

Challenges and Strategies of Virtual Co-design Workshops with Blind or Low Vision

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The COVID-19 pandemic has forced researchers to find new ways of conducting research remotely. This paper describes the challenges and learning from three research projects that involve people who are blind and or low vision (BLV). Through these studies, we explored the challenges of music learning, the application of conversational agents to learn board games, and the advantages and limitations of virtual collaboration tools for BLV people.

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1 INTRODUCTION

The COVID-19 pandemic has driven researchers to translate traditional in-person research methods to remote studies as universities remained closed. Virtual interviews and workshops have increased accessibility for certain groups of people, however, this mode of interaction has also posed new challenges for both researchers and participants. This paper describes the challenges and learning from three research projects that involve people who are blind or low vision (BLV). Through these studies, we explored the challenges of music learning, the application of conversational agents to learn board games, and the advantages and limitations of virtual collaboration tools for BLV people.

We identified three key factors that can impact virtual co-design workshops:

- Involving BLV people as co-researchers to inform the study’s design.
- Limited use of commercially available virtual collaboration tools for BLV people.
- Accessible video demonstrations of voice-based technologies to inform ideation of a prototype.

2 CHALLENGES OF CO-DESIGN WORKSHOPS WITH BLV PEOPLE

Co-design workshops involve collaboration with people who are subject matter experts but may not have training in design and development [11]. A widely used method of co-design with BLV people is the creation of low-fidelity prototypes using tactile elements (e.g., clay, foam paper, cardboard box) as a method of ideation and design [1, 8]. However, Brewer argued that traditional co-design methods such as low-fidelity prototyping is highly visual and does not support collaboration between BLV participants [4]. For example, BLV Participants engaged in in-person prototyping workshops may not be able to see what other participants are making and thus would find collaborating

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53 with others challenging. Moreover, studies showed that participants are often hesitant to actively engage in tactile
54 prototyping and prefer a discussion-based approach to generate ideas [12]. Furthermore, Denison found that there is a
55 lack of accessible digital ideation tools [5] as conventional techniques such as storyboarding is visual and unsuitable for
56 BLV people.
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59 **3 CONSIDERATIONS FOR REMOTE CO-DESIGN WORKSHOPS WITH BLV PEOPLE**

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61 In this section, we reflect upon three studies and identify factors that could influence virtual co-design workshops with
62 BLV people.
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64 **3.1 BLV Musicians as Co-researchers**

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66 This study aims to develop tools that can support BLV music learning through remote co-design workshop. We explore
67 material properties, form and functionality and the use of vibrotactile feedback. Participants will be sent materials and
68 hardware prior to the study which will take place over a video conference call. As sighted researchers, it was essential
69 for us to include subject matter experts in the design of the study itself. We invited a blind music teacher to participate
70 in the design of this study as a co-researcher and developed a clear goal for the workshop through a series of informal
71 meetings and discussions. Through the collaborative design of this study, we found the following:
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- 74 • Materials such as Wikistix [2], bendy straws and clay were materials that can be used to describe ideas through
75 making.
- 76 • Google docs [7] was the preferred platform sharing notes and collaborating on document writing.
- 77 • Remote video documentation of the workshop may be challenging as participants may not be able to show
78 what they are making to a computer camera.
- 79 • Facilitation of remote workshops would be especially challenging as the workshop involves hardware and
80 material that may need to be strapped to the body. Getting assistance from family members or friends during
81 the workshop is essential.
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85 **3.2 Challenges of Virtual Collaboration Tools**

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87 Our next study explored the challenges screen reader users experience when participating in virtual events and activities.
88 Through semi-structured interviews, 12 participants shared their pain points and challenges using tools and platforms
89 like Miro [9], Mural [10], and FigJam [6] while participating in online learning, workshops, design jams, events, and
90 conferences.
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92 Overall, our BLV participants and ones with other disabilities stated that there is an important need to improve the
93 inclusivity of digital collaboration experiences. Their insights shed light on the importance of focus management when
94 designing collaborative sessions, including the challenges they experience navigating virtual spaces where instructions
95 and direction are not indicated within the work spaces. Participants shared examples of how they experience high
96 cognitive load while engaging in virtual collaboration. For example: Ideation on virtual Post-it notes is hard to keep
97 track as there is no order or structure in the information.
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100 **3.3 Application in Board Gaming**

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102 To explore the design requirements and potential challenges of using Conversational Agents (like Alexa [3]) for learning
103 the rules of board games, we opted to co-design with BLV participants. We conducted nine co-design sessions with 14
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105 participants over three weeks. First, participants shared their experiences of learning and teaching board game rules,
 106 the use of rulebooks, and the challenges associated with them. We then showed them the two demonstration videos
 107 created by the researchers, showing the current capabilities of Alexa for use in tabletop gaming to assist the players.
 108 This was followed by participants generating social and functional characteristics of Alexa that might help improve
 109 their gameplay experience.
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111 To combat the challenges of virtual co-design and make the sessions more accessible, we created a virtual voice-based
 112 interactions that involved activities that only required verbal feedback. We also explored accessible video demonstrations
 113 as an alternative ideation tool to show our participants how Alexa is being used in recent times in the context of board
 114 gaming. We recorded our demonstration videos showing various features of Alexa for board gameplay. We added
 115 voice-overs in between to explain any visual activity and also to distinguish between different ways Alexa was assisting
 116 in the game. We also added closed captioning to ensure accessibility.
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118 Our main takeaway from this exercise is that video demonstrations were proven beneficial in facilitating discussion
 119 and allowing BLV users to visualize the system early in the design stage, which will open opportunities for remote user
 120 testing. On the flip side, this technique limits the user from interacting and navigating the system on their own, leading
 121 to potential problems remaining uncovered during testing. Although beneficial in the ideation phase, we believe that
 122 this should be coupled with other accessible methods in the user testing phase.
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126 4 DISCUSSION

127 Through these studies, we have explored collaboration between researchers and BLV participants using existing
 128 platforms and tools. The remote workshop format has enabled people who are blind or low vision to actively participate
 129 in HCI research and voice their insights and thoughts for the design of assistive technologies. However, remote co-design
 130 workshops present new challenges for researchers and participants that are yet to be fully understood and explored.
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- 133 • Facilitation and documentation: Conducting remote workshops over video conference calls has been found
 134 to be a particular challenge as BLV participants do not always know if they are in the frame of the computer
 135 camera.
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- 137 • Lack of accessible platforms: Through our studies, we found that current collaboration platforms are not
 138 accessible to BLV people and not suitable for remote co-design studies
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- 140 • Flexibility: Considering the current challenges of remote co-design workshops, we found that facilitators must
 141 be accommodating, empathetic and flexible while conducting workshops.
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