Participatory Design of a Virtual Reality-Based Reentry Training with a Women's Prison[*]

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ABSTRACT

This study examines the participatory design process of a virtual reality (VR) reentry training program with a women's prison. Conceptually drawing on previous work in VR exposure training, this prototype consists of guided, first-person 3D-360° video episodes that depict psychologically stressful situations that women commonly face when returning home. Critical story and production elements, including screenplay, acting, and narration, were created with incarcerated and formerly incarcerated women. The institutional, technological, and cultural restrictions of prison, combined with the tensions of making media with often exploited groups, forced adaptations of participatory design methods. The inclusion of incarcerated female voices resulted in an immersive narrative that reflects this group's specific challenges. The next phase is to evaluate its efficacy against non-immersive comparative trainings for reentry-related anxieties.

(a)

(b)

(c)

Figure 1: Storytelling workshops to 360° video, a) prisoner's drawing of set and "Kim" character, b) set and camera, c) actor as "Kim" with script. Both set designer and actor have been through prison.

CCS CONCEPTS

• **Human-centered computing** → Virtual reality; Participatory design

KEYWORDS

Virtual Reality; Prisoners; Reentry; Participatory Design; Exposure Training

1 INTRODUCTION

Each year over 640,000 people in the U.S. are released from prison, facing obstacles at every step of their reentry into the community [4]. Challenges include finding stable housing and employment, reconnecting with children, and meeting the demands of parole or probation. For some, the daily confrontations with otherwise incremental advances in society and technology can feel incredibly stressful or even triggering. Reentry is especially challenging for women, with reintegration programs predominantly focused on men's needs and harsher social stigmas associated with incarcerated mothers. It is no wonder that in the US, 22% of women leaving prison return within 6 months and 68% within five years [7].

Our partner site—a women's state prison—provides a variety of reentry training programs, but the legal jurisdictions of the prison and overall state Department of Correction (DOC) are severely limited after prisoners are released. In conversation with the prison's Deputy Superintendent, existing programs do not adequately prepare women for the psychological stresses of reentry that can worsen conditions for recidivism. With fully immersive VR headsets increasingly affordable and research in VR exposure-based therapy showing promise, we partnered with a women's prison to explore how the design of a VR-based training may more effectively prepare women for reentry. Given the conservative culture around digital technology experimentation, a focus in HCI and design research within the context of prison and the criminal justice system is severely lacking [8, 14]. As captive users are vulnerable to coercion and exploitation, designing with prisoners requires special attention to consent, meaningful inclusion, and agency.

This case study describes our participatory design process of a VR training prototype, consisting of three 3D-360° video episodes depicting psychologically challenging situations that women commonly face when returning home. Each episode is experienced in the first-person, with an internal monologue guiding the viewer through the story. Critical creative elements were designed with women incarcerated at our partner prison and formerly incarcerated women from local nonprofits. This study offers two novel contributions for the following: a) a set of considerations to direct ethical VR design in sensitive settings, and b) insight into the obstacles faced in doing participatory design work in prisons.

2 BACKGROUND

2.1 Introduction to Incarcerated Women

Representing 7% of the total U.S. carceral population, women have historically been invisible in broader criminal justice discussions. Recent cultural awareness around women's unique needs has spurred the investigation of gender-responsive reentry programs [6]. However the individual and systemic experiences of incarcerated women are difficult to design for. Disproportionately coming from low-income backgrounds, incarcerated women report extremely high rates of lifetime trauma exposure (98%), mental illness (73%), and substance abuse (74%) [10]. With qualitative data on women's reentry experiences—especially firsthand accounts—generally lacking, a gender-responsive reentry training could not truly empathize with or anticipate all potential cultural or cognitive traumas without the input of women who have lived through incarceration and reentry.

2.2 VR Exposure-Based Training

VR is uniquely well suited for exposure-based therapy and training applications, with notable work in post-traumatic stress disorder (PTSD) treatment, combat-related stress training, and off-field sports training [13, 3, 5]. The stress trainings are conceptually grounded in two learning principles: "latent inhibition", or the development of emotional protection against events after being pre-exposed to similar events in a safe environment, and "stress resilience", or the ability to improve allostasis (the body returning to equilibrium after stress) through training and adapting [13]. However the immersive, embodied, and highly controllable characteristics of VR raise ethical concerns about potentially harmful design, including using racially stereotyped models or memorable disempowering embodiment [9, 12].

2.3 VR Used in Prison

While VR usage in prisons is rare, all initiatives we found approached reentry training design as task-based virtual lessons, e.g. doing laundry, using a grocery self-checkout, or driving a car [11]. These trainings overlook the affective dimensions of returning home from prison. For example, the Pennsylvania DOC partnered with VR startup, NSENA, to create 360° video tours of every halfway house in the state. After experiencing a tour of his designated house, a newly released inmate said visiting the house in reality felt familiar, but ultimately reentry felt like being taken to a foreign country [11]. Beyond impersonal, lessons may be unknowingly exclusionary or endangering, as with a VR training on confronting violence between domestic partners by the startup, Virtual Rehab. The steps were described as: "try to interject and separate the two" and "call 911 and ask for assistance" [1]—advice that would only be safe for non-policed, able-bodied groups. While prior VR initiatives have approached prison settings by designing experiences for prisoners, we wanted to recognize designers as facilitators, not experts, and prisoners as agents, not users. To invite co-creation, our workshops conceptually drew from the design of "agonistic public spaces," where heterogeneous participants may have a safe and relational space to be creative [2].

(a)

(b)

(c)

(d)

Figure 2: Outcomes from several workshop activities, a) storyboard template, b) facilitator notes, c) script edits, d) final shooting script.

3 METHODOLOGY

Given barriers to accessing incarcerated women, our early work engaged various secondary stakeholders (formerly incarcerated community leaders and artists, prison staff, prisoners' rights advocates, reentry service providers, VR educators). We conducted preliminary research over four months, consisting of 11 interviews with formerly incarcerated people and an ideation workshop with 11 prison staff to better understand the psychological and cultural experiences of women's reentry. From these conversations, our research design made two pivots. First, rather than imagine reentry training as isolated "lessons," we framed our VR experiences as guided journeys about relationships with self, others, and society. Second, to respect the fatigue we heard from formerly incarcerated women in being research subjects, we built workshops around encouraging prisoners' voice and agency. To design the script for the VR prototype, we facilitated four storytelling workshops with incarcerated women and three with prison staff at our partner prison over three weeks. Then we worked with a VR cinematographer and editor to film the script as stereoscopic 3D-360° video episodes, made for offline viewing in an Oculus Go VR headset. Voice over (VO) for the story's "guide" was recorded separately and included with final post-production edits.

3.1 Participants

For storytelling workshops, we recruited six incarcerated women, nine staff from the women's prison and the state DOC, and two staff members from community reentry service organizations. These participants were selected by and included the Deputy Superintendent of the prison. Prisoners were selected using the following criteria: currently incarcerated at our partner prison; has experienced reentry multiple times; has expressed to the Deputy Superintendent interest in improving reentry for women at our partner prison; is able to communicate with staff; has remained disciplinary-free for at least three months; is cooperative with staff; and has at least six months left to their earliest release date. To help facilitate the workshops and produce the final prototype, we recruited three VR creators with experience teaching VR design and producing pro-social VR experiences. For actors and creative consultants, we recruited three formerly incarcerated women, one woman in addiction recovery, and several formerly incarcerated men and trans-men. We met one of the formerly incarcerated women through the Deputy Superintendent, while the others were recruited through local non-profits that provide reentry services.

3.2 Ethics

Ethical approval was granted by Emerson College. Our research plan was designed in accordance with the U.S. Department of Health and Human Services (DHHS) 45 CFR Part 46 Subpart C ("Protections Pertaining Research Involving Prisoners as Subjects"). Careful consideration of ethics prior to and throughout the study was integral to the project's participatory goals. Prior to the workshops, all facilitators were given a handout that suggested ways to be mindful when working with incarcerated women, as well as statistics and a zine about women in the U.S. criminal justice system. Workshops were designed to be concise and recurrent to be respectful of prisoners' schedules, being transparent about when to expect our visits or
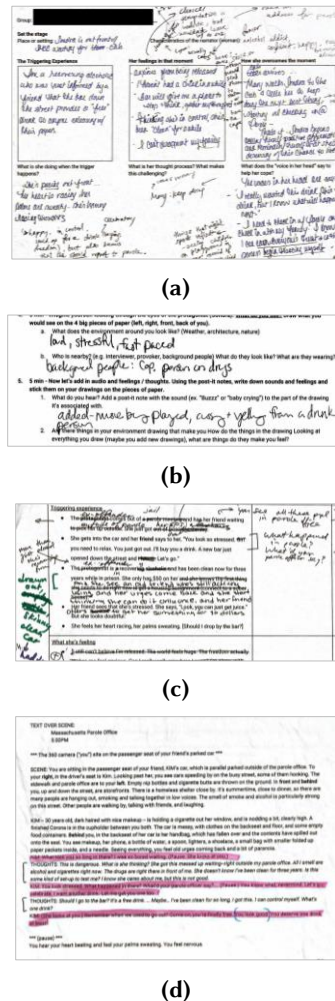
(a)

(b)

(c)

Figure 3: Behind the scenes, a) discussing the script with actor and set designer, b) the "job interviewer" actor receiving coaching from a formerly incarcerated man, c) recording voice over.

absence. Though workshops were limited to one hour, we made time to get to know participants. In the first workshop, we introduced ourselves, explained what we were looking for, what they could expect, and how they may benefit in interacting with us. In addition to writing consent forms in accessible language, we verbally reinforced participants' rights to stop or raise issues at any point.

3.3 Data Collection

Recording devices, cell phones, and Wi-Fi are restricted in prison, requiring all data to be recorded by hand. Workshops required three facilitators, each with a paper template to record notes on content (e.g. what happened, direct quotes, major discussion topics), process (e.g. emotional reactions, first impressions, side conversations), and culture (e.g. group dynamics, body language). Given our limited timeline to construct a narrative that could be translated into 360° video, we used a multimodal approach to collect data, where participants shared stories through writing, drawing, small and large group discussions, and performance.

3.4 Storytelling Workshops

In our first workshop with the incarcerated women, we presented three story "seeds", each depicting a common stressful reentry scenario given by secondary stakeholders. In small groups (two participants and one facilitator), participants were asked to choose one scenario or write their own. Participants then elaborated on their scenario using a storyboard template that highlighted three stages: (i) the presentation of a stressful situation, (ii) the emotional development during the situation, (iii) the overcoming of the situation. After storyboarding, each group performed their stories in skits. Every individual in the room participated, including the DOC staff supervising us. Finally, we closed with a large group reflection. This same workshop was also run with a group of prison staff. After these two workshops, we consolidated the storyboards and facilitators' notes into a typed three-episode script. We shared the script with formerly incarcerated people, reentry service providers, and VR creators. This feedback was used to create an updated script and brought back for a second workshop with the group of incarcerated women. Repeating this internal-external revision process, the script was iterated on over five more workshops.

Every workshop began with a group reading of the latest script out loud. Participants were encouraged to edit as they read, verbally in the group discussion and in writing by annotating their copy of the script. In the third workshop, we asked participants to design major elements of large sheets of paper to draw the virtual environment's left, right, front, and back views. The resulting script reflected conceptual and aesthetic input from currently and formerly incarcerated women, VR (environment descriptions, location-specific sounds, and character design) using analog activities. For example, each episode's group was given four large sheets of paper to draw the virtual environment's left, right, front, and back views. The resulting script for each episode included detailed multisensory environment descriptions, realistic dialogue and internal monologue lines, and cues for actors. The final shooting script depicted these three episodes:

- Your best friend is high and offering to buy you a drink right after your first parole meeting
- You are running late and need to ask for help during rush hour in a train station
- You are illegally asked during a job screening at a nice restaurant about your criminal record

3.4 Creation of the 360° Videos

As the script evolved, we arranged locations and actors for the film shoot. When possible, locations were suggested or vetted by incarcerated or formerly incarcerated women. When actors had no experience being incarcerated, formerly incarcerated people served as acting coaches. VO was recorded later using a portable microphone setup. The first part of VO sessions involved rewriting the actor's lines in her own voice, with the producer available to relay the in-prison contexts in which the original narrative arose. The second part involved recording five to six workable takes per line, with the footage on hand so VO actors could respond naturally to the on-screen actors. Finally, the editor pieced the footage and VO recordings together, in addition to finalizing audio, visuals, and usability considerations.

4 FINDINGS

4.1 Obstacles to Participatory Design in Prisons

Throughout the design process, prison presented cultural, institutional, and technological challenges. Participatory processes usually strive for a culture of camaraderie and empowerment. However, after using an icebreaker in the first workshop, we were told by the Deputy Superintendent that we were too familiar. Because prisoners are confined to a deprived environment, forming co-creative partnerships carries the risk of coercion and resentment if relationships seem disingenuous or exploitative. Further, prisons are not designed to reward or acknowledge the creative authorship of prisoners.

We could not credit the women at our partner prison by name for their creative contributions to this project if they had a victim record. Similarly, while we could describe characteristics of a shoot locations, we were discouraged from revealing specific information to the prisoners in case they invited their friends or family on the outside to show up. Due to liability of inducing nausea or discomfort, the DOC blocked our prisoner group from wearing a VR headset until the larger institution approved the final prototype. This meant we were unable to test basic usability issues related to the hardware. None of the women in our group had experienced VR, so we did not explore the specific expressive qualities of the medium and designed VR using metaphors ("like watching a movie, but you're in it").

It is worth mentioning the advantages of institutional partnership with a prison. Our main advocate was a progressive individual embedded high and long enough in the historically conservative DOC that she was able to challenge some institutional norms. She was someone whom others inside the corrections system already trusted and who was able to guide our navigation through the bureaucracy. In the final presentation to the necessary institutional agents, the prototype was unanimously well accepted.

(a)

(b)

(c)

Figure 4: Screenshots of final 360° video episodes, a) facing substance temptation outside a parole office, b) asking for help in a train station, c) addressing your criminal record in a job screening.

(a)

(b)

(c)

Figure 5: Demoing the prototype to various stakeholders, a) staff in the DOC, b) formerly incarcerated community leaders, c) formerly incarcerated artists.

4.2 Including Prisoner Voices in VR

As facilitators, we strove to balance a playful environment with reminders that participants' contributed would be taken seriously. This task orientation was validating and resulted in honest discussion about issues the women faced after release. Both currently and formerly incarcerated groups we worked with displayed excitement about being part of something that would help other women. One formerly incarcerated actor rehearsed her lines with the producer for two hours over video call because, in her words, she "cared so much about being good for [the prototype]." However, the process from shooting the co-created script to exporting the final 360° video occurred entirely outside of prison. The notes taken by facilitators proved crucial in maintaining the voices of prisoners in their physical absence during this phase. Though much of these notes are not directly represented in the script, they captured the underlying motivations, core challenges, and the context in which specific plot lines emerged. Knowing this helped the producer adapt the script when unexpected changes arose during production and post-production.

5 DISCUSSION

5.1 Considerations for Participatory Design in Prison and Inclusive VR with Prisoners

Prison was designed to suppress the voices of their captive population. In addition to working with an institutional partner with shared values who is embedded within the DOC, working with community-based secondary stakeholders proved to be both instrumental in moving our design process forward and useful in contextualizing our experiences inside prison.

In considering how VR may be designed more inclusively with prisoners, issues of bridging technical expertise must be addressed. In particular, conveying the affective data from the storytelling workshops to our editor proved difficult. Tasked with editing the VO audio, visuals, and usability, our editor had a fairly singular authorial voice over design choices. We defused some of this by sharing feedback from secondary stakeholders and visual mockups with the editor. Additionally, the producer was the only person able to engage in both storytelling workshops and production/post-production. In future work, it is important that formerly incarcerated people engage in all project phases in order to reduce mistranslations of experience and ensure accountability in the prototype's authentic representation of reentry experiences. VR design and editing are still highly specialized skills. More people can be involved in VR design by creating analog activities that translate the medium's core characteristics, as we did. VR editing, however, is labor-intensive, requiring a specialized skill set and access to costly production technologies. This is not conducive for participatory design, which by nature of being relational and procedural requires room for error and testing. In designing VR with prisoners, there must be a commitment from partners and researchers to get through the messy technological hurdles of design.

5.2 Limitations and Future Work

It should be noted that this project is participatory-intentioned, in that a truly participatory process would require more time and mutual trust to build shared knowledge. Our time with

stakeholders was constrained by prison schedules or commitments to family and full-time jobs. We were limited by a tight production timeline, which meant actors and locations for the shoot were not as representative as hoped. Our next phase is to pilot the VR prototype with our partner prison, and evaluate it against comparative non-immersive reentry training programs.

6 CONCLUSION

The work of doing participatory design with prisoners about a topic that is deeply personal and relevant to their future success poses challenges regardless of medium. But with several DOCs already experimenting with VR, there is need to reconsider existing approaches and address the lack of VR design research in the context of prisons and design with prisoners as creative agents.

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