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USING SOCIAL MEDIA FOR ASYNCHRONOUS COLLABORATION WITHIN COLLABORATIVE NETWORKS

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ABSTRACT

Societal challenges of today (e.g. aging) are complex and often require systemic solutions to be addressed. To address these challenges, various expertise and knowledge are required; in this sense, collaborative network projects have a lot of potential in offering a systemic solution.

Design workshops (synchronous collaboration) are often used to achieve progress in such projects. In this paper we introduce asynchronous collaboration, which can occur anytime, anywhere through the use of social media.

We have probed Instagram as a 'ready-made' social media platform within two collaborative network project case studies. This was done to experiment with asynchronous collaboration and knowledge sharing in addition to design workshops.

Both cases were evaluated through focus groups that indicated how social media has the potential to enable actors to cross-field boundaries, inspire each other, and in this way enrich the design process within asynchronous collaboration.

Our contribution with this work is two-fold: on the one hand, we aim to inspire and show how collaborative network projects can benefit from asynchronous collaboration in addition to synchronous collaboration. On the other hand, we hope to contribute to the creation of specific social media platforms as tools for supporting asynchronous collaboration within collaborative networks.

1. INTRODUCTION

1.1 BACKGROUND

Societal challenges, also referred to as 'wicked problems' (Rittel *et al.* 1973), are known for their complex and dynamic nature. In order to be fully addressed, societal challenges require solutions that can bring about systemic change within society (Mont 2002, Tan *et al.* 2006, van Gent *et al.* 2011). Product Service System (PSS) design seems to be a promising concept when dealing with 'wicked problems' (Baha *et al.* 2013).

In order to instigate this systemic change a collaborative network that consists of various actors (e.g. producers, stakeholders, opinion leaders, and consumers) is needed to support the creation of the PSS (Tomico *et al*. 2011). The underlying idea of collaborative networks is that different actors can bring in key knowledge and expertise into the system, increasing the likelihood of creating a meaningful innovative solution. Collaborative networks are known for a horizontal hierarchy, lacking a clear leading actor (Chesbrough *et al.* 2006, Mandell & Keast 2007, Howden 2007).

Working within collaborative networks, in contrary to cooperative or coordinative networks, can be complex and risky due to the following factors (Mandell & Keast 2007, Stompff 2012):

- Stakeholder (inter)dependency: Actors within collaborative networks are often strongly dependent on each other, which makes reaching consensus difficult.
- Cross-cultural boundaries: Actors may have different incentives or perspectives on how the project should be framed. Also, jargon can limit communication between actors.
- Unpredictability: Actors sometimes may quit the network or become redundant whilst new actors emerge.
- Availability of time and attention: (Project) activities are often not a prime directive of actors but rather additional tasks to their normal schedule, making it hard to consolidate on meetings or participation.
- Legitimacy: Because of the horizontal hierarchy, often actors find themselves in a democratic innovation process, being a compromise. In particular, when the value proposition is not clear or defined, actors may find themselves in a position where they lack power or legitimacy to lead the actors towards a successful design process, especially when they are not in charge of vital resources.

In short, for actors in a collaborative network it is essential to form strong interpersonal connections. These connections can be influenced by actively sharing data, knowledge, demonstrate competencies, and collaboratively sensing and exploring the design landscape (Howden 2007). Usually, these activities are done within workshops ('synchronous' events).

By putting the user central in the innovation design process, these workshops enable a joint practice within the collaborative network. (Sanoff 2006, Soini 2006, Mattelmäki 2007, Buur & Matthew 2008, Tomico *et al.* 2011).

However, when the multi-stakeholder innovation process is only based on 'synchronous moments', in which actors can collaborate and discuss, multiple disadvantages appear:

- Isolation/De-contextualization of knowledge: Workshops allow for limited time and often de-contextualize the actors from context, from which otherwise interesting or valuable knowledge can be shared.
- Retaining momentum: often, long time gaps may appear in between workshops. This makes it hard to retain momentum and keep actors engaged within the project, thus undermining the creation of interpersonal connections.
- (Mis)communication issues: in order for actors with different backgrounds to collectively explore and reach consensus, assumptions and miscommunications need to be eliminated. However, the frequency of workshops is usually insufficient to deal with this issue.

In this paper, we address the disadvantages of only deploying synchronous collaboration moments by using social media as a tool to support 'asynchronous collaboration'; meaning that actors do not need to share the same space and time in order to collaborate. Therefore, we are interested in finding ways that enable actors to share knowledge anytime, anywhere.

The rapid use of social networking sites (such as Facebook), and media-sharing technology (such as YouTube), and their increasing availability in mobile platforms, is changing the way that we are communicating with each other. Social media are changing the way that information is passed across our societies and around the world. The concept of social media has been widely explored in business creation to create better communication platforms between consumers-producers, consumers-consumers, and producers-producers (Kaplan & Haenlein 2010).

Social media allow for bi-directional or multi-directional forms of knowledge sharing among actors. On the contrary, traditional knowledge management or consumer research methods within design often use one-directional form to gather or spread data. In other words, social media enable a more democratic way of knowledge management within multi-stakeholder innovation.

The diffusion of social media enabled devices makes the use of social media attractive to share tacit knowledge (knowledge from in situ) within actors in a collaborative network. Another advantage of social media can be that they empower all the actors to equally contribute in sharing their knowledge and/or perspective.

1.2 OBJECTIVE

Our work departs from the idea that social media has potential to serve as a knowledge sharing platform supporting asynchronous collaboration between actors within collaborative networks.

With our research we aim to investigate to what extent social media can support asynchronous collaboration within collaborative networks and for design.

Moreover, we are interested to find out whether the design workshops' limitations can be compensated by the use of social media.

1.3 STRUCTURE OF THIS PAPER

This paper is structured in five sections. We start by explaining our research approach and methodology (section 2.1). We then present a social media selection study and motivate the platform that we have selected for this research (section 2.2). In the following section we introduce two collaborative network case studies, each related to a different societal challenge (section 3.1).

Then we explain how our investigation (asynchronous collaboration through social media) was set up and executed (section 3.2). In section four we present the results of each case study (sections 4.1 and 4.2). Based on focus groups, after each experiment, we drive conclusions and discuss them in section five. Finally, in section six, we define our future work.

2. RESEARCH APPROACH AND METHODOLOGY

2.1 CASE STUDY (PROBING AND FOCUS GROUP)

We performed two case study experiments using existing, real life, collaborative networks (Yin 2008). To include complexity as a dimension in our research, we selected a large and a small collaborative network. In both case studies, an existing social media platform was probed and reflected upon together with the involved collaborative network actors, within a focus group (Mattelmäki 2007, Berg & Lune 2011).

2.2 SELECTING A SOCIAL MEDIA PLATFORM

A social media platform was selected and used as a 'ready-made' probe. Since there are many social media platforms available, a set of requirements was defined and used to select the most appropriate platform for our study. The following requirements were considered in our selection process based on design guidelines for knowledge sharing tools, provided by Burg *et al.* (2008):

- Accessibility: The social media platform should allow the actors to capture/record knowledge in any context.
- Presentation: The sharing platform should focus on conveying media input visually rather than having a pure textual orientation.
- Efficiency: Capturing knowledge should be done efficiently without interfering with the actors' daily life.
- Compatibility: The social media platform should be available for multiple devices; to capture, share, or view knowledge from.

Based on the requirements, the following social media platforms were evaluated: Instagram, Evernote, Twitter, Pinterest, and Yammer. In the end, Instagram was chosen as the platform to be probed. Instagram enables actors to share and communicate knowledge through photos, related captions, and additional comments (from both the uploader and viewers). Adding both captions and comments to the photo, in context, makes knowledge more concrete and understandable, enabling other actors to relate to it more easily (see Figure 1). In addition to captions and comments, the uploader can associate hashtags to each photo. Hashtags enable organization, (semantic) grouping of the photo collection and offer the possibility of filtering it through Instagram's internal search engine (Hashtag 2013).

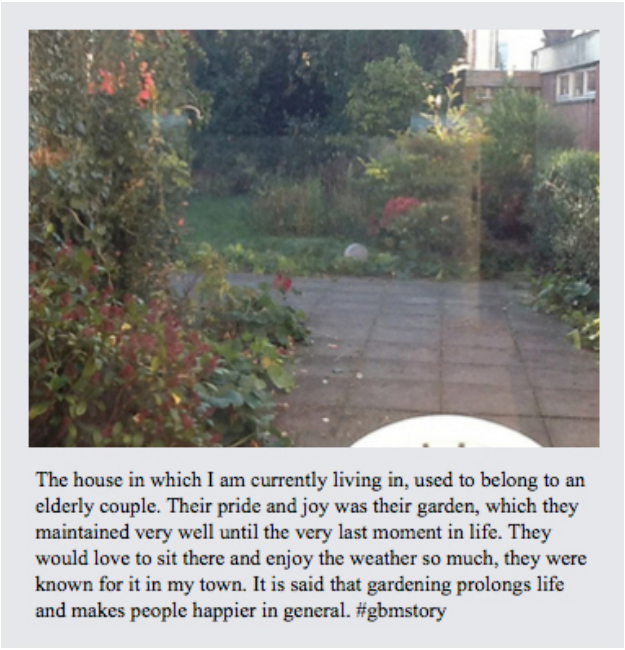

Figure 1: By adding a caption the moment after a photo was taken, actors have the possibility to concretize their knowledge about the captured content, e.g. relating to a personal experience, a special insight or explaining what is happening. The hashtag #gbmstory was part of the setup of the first case study; it was added to define and categorize this knowledge as a design opportunity.

3. CASE STUDY SETUP AND EXECUTION

3.1 SOCIETAL CHALLENGES AS CASE STUDIES

Two ongoing projects aimed at addressing societal challenges were selected and used as cases for our research. The projects related to the societal challenges: aging (case 1) and energy saving (case 2). Below we describe each case in detail followed by our experiment design for the case.

3.1.1 DESCRIPTION CASE 1 (GREY BUT MOBILE)

The first case study was performed within the project Grey but Mobile (GbM), as part of the Dutch national 'Creative Industry Scientific Program' (CRISP 2010). The goal of GbM is to address the societal challenge of aging and care in relation to mobility and social participation of elderly in the Netherlands, using PSS solutions.

GbM attempts to instigate meaningful change in the society by designing solutions within a collaborative network, consisting of various actors based on a quadruple helix innovation model. This model includes the industry, the public sector, knowledge institutions, and societal representatives (active citizens) (Carayannis & Campbell 2009, Tomico *et al*. 2011). Two design workshops within the GbM project formed the context of our first case study (probing Instagram to support asynchronous communication).

3.1.2 DESCRIPTION CASE 2 (ENERGY CONSUMPTION)

The second case study took place within an industrial design MSc graduation project, aimed at stimulating energy saving behavior within the campus of Eindhoven University of Technology (TU/e). The student, who initiated the project, wanted to design a PSS solution to address this societal challenge. However, at that moment, the project was yet to be framed in terms of specific context and direction.

In order to frame the project and define interesting directions, Instagram was probed as a collaborative tool to gather different perspectives on energy consumption within TU/e. In practice, a small team was formed between the student and an involved design researcher to benefit from multiple perspectives.

3.2 SETTING UP THE CASE STUDIES

In this section we describe the separate setup of the two case studies.

3.2.1 SETUP CASE 1 (GREY BUT MOBILE)

An electronic probe package was designed, consisting of the 'ready-made' Instagram app, an assignment brief, and a manual of use of the probe (see Figure 2). The package was then distributed through e-mail to the GbM collaborative network actors after the first workshop.

Four out of ten invited participants (around 50% of the network) were included in this study. These were: the first author, an innovation manager from a care organization, an innovation manager from a public transport company, and an account manager from the municipality. The actors were asked to collect and share: project inspiration, context related experts and current problems elderly face within the society. Moreover, a set of three categories of hashtags were defined and used to collaboratively explore the design space:

- #GbMinspiration: Projects that have been done in the past or other material that can inspire the network in addressing the societal challenge.
- #GbMexperts: People with expertise from which the network can benefit.
- #GbMstory: Situations or challenges elderly people currently deal with, meant to give the network a more empathic orientation.

After sending the electronic package (see Figure 2), all actors were contacted to confirm: package reception, acceptance of the assignment, and understanding of the brief. The participants had one and a half weeks to upload the required materials before meeting again in a design workshop. The collected results would be used for supporting the second workshop by putting them on an 'inspiration wall' for co-design purposes. Within this workshop, the collaborative network would co-design PSS concepts.

At the end of the second workshop, a focus group was organized to get more insight on how Instagram

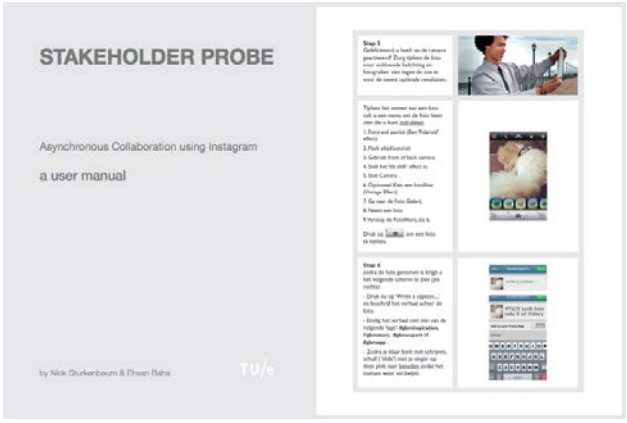

Figure 2: Pages from the manual that was provided to the participants through e-mail.

contributed to asynchronous collaboration in between the two workshops. In addition, individual interviews were held with each experiment participant to get more insights on how the Instagram platform was received, and to what extent it was useful for asynchronous collaboration in between and for the workshop(s).

3.2.2 SETUP CASE 2 (ENERGY CONSUMPTION)

Before our social media experiment, the MSc graduate had executed a 'photo safari' (Broberg *et al.* 2011), with his photo camera, with the aim of exploring how energy was used in TU/e. This allowed room to compare the two techniques.

In this case study, Instagram was used intensively for three days, allowing the designer and the design researcher to share their perspectives and findings in how energy is being consumed within various locations of the TU/e campus. This was to uncover behavioral patterns and infrastructural/unforeseen uses of energy within different activities in different contexts.

Before starting the probing session, a hands-on training was provided with examples on how to capture tacit knowledge and make it explicit through adding captions, comments or hashtags. We added this step to the probing experiment based on the knowledge that was gained from the previous case study experiment design.

After the three days, the collaborative network actors joined forces in a meeting in which they co-explored interesting aspects of the collected material. The uploaded photos, were analyzed and discussed while being displayed through a browser, using a third party client of Instagram, Pinstagram (Pictacular 2012). After the analysis, the participants had a focus group to reflect upon the use of social media for asynchronous collaboration within this experiment.

In addition, the MSc graduate who had executed the 'photo safari' was asked to write down a reflection in which he would compare the two approaches (photo camera vs. Instagram) and elaborate on his subjective experience of using social media within a small collaborative network for design exploration.

Figure 3: The ‘inspiration wall’ created from the Instagram probe results during the second workshop.

4. RESULTS

4.1 CASE STUDY 1 (GREY BUT MOBILE)

The participating actors uploaded their previous elderly related projects as inspiration to convey what they have been doing in the past. Because of the social media probe, two actors were triggered to share documents about their earlier pilot projects with other actors in the collaborative network.

Concretely, one actor uploaded four different photos spread over the three categories (Inspiration, Experts, and Story). The second actor uploaded seven inspirational sources, the third actor uploaded eight photos divided over the three categories. The fourth actor was not uploading any material. This was observed by the other actors who then decided to get in contact with the former.

For the description of the uploaded materials, participants used short keywords, similar to hashtags, to express their inspirational sources. The pictures by themselves generally conveyed enough information about what they were about, suggesting the focus and intention of the actors to some extent.

We also observed that whenever an actor, for any reason, did not share anything on Instagram, the social media context provided an indication that this actor required attention. Compared to traditional workshops (synchronous events), this type of collaboration provides organizers with instant/dynamic information that might be of use for their facilitation role.

The photos were presented on an ‘inspiration wall’ during the second workshop, which allowed participants to reflect upon each other’s work (see Figure 3).

The contents of the uploaded photos indicate that actors mainly share projects related to their own expertise, giving little attention to customer needs or expertise from other fields. The content of the photo material, to some extent, reflects the expertise/knowledge of each actor, indirectly indicating what is missing for the project. In addition it shows which actors require more intensive facilitation, during the workshop, to open up for better collaboration.

These findings also raised awareness that most actors still require support in crossing the boundaries of their field (acculturate) in order to get better insights in the ‘wicked problem’ and the needs of future customers.

One of the societal representatives acknowledged that many organizations currently have a tunnel vision, due to which they fall into recurring thinking patterns, leading to repeat conventional solutions. The focus group and separate actor interviews revealed that the use of a visually oriented social media platform forced actors to work and think differently. Actors were used to be ‘thinking on paper’ and to share largely textual materials rather than concretizing and showing their ideas through pictures and captions.

The time-effectiveness of asynchronous collaboration was acknowledged within the focus group:

> Innovation Manager from care organization: *{The problem with every organization is time and money... Time seems to be shorter when you're working with different organizations.}*

Using social media for asynchronous collaboration was also appreciated:

> Manager of Infrastructure within the municipality: *{Normally, we have a tunnel vision, the idea of the tool is to keep you reflecting on the project. We connect with the project through notes and pictures}*

Still, most of the participants found difficulties in using their smartphone for social media. They mentioned that this was because of a ‘generation gap’. In addition, some of the actors were not sure about how they could reply within the browser, despite stating before that they knew how to use the platform before the session started.

4.2 CASE STUDY 2 (ENERGY CONSUMPTION)

The second experiment added valuable insights within the advantages of using social media as a tool for co-exploration. The participant, who had performed a ‘photo safari’ before, stated:

> *{I regret I didn’t find out about this tool sooner}*

Social media allowed him to get out of his own tunnel vision, enrich and co-reflect his perspective with others.

Concretely, there were over fifty photos shared within the small collaborative network. The ability to add context to the photo through comments and hashtags was especially appreciated by the participating actor within this session. This allowed the photos ‘to speak’ in contrast to the previous ‘photo safari’, in which it was often forgotten what exactly was meant with a photo, or why was it captured in the first place.

Figure 4: Instagram probe analysis session. On the right: probe results displayed on screen; on the left: post-its used to capture and group the subjective insights.

The ability to add captions also made it easier to discuss the context of the photo, and exchange subjective interpretations and experiences (see Figure 1).

For the analysis, photos were displayed on a large TV screen using Pinstagram within a browser. Meanwhile the designers physically captured tacit knowledge by writing on post-its and grouping them (see Figure 4).

By looking at the context from different perspectives, the design exploration got much richer in terms of creating new and increasing awareness about certain energy use behavior. It provided rich content for dialogue about the design context. Or as the designer who performed the 'photo safari' puts it:

> *{To conclude, it was the very format of the session that contributed to its success: it was an open, group discussion centered not just on a central theme (the one of my project) but around our own creations and point of views (the photos). This ownership element stimulated participation and sharing of information coming also from our own experience and personal life as well.}*

5. CONCLUSIONS AND DISCUSSION

We have probed Instagram as a 'ready-made' social media platform to support asynchronous collaboration within collaborative networks. This was done within two projects that aimed to address societal challenges. In the remaining parts of this section we draw conclusions and discuss them one by one.

5.1 ASYNCHRONOUS COLLABORATION

5.1.1 THE ACTORS

Asynchronous collaboration, probed by using Instagram, proved to lower the threshold for the actors to get engaged in collaborative projects, contributing to retain project momentum to some extent. In particular, we found out that the social media platform Instagram, enabled informal and low effort communication through surprise and dialogue. This communication is based on sharing knowledge through captioned and tagged photos, representing situations, people, ideas or even other sources of knowledge (e.g. books).

5.1.2 THE ORGANIZERS

Instagram was found to be useful by the project organizers due to the instant/dynamic sharing of knowledge among the actors. This allowed the organizers to anticipate on the shared knowledge and modify the structure of workshops accordingly (section 4.1). In addition, since knowledge is instantly shared across the collaborative network, the organizers did not have to actively distribute it to each actor.

5.1.3 THE PROJECT

The case studies indicate that projects can benefit from rich discussions due to asynchronous collaboration possibilities enabled through social media. The introduction of social media in the projects resulted in actors: bringing in more knowledge, uncovering their interest, and increasing their availability for the project. These elements, benefited the project by improving the systemic understanding of the 'wicked problems', and shifting towards a more user-driven approach.

5.2 INSTAGRAM

5.2.1 PROS

Within the two experiments, the use of social media platform Instagram benefited actors and organizers in the following ways:

- It provides more interaction moments, as there is no need to make appointments: content can be uploaded to the platform and shared with others at all times. This potentially allows to save up more time for the PSS project.
- It allows the actors to go more in depth in the project due to the possibility to contribute more (in situ) knowledge and expertise, while using the workshops for having face-to-face reflection/interaction.
- It enables informal and low effort communication thanks to the introduction of comment-based dialogue and the combination of photos, captions and hashtags. We observed this to be a motivating factor for actors to get more engaged within the collaboration.
- The additional knowledge that is shared by actors through Instagram creates a common knowledge source for actors to reflect upon during meetings. This improves the quality of communication and understanding of each other's incentives for collaboration.
- The possibility to add hashtags and captions to a photo after capturing was found most appealing by the designer from the second case study (section 4.2). Through description, the photo becomes concretized based upon the actor's view in an (actual) context.

5.2.2 CONS

We encountered the following cons when using Instagram for asynchronous collaboration:

- Instagram as a social media platform only facilitates photo sharing, whereas participants from the first case study all expressed the need to also share other types of files, especially documents.
- While Instagram has a relatively quick learning curve for use, a possible 'generation gap' was expressed by some actors above forty years old.
- Some actors found the lack of privacy over uploaded content to Instagram disturbing. Please note that Instagram does not ensure a closed network that provides full ownership over uploaded content.
- Instagram does not have many features for representing the shared knowledge. This led us to rely on 'Pinstagram' for structuring the photos for analytic purposes. In addition, we used Post-it's for reflecting and drawing relations between the shared knowledge.

5.2.3 UNEXPLORED OPPORTUNITIES

The possibility to initiate a discussion within the commenting system of Instagram remained largely unused in both case studies, while it does show potential in further exploiting the shared knowledge. The authors are interested to see whether social media can also contribute to asynchronous dialogue within participatory innovation (Buur & Matthews 2008).

We still lack clear guidelines on how we can encourage participants in using the social media platform to share knowledge and to motivate people in discussing about this knowledge. Some insights can be gained through the works of Gupta & Govindarajan (2000), who distinguish five factors that determine whether knowledge will be shared.

5.3 GENERAL RECOMMENDATIONS

Finally, we would like to provide a few general recommendations for deploying asynchronous collaboration in collaborative network projects, using social media:

- To ensure satisfying outcomes when deploying social media for asynchronous collaboration, we strongly recommend to provide a brief hands-on training beforehand.
- Before deploying asynchronous collaboration within a collaborative network project, we recommend project organizers to first negotiate with the actors how asynchronous collaboration could benefit the project.

6. FUTURE WORK

We are interested in similar case studies that can contribute in exploring to what extent social media can be used within open or participatory innovation. This study has also inspired us to do research on how tools such as cultural probes can be innovated using social media.

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