# Playful User-Generated Treatment:
# Expert Perspectives on Opportunities and Design Challenges

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## ABSTRACT

Virtual reality exposure therapy (VRET) is a promising approach in treating phobias such as fear of heights (acrophobia). VRET provides an effective, cost-efficient, scalable and individually adaptable alternative to traditional exposure therapy. To further foster the potential of VRET, a novel concept called *Playful User-generated Treatment* (PUT) was derived from expert interviews and literature review. In this paper, we provide additional insights regarding the applicability of PUT in real therapy scenarios. For that purpose, practicing psychotherapists ($n$=13) participated in an online survey and shared their assessments regarding PUT. By conducting qualitative content analysis (inductive category formation), we identified opportunities and challenges that should be considered for the design of playful VRET systems. Opportunities were seen for preparatory habituation, increased control and self-efficacy, improved interaction, economic usage and a realistic display of anxiety-inducing environments. Challenges included lack of direct communication and realism as well as pseudo-habituation to virtual environments.

## CCS CONCEPTS

• **Human-centered computing → Human computer interaction (HCI)**; **Virtual reality**.

## KEYWORDS

virtual reality; exposure therapy; user-generated content; game design

## 1 INTRODUCTION

The immersive characteristics of reality-altering technologies such as virtual reality (VR) open avenues for novel modes of treatment and facilitate the democratization of therapy [6, 18, 22, 28]. For mental health – e.g. treating phobias –, a growing body of work has shown VRET to be valuable [8, 10, 11, 27], enjoyable [6, 16, 17] and sometimes even more effective [6, 20, 21] than traditional therapies. As with many other uncomfortable activities, undergoing and adhering to a therapy is difficult and many patients avoid treatment [2, 4, 5, 16]. To this end, motivational strategies from game design are frequently recommended. While a large portion of the literature on game design builds on *functional challenges*, which address physical or cognitive skills of the players [7], these insights may not be applicable for therapy games. Therefore our approach leans on *emotional challenges* where the gratification results from resolutions of tension or overcoming negative emotions [3, 7, 12, 19].

For acrophobia therapy in VR, Alexandrovsky et al. [1] developed *Playful User-generated Treatment* (PUT) – a two-step approach, where users first engage with a *design phase*, in which they can shape and design a terrain in table-top mode with top-down view and then enter an *exposure phase*, in which they experience the very same terrain at realistic scale from a first-person perspective (see Figure 1). Enabling users to design their exposure in a simulation (top-down view of a miniature map) before they undergo the exposure with the terrain at full-scale is the key concept of PUT, as it enables playful interaction in the first phase without impacting any desired characteristics of the second phase. The approach of Alexandrovsky et al. [1] was based on related literature on game design for mental health [13, 14], motivation [29], behavioral theories [30] and informed by interviews with practicing therapists. The concept was evaluated in a user study and showed positive effects on player experience. After showing that the game design principle can be effective, we conducted a second round of interviews with expert therapists to begin to further consider ecological validity. The outcomes confirmed the value of the approach and also pointed towards valuable design recommendation for VRET games.

This work augments the previously reported evaluation of the PUT concept and discusses the design approach from the perspective of a larger group of therapists based on outcome-oriented qualitative content analysis [23]. The analysis is guided by two main areas
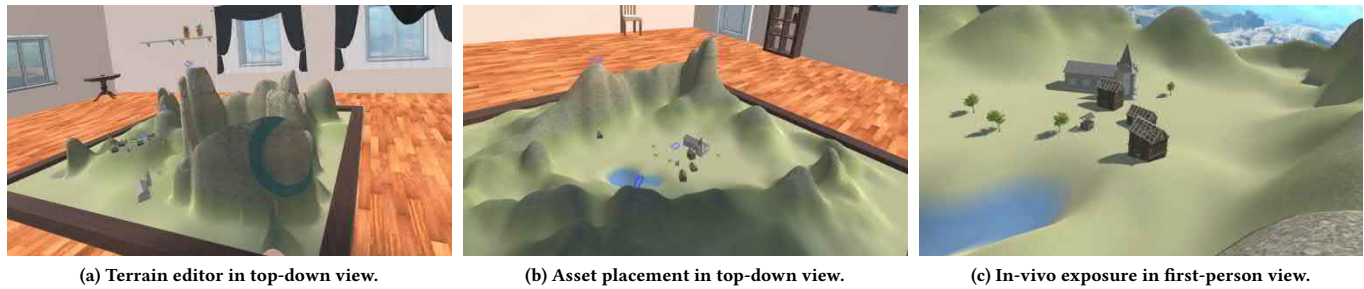
(a) Terrain editor in top-down view.         (b) Asset placement in top-down view.         (c) In-vivo exposure in first-person view.

**Figure 1: Subsequent steps of a VRET application incorporating the PUT concept.**

of consideration:

*Opportunities*: Where do professional therapists see potential in using PUT for VRET?

*Challenges*: What concerns need to be considered when employing PUT in VRET?

We build on – and extend – the results from the initial interview study and provide additional guiding insights for the playful design of VRET.

## 2 METHODS

In order to address the challenges and opportunities, a survey targeting professional psychotherapists was implemented as an online study. This survey extends the expert evaluation reported in [1] and therefore followed the same structure and procedure. However, whereas the previous evaluation served only to gain insight regarding technology acceptance and the general applicability of PUT [1], this survey was aimed at deriving specific strengths and weaknesses regarding the concept. Therefore, it included a larger group of therapists ($n$=13) together with a deeper analysis procedure.

### 2.1 Material

The survey was delivered using a Google Form consisting of an introductory page, a consent form, an extensive description of the concept (composed of a text, images and a 3 minute explanatory video) and 12 questionnaire items. The embedded video provided a short explanation of the possibilities of VR in the context of exposure therapy and it illustrated the core functionalities of PUT by displaying short clips of the terrain editor application. Next to structured and free-form responses to the questionnaire items, demographic data on the therapists' age, gender and professional background (13 additional question items) was collected as well.

### 2.2 Characterizing the Expert Interviewees

In total, 13 professional psychotherapists (9 self-identified as female, 4 as male) took part in the evaluation. The reported age ranged between 28 and 67 years ($M$=47.69, $SD$=12.45). 12 participants held a professional approbation whereas the remaining participant held a master's degree in psychology as highest qualification. In terms of work experience, participants stated to have performed their occupation as psychotherapists for a period between 1 and 40 years ($M$=14.00, $SD$=10.50). Being asked about their job specialization, 9 therapists reported to use methods from the domain of cognitive

behavioral therapy (CBT) [26] most frequently, whereas the other 4 primarily used psychoanalytic methods from the domain of depth analysis / depth psychology [9]. The frequency of engaging with acrophobia therapy was assessed with "Once a Week" ($n$=1), "Multiple Times a Year" ($n$=5), "Once a Year" ($n$=5) and "Never" ($n$=2). Regarding experience with VR in general, participants responded on a 5-point Likert-scale ranging from "No Experience (1)" to "Expert (5)" resulting in a minimum score of 1 and a maximum of 3 ($M$=1.46, $SD$=0.63). None of the therapists indicated that they had ever used VR in a therapy setting before.

### 2.3 Procedure

The link to the survey was distributed via social media and several networks of therapists that shared it in their newsletters and mailing lists. The first part of the survey gathered informed consent. Upon agreeing to the terms, the concept of PUT was laid out with a descriptive text accompanied by images and the 3-minute explanatory video. After the experts were informed about the concept, they responded to the items of the survey (consisting of qualitative and quantitative measures) and a demographic questionnaire. The entire procedure took between 15 and 20 minutes.

## 3 OUTCOMES

As part of the online survey, quantitative and qualitative measures were collected that will be reported separately.

### 3.1 Expert Ratings

For the first three questions, participants were asked to respond on 5-point Likert-scales ranging from "Not Useful"(1) to "Very Useful"(5). Question one asked how the therapists would rate VR in general in terms of applicability in exposure therapy. On average, this item received a score of $M$=4.15 ($SD$=.77). Question two was concerned with the applicability of playful software in exposure therapy and was assessed with an average rating of $M$=3.85 ($SD$=.86). Finally, the third question addressed the applicability of the PUT design approach specifically which received an average score of $M$=3.69 ($SD$=.91).

The majority of therapists ($n$=11) stated that giving patients the ability to create (or take an active part in designing) the anxiety-inducing environment themselves would be a valuable approach. Accordingly, most therapists ($n$=10) agreed that separating therapy into two phases of creation and actual exposure may have a positive

**Table 1: Codes and text passages of the inductive qualitative content analysis. Categories O1-O5 are concerned with opportunities of PUT whereas C1-C3 cover challenges. T1-T13 represent respective therapists. Text excerpts are translated from German.**

| Coding | Category | Text Example(s) |
|---|---|---|
| O1 | Habituation to anxiety-inducing situations | "Playful (not as threatening), as a preparation and habituation for anxiety-inducing thoughts." (T1) "This allows a graduated approach employing one's own design elements […]." (T4) "By employing a playful approach, exposure therapy becomes more accessible for patients, it also facilitates the eventual real exposure in vivo." (T4) "Deep cognitive processing of anxiety-inducing situations can lead to reassessment and facilitate curiosity/exploratory behavior in vivo." (T9) |
| O2 | Perceived control and self-efficacy | "[…] which increases one's own perceived control and with it one's perceived self-efficacy." (T4) |
| O3 | Improved interaction of patients and therapists | "Additionally, it enables an easier interaction with the therapist." (T4) |
| O4 | Economic usage of VR | "In a therapist's everyday life, the HMD is more practical as it does not require the therapist to go somewhere with the patient but allows them to stay in the facility." (T5) "In some regions there simply is not enough 'material' for exposure." (T10) "A realistic emotional response in VR can (somewhat) replace a challenging exposure planning/execution outside the therapeutic facility and thus, save time for travelling long distances." (T11) |
| O5 | Realistic environment | "[…] very realistic and capable of addressing situational anxiety triggers of patients with fear of heights." (T7) "realistic projection" (T8) |
| C1 | No replacement for actual communication | "It is hard to say to what extent the software is applicable as its own therapeutic approach." (T1) "[…]the therapeutic relationship would be missing which I think is essential." (T6) "Direct communication with the therapist is very important." (T3) "How about the communication between patients and therapists?" (T3) |
| C2 | Lacking realism | "According to the video, the environment (situation) was not displayed in a very realistic way." (T1) "The expo-scenario showing the mountains was poorly done, too artificial, virtual" (T7) "Buildings and the environment seemed rather unreal." (T12) "It is fairly obvious that it is not real" (T13) |
| C3 | Pseudo-habituation | "It is rather simple to expose patients to heights in real life which is preferable to a virtual version since certain thoughts such as 'this is not real', which may increase the feeling of security, do not appear in a real scenario." (T5) "There might be a false sense of security which in turn prevents a therapeutic effect when actual exposure happens." (T5) "In addition, it can become a cognitive avoidance-mechanism." (T13) |

impact on the course of therapy. The remaining (*n*=3) therapists stated that the approach may have no effect at all.

In the design phase, patients view the terrain they are editing from a top-down perspective and at miniature scale. We asked the therapists if this may have an impact on reducing the patient's anxiety level. Responses included "Yes, a Positive Impact" (*n*=8), "No Impact" (*n*=4) and "Yes, a Negative Impact" (*n*=1).

We asked the participants whether the design phase of the PUT concept may form too much of a distraction from the actual therapy. On a 5-point Likert-scale ranging from "No Distraction"(1) to "Full Distraction"(5) the mean response was a rating of *M*=2.31 (*SD*=1.20).

## 3.2 Opportunities and Challenges

Accompanying the quantitative items, the survey contained open-ended qualitative questions that were phrased to address the two areas of investigation. As described in the previous section, the survey participants were asked to rate the applicability of PUT on a 5-point Likert-scale. In the following question we asked the therapists to explain their reasoning for this rating in a free-text field. Additionally, another item of the survey asked for any further remarks regarding the PUT concept. Responses to these two items were subjected to a structured qualitative content analysis performed by two independent researchers. More precisely, we employed inductive category formation [23, 24] to work out specific opportunities and challenges of the concept that were expressed by

the experts. The steps reported in this section are in line with the standard procedure of inductive qualitative content analysis [25]. The content-analytical units were defined as follows: A coding unit was defined as distinct semantic elements in the text. This could be a sentence or a bullet point that was entered into the online form. The context unit was composed of two open-ended questions of the online survey which specifically targeted opportunities and challenges of the playful user-generated treatment PUT design concept. The recording unit entailed the summarized data of the online survey from all 13 participants. For the analysis, a category was defined as a property of PUT design which was emphasized by the therapists to be an opportunity or a challenge in a real therapy setting. Hereby, the level of abstraction was specified to be concrete properties of PUT design that impact its applicability for actual usage in therapy. With the preparations for a structured content analysis finished, we worked through the material and derived 5 categories of opportunities (O) and 3 categories of challenges (C) which are depicted in Table 1.

## 3.3 Suggestions for Improvements

In the survey, one item asked for particular suggestions that the experts may have for future implementations of PUT. One expert proposed to "enter the virtual world together"(T3) to enhance the interaction between patients and therapists. Another therapist expressed the wish to mirror the patient's view on their device. This way, they could "encourage the patient to look around, stand still, face the anxiety-trigger consciously, to really look at it without evading the situation" (T7). One suggestion included the option to "integrate real buildings that relate to the patient's [personal experience] as a first step to exposure" (T13). Other suggestions included the "option to enter unknown terrain" (T5) and a way to "create potentially phobic stimuli while being able to adjust the level of difficulty" (T9).

## 4 DISCUSSION

The quantitative ratings confirm preliminary findings of the previous study in which PUT was assessed to be well applicable in therapy and deemed capable of raising interest and enjoyment [1]. Accordingly, in this study we found that therapists were rather fond of VR and playful applications in terms of applicability in a real therapy setting. Similar responses were recorded for the PUT concept which received high ratings regarding applicability and was attributed potential positive effects on the patients' health according to the experts. Although most participants assessed PUT to be a valuable approach, it received mixed results regarding the scaled-down miniature view and possible distraction from the actual therapy. To obtain more nuanced findings on the experts' reasoning for their assessment, we included open-ended questions and employed qualitative content analysis to categorize distinct opportunities and challenges of the concept.

The therapists stated that PUT allows for a graduated habituation to anxiety-inducing situations (O1) and identified this property to be a core feature of the concept. They stated that by using PUT as an element of therapy, it can serve as a preparation for actual exposure in-vivo and ease the early stages of therapeutic procedure. Additionally, according to the therapists, PUT may also increase

the level of perceived control and self-efficacy (O2), which can be relevant mediators of motivation and adherence. In terms of patient-therapist communication, the approach may improve the interaction between both (O3) but should not be seen as a replacement for real communication or in-vivo exposure therapy as a whole (C1), since the relationship between patients and therapists is clearly seen as an essential element of therapy. Another opportunity that therapists noted is the relatively low cost of VR when used in a therapy setting (O4). Especially for treating certain phobias that require seeking extraordinary anxiety-triggers (e.g. treating fear of flying), VR may serve as an economic and efficient alternative. However, the experts also pointed out that VR exposure alone might lead to a kind of pseudo-habituation (C3) which means that patients could become accustomed to the virtual scene but remain anxious regarding real exposure. This concern is in line with the lack of realism (C2) that was expressed to be a potential weakness that could lead to pseudo-habituation. As some therapists rated the virtual environment to be realistic (O5), there seems to be disagreement between the experts regarding this point. This is understandable since the therapists had only sparse prior experience with VR and thus different, highly subjective standards in rating a scene to be realistic or not. Nonetheless, realism is considered to be a relevant factor in allowing a graduated preparation to real exposure while preventing pseudo-habituation to the virtual scene.

## 5 CONCLUSION & FUTURE WORK

This work provides an extended expert-perspective on the the applicability of a novel VRET concept - PUT (*Playful User-generated Treatment*). This research provides an extension of previous findings [1] with a more nuanced view regarding the potential of the concept as well as concerns from professional therapists. The therapist considerations indicate that VR applications in general and the PUT concept specifically, bear great potential to be used as effective treatments in exposure therapy. Additionally, we identified points of concern that should be considered for future implementations of the concept. From the responses reported in the previous section, we can already derive expert suggestions for improving the PUT application. As therapists pointed out, communication between patients and therapists is vital for a successful treatment and should be incorporated into the concept. Entering the virtual scene together could be implemented through avatar-based projection, which is a promising trend in VRET [15]. On top of improving the interaction between patients and therapists, the participants of the survey suggested that there may be value in increasing the level of visual realism and thus, potentially prevent pseudo-habituation. These propositions can be seen as design implications to inform future developments of the PUT concept. Future work will need to investigate the applicability of PUT in a long-term study including phobic patients and CBT therapists in a real therapy setting. Moreover, we will consider other use cases in addition to acrophobia where PUT may form a valuable addition to traditional exposure therapy and assess the impact on motivation as a potential mediator.

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