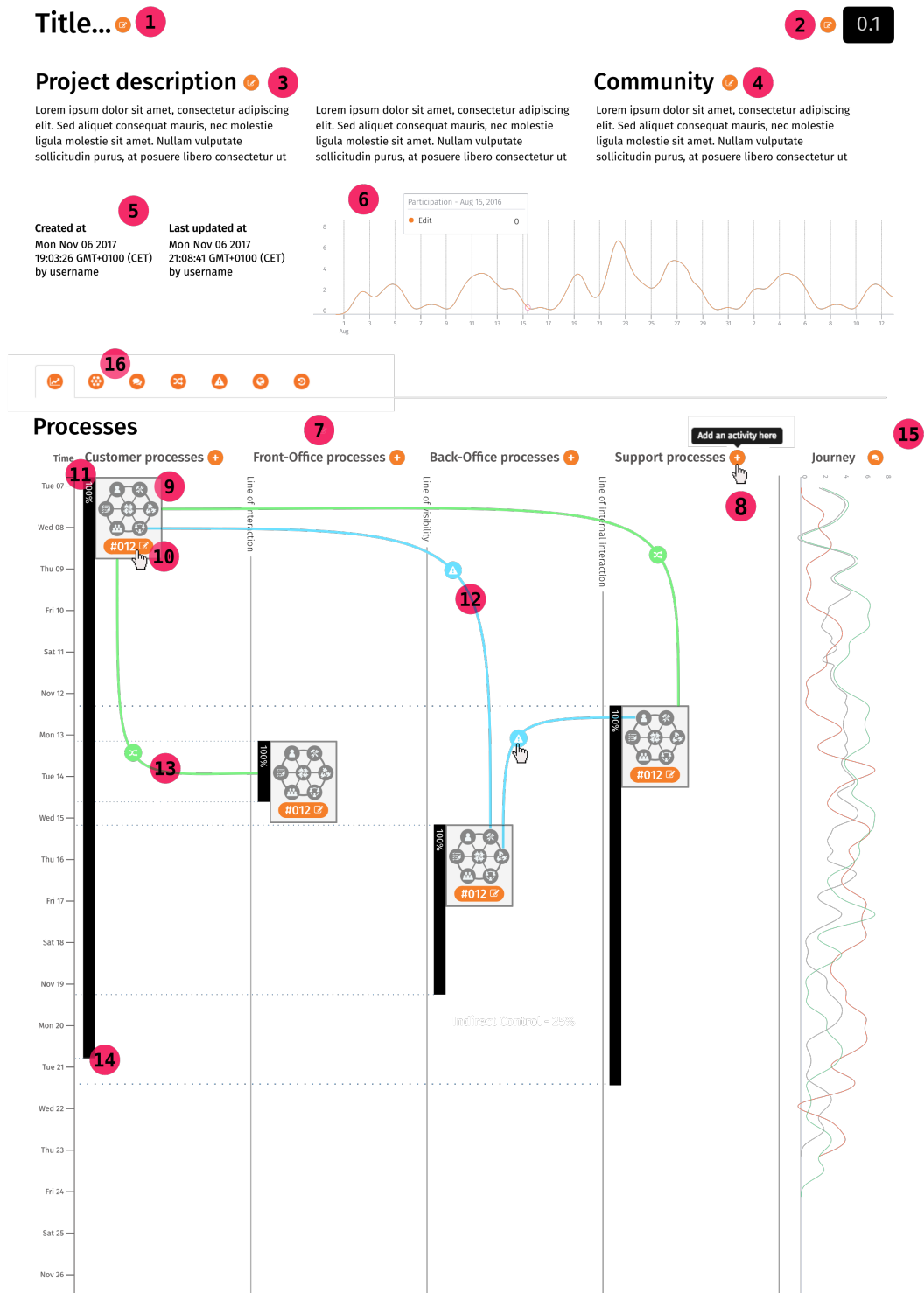


Figure 4 – An overview of the meta-design visualization and digital platform interface

Figure 4 shows the current status of the meta-design platform pointing out the most relevant elements: the visualization can be edited and discussed in realtime by clicking on the orange buttons, which open a modal window showing more details of each element, enabling its editing and discussion (Figure 6); such discussions can be also analysed in order to understand better the meta-design activity. The visualization went through a simplification process regarding the representation of activities and their interface (Figure 5), moving more details and functionalities to modal windows (Figure 6).

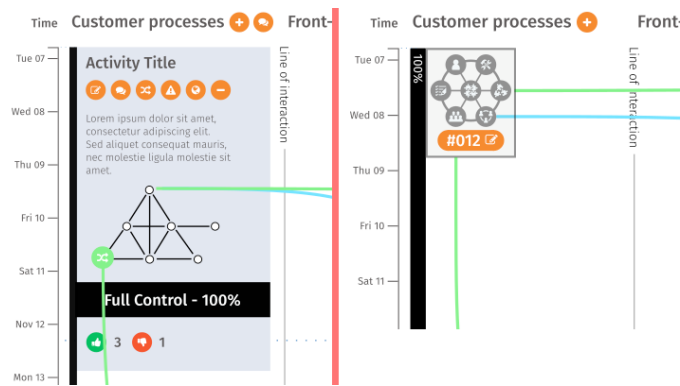


Figure 5 – Comparison between a former visualization of activities and the current one, after a process of simplification of both the activity system representation and of its interface

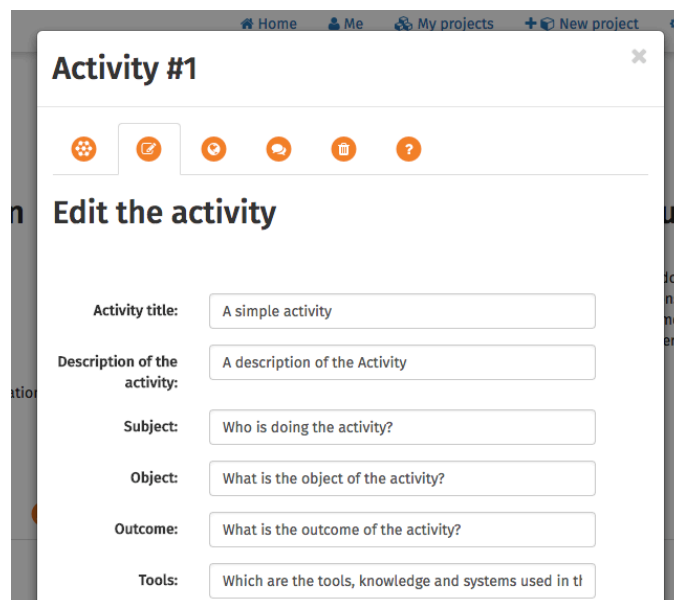


Figure 6 – A modal window for the edit and discussion of an activity

Validation and future research

The meta-design visualization and platform presented in the previous section is based on a series of workshops (Menichinelli, 2015) and following reflections (Menichinelli & Valsecchi, 2016), but more steps for validation and future research are essential in order to make sure that such a complex topic, framework and visualization are valuable for users. This section elaborates further strategies and directions for evaluating the integration of Service Design logic and tools in meta-design platforms. As a first step, we can elaborate the research objectives of the validation process:

1. **VRO1:** validate whether the meta-design framework and visualization are easy to understand and use. This objective could be addressed with User Experience methods.

2. **VRQ2:** validate whether the meta-design framework and visualization have a positive impact on collaborative design processes already established or to be developed. This objective could be addressed with an Action Research approach.

These validation objectives could be then formulated with the following topics and research questions:

1. **VRQ1. The experience of the users:** how has the platform modified their experience of collaborative processes?
2. **VRQ2. The shared understanding of collaborative design processes:** how does the platform influence the understanding of collaborative design processes?
3. **VRQ3. The social interactions among users:** how has the platform modified the social dynamics among them? Has the platform improved collaboration among users?
4. **VRQ4. The practice of users:** how has the platform modified the collaborative design practice users?

Based on these perspectives, this paper suggests to adopt a triangulation of three different methods for analyzing the visualization / platform and its impact on the courses/workshops in order to understand more the dimensions of the results (Gray & Malins, 2004):

1. **VM21. A qualitative analysis:** a think-aloud session where participants test the platform and openly discuss its functioning. The think aloud technique is a qualitative data collection technique in which user participants verbally externalize their thoughts about their interaction experience, including their motives, rationale, and perceptions of UX problems. By this method, participants give the evaluator access to an understanding of their thinking about the task and the interaction design (Hartson & Pyla, 2012). This method would answer to VRQ1 and VRQ2.
2. **VM1. A quantitative and qualitative analysis:** a survey with questions for the participants (in order to understand the impact of the platform in their experience). It will consist of both open and closed questions. The survey will cover the needs of the participants, their expectations, their experience in using the platform; for this reason, the survey will include established questions like SUS¹, USE², AttrakDiff³ (Hartson & Pyla, 2012). This method would answer to VRQ1, VRQ2 and VRQ4.
3. **VM3. A quantitative analysis:** a social network analysis based on the work on the platform and on specific questions in the survey (in order to understand the collaboration, social structure and organization among the participants). Data from social media platforms could be also considered in order to improve the understanding of these interactions. This method would answer to VRQ3.

The focus of this paper is especially on collaborative design around the development of shared projects within digital environments; in this direction, the initiatives inspired by open source and peer-to-peer software seems promising (Abel, Evers, Klaassen, & Troxler, 2011; Cruickshank, 2014). Therefore context for validating this meta-design visualization and platform could consist in the collaborative efforts around Open Design projects developed by designers and makers in Fab Labs and other Maker Facilities. Testing the platform in a real-life setting (a maker collaborative project) would be the optimal context, following the Action Research approach, and User Experience methods could be applied there.

This paper has focused only on the concepts (section 2) and visualization dimension (section 3) of a meta-design platform, and further research and validation might be necessary for the other dimensions of software and data. Furthermore, this paper has not focused on the governance dynamics of the platforms and of the potential conflicts emerging from the interactions among users, which could be a very important topic for future research; Activity Theory could be here adopted for its ability to deal with contradictions and modify activities

1 <https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html>

2 <http://garyperelman.com/quest/quest.cgi?form=USE>

3 <http://www.tandfonline.com/doi/pdf/10.1080/10447318.2015.1064664>

by learning from them (Engeström, 2008). Furthermore, future research could investigate the organizations emerging from this platform, and here Activity Theory could be implemented as well (Blackler, 1993).

Conclusions

This paper explores how the approach, logic and tools of Service Design could support the development of a digital meta-design platform that enable the collaborative design of open and collaborative design processes. By integrating Service Design, Activity Theory and Meta-Design, such meta-design platform could foster community building and management providing concepts and visualizations that help users forming a community during the conscious and reflexive design of the activities constituting the community's own collaborative design processes. How could Service Design enable the meta-design of collaborative design processes on digital platforms? This paper tries to answer to the main research question (**RQ0**) with three sub-questions:

1. How could the Service Design logic and tools be adopted in the design of community-based and collaborative design processes (**RQ1**)? This question was answered by establishing conceptual and operational basis of such platform by highlighting the already existing connections among Service Design, Activity Theory and Meta-Design. Service Design and Activity Theory provide the concepts and tools for understanding and designing activities while Meta-Design provides the concepts for applying them in the reflexive and conscious design of design processes and the guidelines for developing digital platforms supporting this. This answer provides insights about how collaborative activities could be designed both conceptually and operationally, especially into a digital platform that facilitates the participation of users.
2. How could the Service Design logic and tools be integrated in digital platforms in order to help communities design, document, visualize, manage, share and understand their collaborative design processes (**RQ2**)? This question was answered by developing the visualization dimension of a meta-design platform that integrates Service Design tools and logic with Activity Theory and other tools in order to enable users to meta-design collaborative design activities as ecosystems of activities. Such visualization is based on a set of tools that provide a visualization of collaborative design processes through the elements of: activity, time, participation, boundaries, resources, flows. Such visualization can be described as Gantt chart of Activity Systems with flows of resources among them as in a System Map organized according to a Service Blueprint.
3. How could we evaluate this integration of Service Design logic and tools into meta-design platforms (**RQ3**)? This question was answered by suggesting validation strategies for testing the platform and improving it. The first step was the identification of two broad research objectives: validate whether 1) the meta-design framework and visualization are easy to understand and use; 2) validate whether the meta-design framework and visualization have a positive impact on collaborative design processes already established or to be developed. These research objectives were then translated into four research questions that aim at understanding how the proposed visualization and platform affects the users' experience and understanding of collaborative design processes, and their social interactions and practice. In order to answer these four research questions this paper proposes three different methods (qualitative and quantitative) for analyzing the platform and its impact on the users' practices.

This visualization and related meta-design platform could represent a tool for improving community-based initiatives thanks to its focus on designing, supporting and visualizing the communities emerging from collaborative practices, with the focus on making them aware of these collaborative practices and the social interactions, dynamics and organizations

emerging from them. This paper documents a step in the development process of the platform, and therefore further research is necessary in order to understand how the visualization and the platform are used and perceived by communities, and how communities are impacted by them. The validation proposal is a further step in this direction. Furthermore, other limitations and related research questions could be elaborated here: for example, the context of this research is the Maker movement, but since it is a global phenomenon, the visualization might not be necessarily understood and used in the same way everywhere: previous experimentations highlighted how cultural differences could present a challenge for the adoption of the platform, especially regarding Activity Theory (Menichinelli, 2015). And beside the Maker movement, such platform should also be tested in community-based initiatives in other contexts, and adapted accordingly, in order to understand if the specific context has influenced the functionalities of the platform. Activity Theory and its representation with Activity Systems has been simplified in order to facilitate its understanding and application, and further specific research should improve this democratization; activities and processes, being intangible phenomena, should also be investigated more, especially regarding how they are perceived by designers and users and how their analysis and visualization could be then improved. Further research might be important also for understanding the social dynamics emerging from such platform especially in terms of conflicts and organizations emerging, and Activity Theory could be further implemented as a research approach along this direction. This paper focuses especially on the design and visualization dimension of the meta-design platform, but the software and data dimensions are equally important, and more research should analyze the connections between all these dimensions and how these could be improved (Menichinelli, Forthcoming).

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