HOW TO MAKE ADVANCED ONLINE USER STUDIES MEANINGFUL

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ABSTRACT

It is of vital importance to explore and understand future users' needs and requirements in the early phases of the product development process. However, in times of social distancing meeting users might not be possible. The project reported on in this paper has investigated the possibilities of conducting advanced user studies online. In total 30 small experimental studies have been conducted. Common digital tools that were used were e.g. Zoom, Teams, Mural, Miro, Snapchat, and Instagram.
The data was analyzed in a thematic content analysis by the authors on Mural. Identified challenges were excluding not tech-savvy user groups, missing out on interpersonal interaction and observations, as well as difficulties creating participant commitment and trust. On the positive side were perceived efficiency, a more levelled power distribution between participants, and ease of engagement and data retrieval for tech-savvy users.
Identified best practices included lowering social barriers through warm up activities and techniques to support open discussion during workshops. Furthermore, engagement could be supported through private social media groups, regular reminders, as well as clear communication of purpose and goal of the activities.

Keywords: User centred design, Collaborative design, online collaboration, Requirements

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1 INTRODUCTION

It is of vital importance to explore and understand future users' needs and requirements in the early phases of the product development process. With an increased interest for understanding, not only more performance-oriented requirements, but to create a superior experience for the user, the attention has shifted from more traditional methods such as interviews and focus groups to methods that involves the users on a deeper level. Example of such methods are different Co-creation activities (e.g Sanders and Stappers, 2008), Cultural Probes (Gaver et al. 1999), Diaries (e.g. Baxter 2015), Enactments (Pettersson & Ju, 2017), Creative Voice (Rivera-Lopez et al., 2018), etc. With increased user involvement comes an increased need to meet users in person for a longer period of time. However, in times of social distancing (such as the current Covid 19 pandemic) this may not be possible. Furthermore, we predict that in an ever increasingly globalised world, where at the same time long distance travel must be limited for climate reasons, the need for online user studies will only increase even after the current pandemic.

While traditional one-to-one interview is a fairly easy method to adapt to zoom and other digital platforms, methods that rely on interaction and creating stuff together may be more difficult to perform online. Nevertheless, it is of great importance to identify methods that can be used without physically meeting users, as well as to develop new variants that are more effective in these circumstances.

The project reported on in this paper has investigated the possibilities of conducting advanced user studies online. In particular, we attempt to answer the following questions:

- Which methods can be transferred to online platforms?
- How can these methods be adapted for online use? Is it possible to design new methods specifically for online use?
- Are there benefits of conducting online user studies that could be exploited even after the pandemic?

2 METHOD

2.1 Data collection

The project has collected data from thirty 30 smaller experimental studies conducted by 40 master students in a course on Advanced User Studies and Co-creation as a part of the Industrial Design Engineering Master Programme at Chalmers University of Technology in Sweden. The aim of the course was to deepen the students' knowledge in user-centered product development as well as providing the students with new tools and methods for user involvement to elicit user needs and requirements in wicked design problems.

The course was divided in three different themes: Co-creation, Into the Future and Into the Everyday. Each theme was explored by the students in groups of four, resulting in ten different experimental user study projects per theme. The students were free to choose any of the methods lectured in the course, develop a variant of the same or explore methods they found suitable for the assignments. Examples of the methods used were different Co-creation methods, Enactments, Cultural probes, Creative voice, etc. combined with more traditional methods such as interviews, focus groups, and observations. Common digital tools that were used in the experiments were Zoom, Teams, Mural, Miro, Snapchat, and Instagram.

The assignments were documented in various ways. The Co-creation by a poster; Into the Future with ha short report and Into the Everyday by a two-page Power Point presentation. The student´s collective experiences from the activities were documented in a final reflective essay. The experiences from each theme were discussed in groups of eight to twelve students in a total of twelve online seminars.

2.2 Analysis

The analysis is based in the students documented assignments together with the seminar discussions, which were recorded and transcribed. All participants gave their consent to being recorded and participate in the research project.

The data was analysed in a thematic content analysis by the authors using Mural as collective workspace. Consistent with thematic qualitative analysis (Granskär and Höglund-Nielsen, 2008; Miles et al., 2014), the analysis did not follow any predefined coding system; rather, the themes emerged as the analysis

proceeded. Various themes concerning positive and negative experiences; specific tools used; technical skills; tips and tricks as well as themes regarding collaboration, interaction and communication evolved. The authors additionally examined the themes individually and the result were compared and discussed to determine whether the individual outcomes were consistent with the collective analysis and reach a consensus.

3   RESULTS

From the 30 user research projects, 21 were conducted online. For the remaining 9 projects, the students identified users who had the opportunity to participate in the projects IRL (In Real Life) and meet face-to-face. Thus these 9 projects were excluded from the study. The results section is divided in three parts: 1) snapshots of the online user research projects, 2) identified advantages and limitations of conducting user studies online, 3) best practices to excel at online user studies.

3.1 Snapshots of online user studies

Co-creation workshops: The co-creation activities that worked well online were post-it exercises and the brainwriting 6-3-5 method. These activities were conducted using tools such as Mural and Miro. For example, one group conducted co-creation workshops "*digitally using Zoom as our meeting room and Miro as our co-creational space where we used Brainwriting 6-3-5*". The purpose of the workshop was to design furniture for shared spaces for study environments and the participants were other students. In figure 1, the students describe their methodology, the identified needs, generated ideas, and the idea voted for further development. According to one of the students: "*6-3-5 is very suiting for co- creation sessions with smaller amounts of participants, including non-designers since the users get the well-needed inspiration from each other, they don't need to present individual ideas and they have a clear and structured way of working*". The simplicity and the structure of 6-3-5 made it suitable for conducting online co-creating sessions.

Experience sampling: The online user studies that involved tapping into users' everyday activities benefitted from utilising social media tools such as Instagram, Facebook and Snapchat. These were used for experience sampling and "*included snapshots of behaviours, interactions, thoughts, moods or feelings, share their experiences of traveling as a student*". The purpose of the experience sampling studies were to understand future requirements for Mobility as a Service (MaaS). For example, one of the user studies involved creating a snapchat group with four participants, tracking the participants' geographical location during three days. The facilitators were engaged with the participants throughout the data collection: "*The participants were also continuously asked questions regarding their behaviour and their thoughts about mobility… we also tried to filming ourselves when we were on the move and posted… became that we were doing it all together*". According to the students, the experience sampling method with social media works well because "*the social media is like their [the participants] living room*". Having a private group meant that "*everyone could see when posed on Snapchats and when you see that maybe it created a sense of community that you want to pitch in as well as a group feeling*". Other social media applications of experience sampling were similarly successful in creating engagement and making a fun study for the users to participate in.

However, the students also raised concerns for self-censorship when conducting experience sampling with social media: "*We wanted to explore how their everyday travels where we were not expecting extraordinary pictures but unfortunately, we did not manage to get this message through to the participants*". The underlying reason was due to the pictures being shared which on the one hand can encourage participation by triggering other participants and other hand can "*affect the content of what is uploaded – a 'weird' picture could be scary to upload, since the participants might not want to stand out too much from the crowd*". Furthermore, the students also raised ethical considerations about ownership of the shared content.
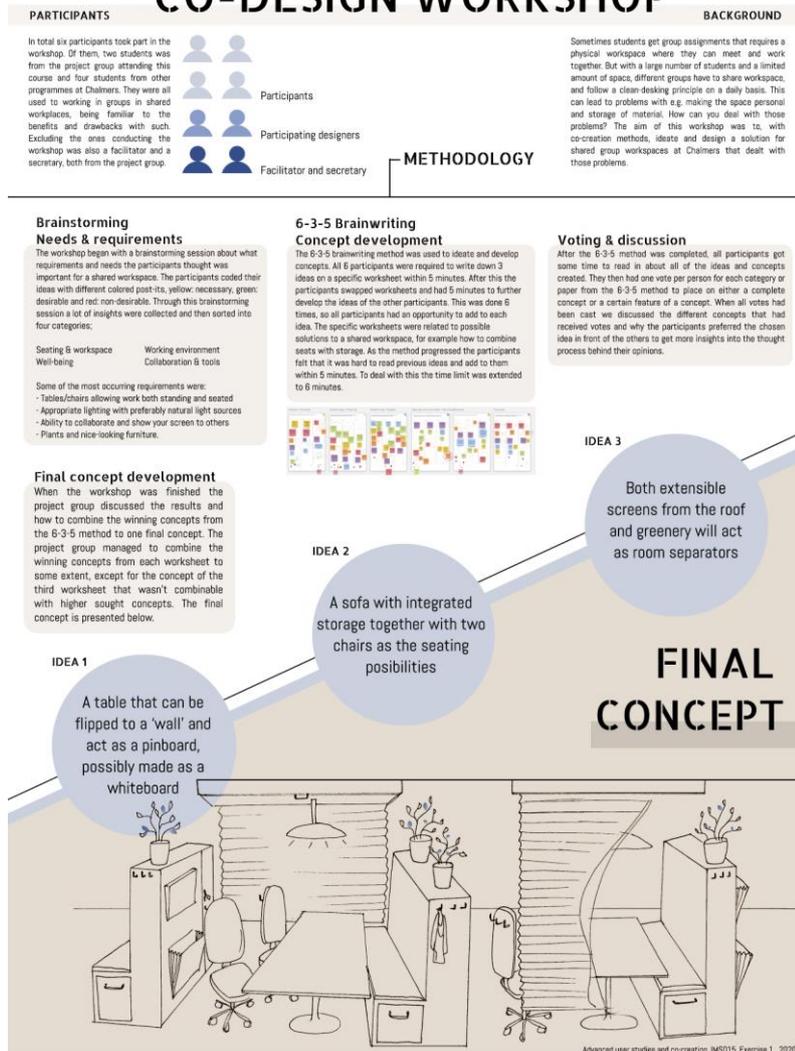
Figure 1. An overview of the process and results of an online co-creation session.

Creative voice: Among the different applications of creative voice, activities that involved creating collages worked well with online tools such as Mural and Miro (Figure 2). For example, in a workshop on Zoom and Mural, a group of participants created collages to depict a "perfect commuting day". The participants were given 20 minutes to create an individual collage. An image library was prepared prior to the workshop for facilitating the making of collages, but the participants were also encouraged to use their own photos. After the collage making, the participants were asked to explain their thoughts around their chosen pictures and reflect on how their collages could be translated into requirements for MaaS. According to the workshop facilitators making collages on Mural worked well because the combination "*is a good creative tool to use for inexperienced creators. It was fun to see images…the explanations were really telling the story…the explanations really added on to it*". The facilitators commented that it was "easy for the participants to have an overview of all the images at the same time and we did not need to have multiple versions of the same image since the participants could copy from the same image". Another application of creative voice was using Instagram and encouraging the participants to use text, Gifs and emojis on their photos to illustrate their desired travel experience (Figure 2). According to the student "the generative technique combined with Instagram enabled the users to be creative and expressive". Some of the groups encouraged the participants to create sketches and art pieces on Mural. This was however not as successful applications as it required more expertise in digital sketching. In addition, according to the students the participants felt inhibited in their creative processes as they thought they had to produce high-quality material. Another challenge that mentioned was that the participants saw each other's' entries and changes on Mural and the facilitators mentioned that being watched may have inhibited the creative process.
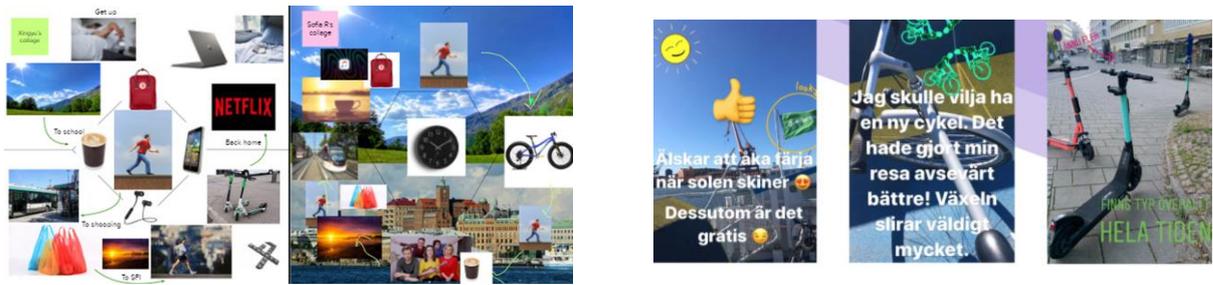
Figure 2. Creative voice application. Left: digital collage on Mural (group 9). Right: generative techniques with Instagram (group 3).

Enactment: The purpose of using enactment was to imagine and understand how life would be in a future where resources, such as water and electricity, are scarce, and identify needs and design opportunities for such scenarios. The students found it more challenging to conduct user studies that involved enactment to explore users' perceptions and behaviours about situations that do not yet exist. The online applications did not succeed in carrying out enactment experiments since the method requires users to engage in an activity, and a large part of the data relies on observing the situation and the users' behaviours and having in-situ discussions. The students instead gave instructions to users for doing an activity with some resource restrictions e.g. wash dishes and clothes with a limited amount of water. These activities were carried out by the users and discussions were held afterwards on zoom. According to the students: *"the hard part was with documentations – yes we just had interviews at the end of the days discuss it but we could not really observe them or… we gave them tasks and then they had to enact them themselves but we could not really see when they enacted and discuss in the moment… maybe we could have done that, videotape them"*. Other students tried to get participants to imagine scenarios in a zoom meeting and discuss their future needs in the face of resource scarcity. This application may not be classified as enactment, as the participants did not enact a given situation, which was also reflected in the students' discussions *"Perhaps our participants did not find small changes troublesome enough when simply discussing them over Zoom, to start imagining their solutions. Maybe the participants would have found these small changes more annoying if they actually had to live through them"*.

3.2 Advantages and limitations of online user studies

Based on the experiments we have identified a number of advantages, as well as limitations, to conduct advanced user studies on-line. Identified challenges were excluding not tech-savvy user groups, missing out on interpersonal interaction and observations, as well as difficulties creating participant commitment and trust. On the positive side were perceived efficiency, a more levelled power distribution between participants, and ease of engagement and data retrieval for tech-savvy users.

Table 1.

	Advantages and potentials	Limitations and risks
Tools	- Easy access through mobile phones (Instagram/FaceBook) - Most users have experience of tools (Instagram/FaceBook) - Easy to learn and use (Mural & Miro) - Mobile phones have big potential for user studies	- Complicated if new accounts and/or downloads of software is necessary - Many users are still not used to online tools - Difficult to observe individual behaviours - Difficult to sketch digitally without specialised equipment
Planning: Clear instructions		- More difficult to explain the purpose of activities online
Planning: Warm-up exercises	- Easier for participants with experience of digital platforms	- Workshops in risk of becoming tutorials - Inexperienced users may be excluded - Focus on the tool instead of the task
Planning: Reminders etc.	- With digital diaries you see the results directely -more transparant	- Social media creates expectations to be available at all times, both for resaerchers and participants.
Recruitment & Inclusion	- Potential to include participants worldwide - Efficient - no travel time	- Excluding people who do not use online platforms
During studies	- Easy to write, show and create digitally - Flexible and playful - Chat creates a direct and easy to use channel for communication - Lots of personal pictures, otherwise difficult to obtain	- Screen fatigue - Uncomfortable to be in fron of camera all the time, others see your sketches, picures etc. - Focus on beautiful pictures instead of content
Discussion	- Easier to avoid situations where one person takes over the discussion - More time for reflection	- Difficult to discuss - Have to give the word to one at the time - No small talks
Results	- Participants enjoyed the activites - Enough data - Felt creative - Good visual results	- Few requirements - Vague results - Googled pictures instead of original skethes might lead to uninventive results - No physical objects to touch

3.3 Best practices

Based on the students' user studies, a number of tips and tricks were identified for recruitment of participants, choice of tools, introduction, holding workshops, dialogue, documentation, tackling risks and ethical considerations (Table 2). Identified best practices included lowering social barriers through warm up techniques, creating a welcoming atmosphere, and techniques to support open discussion during workshops. Furthermore, engagement could be supported through private social media groups, regular reminders and communication, as well as clear communication of purpose and goal of the activities. A general success factor was to try out the digital platforms and to conduct pilot tests prior to the study.

Table 2.

	Tips & Tricks
Recruitment	• Social media users who already have accounts • Tech savvy users • Tools with user-friendly interfaces may facilitate inclusion of non-tech savvy users • Those who might be interested in testing/learning a new tool or opening social media accounts • Consider the potential to recruit participants outside the home market to capture different perspectives
Choice of tools	• Tools like Mural and Miro support co-creation activities especially for brainstorming and making collages • Social media is a useful toolbox for exploring users' everyday lives and conducting e.g. diary studies • Compare the tool's interfaces and pick those that have a more user-friendly interface • Consider tools that do not require the participants to open an account
Introduction	• Get a head start and meet the participants to inform about the study and your planning • Communicate the purpose of the study in a concise and clear manner and ensure that the participants understand the purpose of the study and their contribution • Sending instructions prior to kick-offs, workshops, interviews and specify whether it is expected to have camera and mic on • Set a lively tone for the study (e.g. consider asking to prepare coffee or an introduction kit that can be opened at the kick-off) • Provide an opportunity for the participants to test out the tools and their functions in advance • Consider warm up questions and exercised to ensure that the participants feel safe and comfortable to start the dialogue
Workshops, focus groups and interviews	• Create templates and image banks to facilitate creative exercises • Create a community feeling by e.g. a common social media account for the study where participants can access, create content and communicate with each other • Consider alternative mediating artefacts such as physical ones prepared or sent in advance or digital ones videos, gifs, images • Make it fun!
Dialogue	• Encourage the participants to have cameras on and unmute themselves • Call on specific participants when asking questions • Conversations and interactions in smaller groups work better • Encourage building on each other ideas by means of methods like 6-3-5
Documentation	• Take advantage of recordings and digital platforms for documentation of results Consider participating as a facilitator e.g. by sketching out, writing the first posts, responding to posts
Tackling risks of overload, data loss and attrition	• Beware of screen fatigue and the duration of online activities • Consider the number and extent of assignments and activities allocated to the participants to prevent overload and eventual attrition • Consider sending reminders and staying connected with participants when using social media tools for logging daily activities or to encourage new activities.
Ethical considerations	• Ask permission for using of participants' personal photos and creative content • Inform and ask permission for recording in advance • Comply with GDPR

4 DISCUSSION

The work presented in this paper was instigated by the necessity to conduct user studies online during the ongoing COVID-19 pandemic. While the situation was extreme and we hopefully can soon go back to more normal work condition, it is interesting to see what benefits and drawbacks online advanced user studies have and how we can use the methods and tools tested in the future. While there were many challenges there were also many benefits that we believe makes this way of working relevant also in non-pandemic times, not the least the potential to shorten time and decrease cost for advanced user studies by conducting them online.

In many of the successful online user studies reported in this paper, the users worked with different variants of "creative voice" where they made sketches, collages, took photos, etc. It was noted that there were many benefits of adapting these types of activities to online platforms, not the least it was found to easy to do for novices, not used to expressing themselves artistically. By copying pictures from the Internet and assemble them in new ways, they were able to express usually difficult concepts such as expression and aesthetics of products. While this is certainly a benefit of the tools, we also see a risk of the solutions, if not carefully interpreted, being "copy-paste" of existing solutions, rather than novel ideas ideas (cf. design fixations in Jansson et al. 1991). This raises questions about how to provide design professionals with methods and tools that could overcome the risk of design fixations for the novice participants and help the participants reframe and generate novel ideas.

One benefit of experience sampling via social media is that it is more transparent than analogue methods due to real-time data retrieval. The possibility to send reminders via social media mitigates the recall effects that are otherwise unavoidable in traditional diary studies (cf. Zimmerman, 1977), i.e. that participants forgets to write down their experiences as they occur. While the benefits of having access to the participants on a continuous basis through social media is apparent, our study showed the importance of managing and planning for monitoring and interacting with participants during the study. In several of the mini-studies, the students reported that they felt the pressure to always be available to the participants exhaustive.

One method for co-creation that stood out as a really useful online tool was Brainwriting 6-3-5. The usefulness of this method has also been recognised by Tomitsch & Hepburn (2020) who tried the method on the digital collaboration platform Miro. Digital platforms such as Mural and Miro have introduced a large number of templates to facilitate creative endeavours online. Another practical finding from our studies was the importance of having warm-ups and setting a welcoming tone for the online workshops, which has also been recognised by design firm such as IDEO who describes how teams are using creative warmups—like a 10-second dance break or a quick show-and-tell of an artifact from the home office—to kick-off meetings (IDEO.com).

The need to facilitate user involvement that goes beyond users being merely informants and evaluators to proposed design solutions towards being an acknowledged partner in the design process, i.e. 'designing with users', is widely emphasised (Eason, 1995; Sanders and Stappers, 2008; Sanders and Stappers, 2014). In such context, representational artefacts functioning as mediating tools to 'facilitate communication and collaboration'(Söderman, 2001); 'span the language between different disciplines' (Engelbrektsson, 2004) and 'support the development of a common language' (Brandt, 2007) are essential. The physical interaction and tactile experience with representational artefacts (e.g. prototypes; mock-ups or material samples) plays an important role in the user-centered design process and Brant (2007) discusses that tangible prototypes, becomes 'things to think with' as they allow for manipulation and negotiation reflecting different knowledges and make them explicit and understandable cross design teams' (Carlile, 2002). Due to the pandemic situation the physical interaction with representational artefacts was severely limited, which many of the students experienced problematic in this project. However, as it probably will take time until we fully can interact with other people without taking social distancing into account, this is an opportunity to challenge traditional methods and find new ways of practice. One way to compensate for the lack of interaction with people and potential representational artefacts in the design process is presented by Emerson, Stolzoff and Romanova (2021) who emphasise the importance of designing virtual user study workshops for presence and engagements. They suggest a "Virtual Workshop Survival Kit" which in their case includes "sleeping bags" for cell phones, mini-whiteboards for people to prototype ideas, and physical takeaways to help the presentation resonate off-screen. Such a kit should be sent in advance to the participants but kept unopened until the workshop. At the workshop, the kit should be

opened by the participants and experienced as a collective activity, and the organisers (designers) can act as they "show up in the room" providing the opportunity for all participants to interact and experience the same kind of physical representations at the same time.

One crucial factor in co-creation that have been recognised by e.g. Eriksson et.al. (2020) is to manage the distribution of power. In a group situation there is a risk that one person, often "the older man in a suit", takes over a group and manage the work and discussion. While the intention might be good, experience is that this can severely limit creativity. In our studies we found that the nature of online discussions where everyone has a much more equal appearance the group tends to be naturally more balanced. Thus, online platforms have the potential to increase creativity and diversity. However, there are also drawbacks to online platforms in that discussion in general is much more difficult online. The necessity of talking one at the time makes discussion slow and necessitates for the moderator to give the word to participants rather than the group managing turn taking.

There are many ethical considerations when doing online user studies of the type presented. While some are inherent in all studies where you involve users in product development, such as "who owns an idea developed co-creatively?", others are unique to online studies. An example of the latter is how do we assure GDPR compliance when participants in our studies takes pictures, upload them on social media, etc.? While not unmanageable, this is definitely a question to take seriously if we are to move to digital solutions for user studies.

A clear risk when moving to online platforms when you are conducting user studies is that you are running the risk of excluding people that for some reason don't have access to these types of platforms. An example could be some elderly people that don't use the internet, but there might also be other important user groups that have difficulties using the current online tools for various reasons. However, a benefit of online user studies that has been noted in our studies, but also were discussed a lot in last year's POLIS conference where a large number of practitioners within the area of urban design participated, is that moving discussions to online platforms changes the character of who will be able to participate. Typically, there are a much higher proportion of newly retired men than, say, women with small children represented in activities such as public consultations. With the movement to online platforms, it is much easier to participate for people who, for different reasons, may have difficulties being away from home three hours a weekday evening. In this way online user studies have the prospect of being much more inclusive than traditional methods that requires physical participation.

5 CONCUSION

The study shows that advanced user studies can, under certain conditions, be performed online. These insights will be ever more important in an increasingly connected world as it opens up for doing user studies with different user groups that might be less accessible with traditional physical meetings, including people in markets outside the company's immediate home market.

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