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Exploring VR and AR Tools for Service Design

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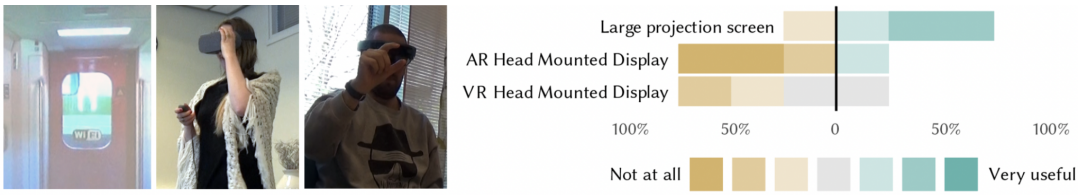

Figure 1: The three visual immersion methods compared in the study and their rated usefulness by the designer focus group. L to R: Projection screen, VR head mounted display, AR head mounted display

ABSTRACT

We explore the possibilities of augmented and virtual reality (AR and VR) as co-design tools for service design. Four expert service designers, working in industry, tried out and discussed different VR and AR based tools: Head mounted display (HMD) based VR and AR, and projected environments. The findings emphasize that HMD techniques are not favored, as they isolate the wearer from the co-design situation and hinder the observation of emotions and expressions. Projection of the design context was positively commented, as supporting collaboration in co-design sessions.

CCS CONCEPTS

• **Human-centered computing → HCI design and evaluation methods**.

KEYWORDS

service design, service design tools, co-design, VR, AR, user study, design methods, co-design methods

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1 INTRODUCTION AND BACKGROUND

Among other fields taking advantage of augmented (AR) and virtual reality (VR) technology, its use has been explored as part of design processes. VR enables virtually visiting remote places [1], providing familiarization with different design contexts, and it can be used as an empathetic design tool, illustrating other's viewpoints [9]. The value of co-design methods as part of service design has been noted by many, e.g. [8], and hence should be supported also when new, technology based, approaches are introduced.

Prior work has addressed the use of projected contexts, VR and AR as design tools. For example, projecting an image or a video as a background for a co-design session in service design [7]. Mäkelä et al. reported on evaluating the design of public displays through a VR environment [6], noting differences from a real-world assessment. Boletsis et al. presented virtual bodystorming in service design, enabling the simulation of a collaborative service scenario [2]. The lack collaborative VR tools has been pointed out as a practical challenge when working with a team of designers [5]. In their 2019 workshop, Gugenheimer et al. addressed the challenges of using HMDs in shared spaces, and called for solutions that address the isolation and exclusion caused by HMD wear [3]. The ShareVR concept presented a solution to create co-located VR experiences between HMD and non-HMD users, by integrating projection in the same space [4]. We aim to chart the perception of service designers on the use VR and AR tools in a co-design process.

2 METHOD

Aiming to identify the main strengths and weaknesses of VR and AR tools as practical co-design tools, we selected to run a focus group with expert service design practitioners, who were using co-design methods in their daily work. We identified banking as an interesting study scope, as it comprises a diverse set of touchpoints, ranging from the physical bank lobby to digital services consumed in a variety of contexts. Thus, we engaged four participants (2 female, 2 male) from the design department of one of the largest national Finnish banks. Two of the participants were service designers, whilst the others were a concept lead and UX design lead. The participants' average age was 36 and they reported an average of 10 years work experience in similar design roles.

Participants first completed consent forms and a background questionnaire. The facilitator then lead discussion on the current co-design methods used by the designers and the importance of

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contextual immersion during co-design. Probes of 3 alternative VR / AR tools were then presented, and discussion on their benefits and weaknesses as part of a co-design process was facilitated. The participants tried each probe in turn and were encouraged to think-aloud about its application as a co-design tool. The probes were, 1) Screen projected 360 tour, 2) VR 360 tour using a Head Mounted Display (HMD) 3) AR using the Microsoft HoloLens and HoloPlanner app to place furniture in the room. The content in the the screen projected and VR 360 tour was identical, consisting of a walkthrough of arriving to a city by by train and transfer to a hotel.

The tools currently used by the participants in co-design sessions are presented in Figure 2. The participants reported having little experience with VR and AR, with 3/4 having tried them. Only one participant had previously used VR as a design tool, reporting using a 3D model of a hospital patient room as part of a workshop.

3 RESULTS

3.1 Contextual Immersion during Co-design

For the participants, the importance of immersion was dependent on the phase of the design process. In the concepting phase, the focus was on ideation, and tools such as post-it notes, whiteboard sketching and paper or digital prototypes of mobile apps were used. In later design phases, context became more important, e.g. one participant related testing a mobile app for fuel payment, by getting test users to drive a car to gas stations (Participant #4). The participants noted that they often held user interviews with individuals or groups of users in the use context, such as a bank lobby or at the users' workplace or home (#3,4). In the contextual interviews, many paper-based tools were used (#3).

3.2 VR and AR tools

3.2.1 Large Screen Projection. The participants considered large screen projection could be useful when designing customer touchpoints that are primarily physical, e.g. when entering to a bank lobby (#1), however it would be less useful when considering digital touchpoints (#2). It was noted that the 360 tour, with clickable hotspots, would well support simulating customer journeys (#3). The need for a dedicated space, if a high level of immersion was targeted, was noted as a limitation of the tool. Fast iteration speed was considered critical, and it was noted that such 360 tour content could be quickly created and modified (#2,3). The designers were already utilizing physical mockups in a lab environment, e.g. for checkout cashiers, and noted that this could be supported by context projection, "I think the immersion is the added value in this" (#3). The benefit of the the projection, compared to the headset based solutions, was that it supported group interaction.

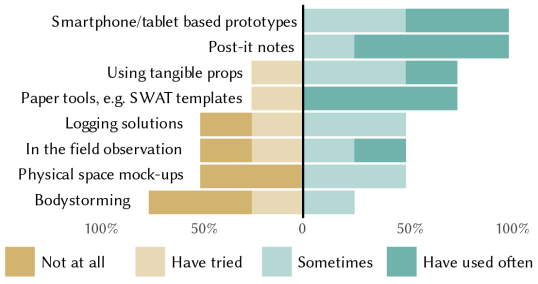

Figure 2: User research methods used by participants

The designers considered that the 360 tour type content was a good way to see the issues through the customers' eyes, "shadowing the customer", building empathy and communicating the customer experience to other stakeholders. Most of the designers (75%) saw the benefit of using large projection screens to immerse co-design participants into the design context, commenting e.g. "Large screen is a low effort solution for immersion" (#1). This was supported by the generally positive ratings for usefulness (Figure 1).

3.2.2 VR Head Mounted Display (HMD). The VR HMD was noted as providing an immersive experience, which would be suitable for context specific use cases. However, the designers noted that they were largely interested in the emotional experiences of test users, and the HMD blocked communication and the possibility to observe facial expressions (#1). It was also noted that the VR HMD was a closed 'digital only' environment, to which traditional tools and probes could not be added. The HMD was considered not suitable for use in co-design, as it separates the wearer from the group (#4). The consensus was that, when wearing a HMD, you are alone. This compares to the projection screen where, "You can point at things, see your hands and have a conversation" (#2). The novelty effect was noted as a concern, one designer had previously observed test participants focusing more on the HMD than the content (#4). His colleagues suggested a warm up task, e.g. in a jungle, would be needed to desensitize users to the tool (#3).

3.2.3 AR HoloLens. Compared to the VR HMD, which was considered closed to the outside world, the HoloLens was noted as more open, i.e. the wearer could still see, and interact with, others in the room (#3). However, the HoloLens headset was considered heavy to wear (#2) and difficult to interact with. As the level of immersion was not as strong as with the VR HMD, the value of using the HoloLens was questioned. The designers were unable to identify how they could utilize the HoloLens in their co-design work, citing an example case of using a smartphone to make a purchase from a coffee machine (#4), adding that they didn't see much advantage compared to using cardboard prototypes (#1). Further, there was concern that users would feel stupid when using it, particularly in a group setting (#1,2).

4 DISCUSSION AND CONCLUSION

The designers in our focus group were generally happy with the current methods they used and were not interested to adopt new technology for its own sake, but rather questioned how they could use it to get answers. For co-design applications, critical problems were noted with VR and AR head-worn devices, as they impeded interaction between the wearer and the co-design group, and blocked observation of the wearer's facial expression. 360 tours presented on a large projection screen were considered to be a useful tool to provide contextual immersion during co-design sessions, while maintaining group interaction. The hotspot based tour particularly suited the exploration of customer journeys and the low effort to create such tours was appreciated.

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