

# Virtual Reality Games, Therapeutic Play and Digital Healing

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**Abstract.** This paper aims to explore the concept of “digital healing,” in which the authors use current virtual reality technology to change the medium in which traditional play therapy practices are delivered. This paper discusses the history of play therapy and the history of virtual reality technology, and how these two concepts can be combined to create digital sand trays. The paper cites current Virtual Reality trends, and explores impacts these current trends can have on other play therapy practices. The paper also explores the author’s current research and future implications of this research.

**Keywords:** Digital healing · Virtual reality · Play therapy · Human computer interaction · Sand tray therapy · Gamification · Video games · Gaming · Digital immersion · Therapeutic play · Augmented reality · Mental health · Digital media · Game design

## 1 Introduction

How can Digital Media approaches and methodology be utilized to leverage therapeutic healing? This paper aims to explore the concept of “Digital Healing.” It will delve into what technology is currently available on the market and how that readily available digital technology can aid therapeutic techniques of a mental health clinician. This paper will dive into virtual worlds, augmented reality and the digitization of a variety of therapeutic treatment techniques. In addition, we will discuss our current research initiative at the University of Central Florida’s School of Visual Arts & Design (SVAD) based off of creating digital analogs to sand tray therapy, a therapeutic technique utilized in counseling.

The concept of play therapy has been utilized for generations in efforts to give children a natural way to establish relationships, communicate and problem solve [1]. Therapists use play therapy techniques to help children gain emotional trust with them and heal through use of fantasy in which they are able to explore previous trauma or current life stressors in a safe and non judgmental environment [2]. The idea of taking pre-existing games, such as Candy Land or UNO, and changing the rules to better suit the client are not an uncommon practice for mental health clinicians. The rise of affordable and readily available technology has opened the window to use digital tools in play therapy.

Digital healing is a concept when therapists use a holistic approach to heal the mind body and soul through the implementation of digital media technology. The mind is able to wander and engage in the same imaginative and creative processes seen in traditional play therapy techniques. Through the healing of the mind, the body is able to cope with more stress and become, in turn, more resilient. With the recent rise and cost reduction of Virtual and augmented reality devices on the commercial market, therapists now have access to previously unattainable tools to aid in their play therapy. Technology ranging from the inexpensive Google Cardboard, to higher priced tools such as the Microsoft Halo lens, allows therapists to engage their clients on a new creative level. The clinician and client now have the ability to share an experience together to help strengthen their therapeutic relationship.

For example, this modality can be applied to the therapeutic technique of sand tray. The sand tray technique was contributed to by H.G. Wells, Margaret Lowenfeld and Dora Kalff. The idea of sand tray is to allow the builder (the client) to develop a world in which they feel connected. They choose items (referred to as miniatures) and put them into the tray (the world) in order to explore their conscious or unconscious thoughts/feelings. In Jungian theory, the use of creativity would help them find a solution to their problem [3].

With virtual and augmented reality, the client is able to not only create a world they feel connected to but also be immersed in it. They choose items that they can strategically place in their world. Then, they are able to walk around and explore their creation. This allows the client to immerse themselves in their world. The therapist is also able to get a glimpse into world that was created by the client. They are able to see what the client is seeing on the screen and are able to better understand the client's place in their world. While VR and AR tools would not take the place of sand tray therapy, it is based on some of the same principals, and creates an additional tool a therapist can use.

To collect data there will be two groups of participants. Each group will be given a wellness exam before their treatment and after their treatment. The first group will include participants that will use virtual reality to create a digital sand tray. The second group will be the control group and will use traditional sand tray therapy. Each participant will have take part in one-hour therapy sessions over a six week period. After their treatment, each group will be given a post-test to determine which group showed the most progress.

This research is not only relevant now, but will continue to evolve as technology evolves and improves. Future Implications for this research could include providing clients with a way to digitally heal. As the tools and technology improve, so will the clients experience. Future developments will aid the clients abilities interact with their digital environment and be able to feel the weight of the objects chosen and be able to feel the sand run through their hands. It would eliminate some of the limitations of the effectiveness of digital healing versus traditional sand tray therapy in which this is paper is based.





(HMD) that utilized head tracking. In 1971, the University of North Carolina created the first prototype of a force-feedback system [6].

Artificial Reality came about in 1975 by Myron Krueger [6]. The idea was that there would be a conceptual environment that had no existence. In 1982, the first flight simulator (Visually Coupled Airborne Systems Simulator) was developed by the US Air Force's Armstrong Medical Research Laboratories. With this, the pilot would have control of the immersive 3-D virtual space by being able to hear and view in real time [8]. Following that, in 1984 a Virtual Visual Environment Display was constructed by NASA Ames [6]. They used off-the-shelf technology for this, including the stereoscopic monochrome HMD. In 1985, the DataGlove was manufactured by the VPL company. This was a device that used a glove as a form of input [9]. Eyephone HMD followed in 1988, which was a head-mounted device. To establish the illusion of depth, this device uses each LCD with a slightly different image. This was the first commercially available virtual reality device.

In 1989, the Fake Space Labs developed BOOM. BOOM is a small box that has two CRT monitors viewed through eye holes [6]. The consumer holds the box to their eyes (similar to binoculars) to move through the virtual world while a mechanical arm measures the position and orientation of the box. The images using the BOOM technology were considered more stable and responded more quickly than their head mounted systems counterparts, as it used mechanical tracking technology [10].

Later in the 1980s, the University of North Carolina developed an application that allowed architectural walkthrough. They used VR devices to improve the quality of HMDs, optical trackers and the Pixel-Plane graphics engine [6]. In 1992, the CAVE was released that featured virtual reality and scientific visualization system. This took a different approach and would project stereoscopic images onto the wall of the room, while the user wore LCD shutter glasses [6]. Augmented Reality became a focus in the early 1990s, in which the aim was to present a virtual world that makes the real world better versus replacing the real world.

There are many terms in which Virtual Reality have been interchanged with: Synthetic Experience, Virtual Worlds, Artificial Worlds or Artificial Reality [6]. All of these names are interchangeable and describe a real-time interactive graphics with three-dimensional models that also use immersion technology and give the user the illusion of participation in a synthetic environment.

## 2 Current VR Commercial Trends

Virtual Reality is said to be a 30 billion dollar industry by the year 2020 [11]. Piper Jaffray estimates over 500 million VR sets will be sold by the year 2025 [12]. Some experts say that sales of VR headsets will actually surpass sales of smartphones [13]. With this recent boom of readily consumer available VR technology hardware, many people now have access to VR for everyday use. There are a wide variety of consumer VR technologies available to the public. These technologies range from relatively inexpensive wireless headsets to more elaborate desktop computer wired setups. All price points have their advantages and disadvantages.

VR is accessible from a variety of mobile devices. Companies such as Samsung and Google have already thrown their hat into the VR game. Surprisingly, Apple has played no, to a little role in the advancement of VR technology, as of yet. Companies, such as Google, have made mobile VR available cross mobile platform. It has been said that nearly one million people subscribe to the YouTube 360 channel [14]. Companies have also developed their own HMD. The Google Pixel and Samsung Gear allow the viewer to have a hands free interactive 360-degree experience. There are also many additional universal HMD devices for consumers to choose from, non-dependent to their mobile device.

The benefits of these devices are their mobility and availability to everyday consumer. Many of the universal HMD fall under the 100-dollar price-point. One simply needs to insert their smartphone into the HMD to obtain a mobile VR experience.

Mobile VR does not come with its lack of disadvantages. As previously mentioned, there is a strong lack of IOS compatibility and support with VR mobile. In addition, due to the processing limitations of smartphones, many VR experiences lack resolution, and have lower, inconsistent frame rates, which, in turn, can lead the player to feel the effects of motion sickness.

On the other end of the consumer market there are more personal computer based VR setups. Companies such as Oculus, HTC and PlayStation have, respectively, developed their own hardware to enter the VR marketplace.

There is a significant difference in the immersive experience with the computer driven wired VR setups. Due to the processing and graphic capability of a personal computer, these experiences tend to offer faster refresh rate and a more smooth player experience. In addition, various controllers have been developed to interact with these technologies in efforts to blur the lines between the virtual and physical worlds. Dexmo has developed an exoskeleton glove peripheral to mimic the affects of forced feedback in order to simulate virtual touch [15]. In addition, the Manus VR glove, currently in pre-order, will be compatible with the HTC Vive to simulate virtual touch [16].

Wired VR technologies have their fair share of downsides. One of the most noticeable setbacks for the causal VR user is the expensive Price tag. After the consumer purchases a high-end graphics, cutting edge processing computer, third party specialty equipment and the VR unit itself they could see an overall price tag over a few thousand dollars.

VR technology will most likely continue to evolve over its growth during the next few years. With the every growing variety of headsets, the VR developers will have to address a variety of usability and design concerns. To allow for larger consumer scope, HMD developers will have to continue to develop peripherals for those consumers with visual accessibility issues. In addition, the current HMD market is lacking size variety for children.

Even with these current design limitations, there is a positive future for a marriage of VR technology, therapeutic treatment and digital healing.

### 3 VR Therapy Possibilities

The authors of this paper believe that there are effective ways to merge the technology listed above with the concept of play therapy, specifically, sand tray therapy treatment to encourage digital healing. By utilizing virtual immersion created by the HMD VR headsets, along with the possible inclusion of third party virtual touch peripherals, therapists now can help their clients, not only visualize, but become transported into their play therapy experience.

Therapists can use a combination of readily available mobile HMD in order to allow their client to be fully immersed into their sand tray creation.

In addition, if a therapist was to use the more powerful, wired VR hardware, the client would actually be able to move around freely in their created sand tray environment.

- A variety of questions arise when it comes to validating the effectiveness of VR technology in sand tray play therapy.
- What is the best combination of virtual immersion and sand tray therapy?
- Should the client begin by creating a traditional sand tray that would then be translated into a virtual environment? Perhaps, the client develops a fully immersive VR sand tray from the start of the therapy session? Is a mix of the two methods more effective?
- Does virtual touch play a vital role in virtual sand tray therapy?

### 4 Research Method/Purpose

Researchers at University of Central Florida's (UCF) School of Visual Arts & Design (SVAD) are partnering with mental health clinicians to study the effectiveness of VR in digital healing through the development of a digital sand tray. Researchers are developing this VR sand tray using the Unity 3D game engine and outputting it to a head mounted device (HMD), such as the HTC VIVE. The research purpose will be to study the possibility of incorporating VR in sand tray therapy. Researchers will start with incorporating VR in a single way (having the client create their world, within the virtual reality sand tray), and will explore other options in the future (have them create their sand tray in the traditional medium and then scan the tray into the virtual world). The act of creating ones physical sand tray is a therapeutic processes in it self. Method 1 has the client entering the VR environment immediately. Their therapist will not be in the virtual space but present in the physical space in efforts to continue a verbal dialog with their client. The client will then proceed to build the sand tray virtually by choosing from a library of pre-digitized miniatures. Method 2 is the traditional approach to sand tray therapy and will not use any virtual reality technology. The goal of this research is to promote digital healing, in which the client is able to heal using digital mediums and their own creativity.

#### **4.1 Design and Sample**

Data will be gathered to determine the effectiveness of the inclusion of the digital tool. The study will be conducted at the University of Central Florida. There will be two groups for this study, with each group including a diverse population. The first group will include participants that will be using VR in their session. The second group will be the control group. They will participate in traditional sand tray therapy, without digital interventions. Each group will be given a pre-test and post-test to determine their overall well being before their six week treatment, and after their six week treatment. Each week will consist of one, one-hour session for a total of six sessions over six weeks.

#### **4.2 Intervention**

Each group will be given six individual therapy sessions. Each participant will work with the therapist to identify their current mental health issue(s) and what they would like to accomplish over the course of the six-week period. Each participant will get one hour-long session over the course of six weeks. Each participant will be given a wellness assessment before they begin their sessions to determine their overall wellness before beginning treatment. They will also be given this assessment at the end of their six-week session to determine if they made gains in their overall wellness after intervention.

The first group will complete a check-in with their therapist, and then transition immediately into the virtual world. They will choose from the same 200-300 miniatures in the digital world (that will also be available in the physical world), and arrange their sand tray, while actively in the sand tray. The therapist will be able to watch the interactions between the participant and the objects on the TV screen linked to the digital world. They will also be able to process the digital world, verbally, while the participant is in the world.

The second group will be the control group. For this group, the therapist will check in with the client, and then complete their session without the digital element. The participants will pick from the same set of 200–300 miniatures, and create a world using those miniatures in the sand tray. They will then process the world with the therapist and have access to interact with the objects in the physical world.

#### **4.3 Measures**

Once all participants have completed their six-week sessions, and completed their pre-test and post-test results will be calculated. The difference in their pre and post tests will be calculated and an average gain for each group will be calculated. The group with the highest gained average will be determined to be the most effective in this study.

### **5 Conclusion**

In conclusion, the authors want to use digital practices to promote healing. The authors will, specifically, model their intervention after the traditional sand tray intervention.



Participants in the study will use current technology to engage in digital healing using their creativity and past experiences. Through this, wellness assessments will be given to participants in order to determine the effectiveness of using digital technology in healing. As current technology becomes less expensive and more prevalent, other markets will need to change their modalities in order to keep up with the changes and be effective in their treatments. This is one step in the direction of making digital practices the new “traditional.”

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