

The Effectiveness of Interactive Digital Installation in Healthcare “Anxiety Reduction”

By Safiya Al Farsi*

This study aimed to investigate the influence of an interactive design installation on patients' anxiety in waiting rooms. Waiting rooms are often stressful environments, which can lead to serious phobias. Therefore, it is essential to make these spaces more pleasant. It is also important to help patients reduce their anxiety and stress levels while in these waiting rooms. Interactive design installations are a behavioral distraction technique used to influence patients' thinking and refocus their attention away from anxiety. This experimental study was conducted using speculative design theory to determine how interactive installations can help reduce anxiety among patients in waiting rooms. Could it be a powerful tool that could be used in the future to improve healthcare quality, potentially replacing direct medical treatments, such as medications for anxiety, with behavioral techniques?

Keywords: *interactive design installation, patient anxiety, waiting rooms, Behavioral distraction techniques, future healthcare innovations*

Background

“Conception of expressive processing: the possibility of creating new simulated machines, of defining new computational behaviours, as the great authoring opportunity that digital media offers” (Wardrip-Fruin 2009, p. 9).

According to Coussement (2012), interactive art plays a significant role in the acceptance of interactive media in everyday life. New media technology provides an opportunity to rethink hospital design and its potential to reduce both staff and patients' anxiety and stress, leading to better clinical outcomes (Ulrich et al. 2004, p. 2). Few studies have examined the effectiveness of aesthetically appealing waiting rooms in influencing perceived waiting time (Becker et al. 2008, p. 130). With advancements in media technology, the idea of using distraction techniques in healthcare center design has emerged, such as playing games, watching cartoons, or listening to music, all of which have a clear effect on reducing preoperative anxiety (Aytekin et al. 2016, p. 57).

This study includes a case study of an interactive digital artwork installation called “Revive,” which was designed to reduce anxiety in hospital waiting rooms. The “Revive” project utilizes motion detection and interactive visuals to engage patients, encouraging physical interaction through body movements. The experiment was conducted using Processing 3.0 software, with the installation projected onto

*Assistant Lecturer, University of Technology and Applied Sciences Nizwa - UTAS, Sultanate of Oman.

large walls using Xbox and projectors, and tested with computer cameras in various settings.

However, what about interactive installations with immersive engagement and participation? What makes interactive installations superior to previous techniques is that they have no side effects, and they introduce a new mode of engagement, such as body movement interactivity, the use of large high-resolution screens that make the surrounding environment more attractive, and their ability to create positive feelings and spark imagination (Lambert 2016, p. 1). These are the reasons behind the growing trend in hospital designs incorporating interactive installation walls.

Study Objectives

The aim of this study is to engage the design interface in addressing social concerns, such as adult anxiety in medical environments and waiting times. Additionally, the study examines the extent to which interactive digital design installations influence adult anxiety in waiting rooms. Adults can experience various types of anxiety, such as preoperative anxiety, which they may encounter while waiting for medical treatment. This form of anxiety is often the most distressing for adults in healthcare settings (Kain et al. 2006, p. 1). As interactive digital media designers, we are always eager to test our designs to better understand users' needs and develop suitable solutions. Furthermore, this study has several objectives:

- Identifying how interactive installation designs can affect anxiety in adults.
- Understanding the nature of interactive installations that makes them a powerful distraction technique.
- Exploring how an interactive environment can promote calmness and motivation in adults.
- Examining user engagement styles through various interaction levels in interactive design.

Study Outline

This paper is structured into five main chapters, starting with an introduction that briefly describes the concept of the work and the main objectives of the study. The second chapter focuses on the literature review, which covers key topics, beginning with the definition of waiting anxiety and then discussing art therapy and technological interventions in art therapy, such as digital media. The third section examines what makes interactive installation design a powerful distraction technique, particularly through its interactivity feature. This is followed by an explanation of user engagement with the interactive interface, focusing on body movement and other factors. The discussion then continues with the idea of encouraging digital designers to approach problem-solving within the context of art therapy. The third chapter presents the methodology, research aims, questions and hypotheses, sampling and selection, research design, data collection and analysis, and the case study. The fourth chapter presents the study's statistics,

including statistical and descriptive analyses of the previously gathered data. The final chapter summarizes the key points and analyzes the findings of the study.

Literature Review

People can spend a significant amount of time waiting in hospitals, from their arrival in the waiting room until they receive treatment (Pati & Nanda 2011, p. 124). According to Biddiss et al. (2014, p. 445), this waiting period is often long, stressful, and uneventful, with the waiting room atmosphere being a major contributor to high levels of patient anxiety. As a result, hospital waiting rooms are a significant source of anxiety for patients. The healthcare community has conducted extensive research to find alternative techniques to mitigate patients' stress and anxiety, moving beyond traditional methods. Creating positive distraction has become a new trend in healthcare art (Mommers 2014, p. 26), as it is a preferred technique for managing patients' emotions and reducing anxiety by altering unpleasant stimuli (Delbaere 2015, p. 6). This form of therapy combines technology and interactive art therapy, which is widely used in healthcare settings. It can help create a healing environment for patients through visual art, audio, video games, virtual reality, and interactive installations, all of which are commonly applied in waiting rooms to improve the atmosphere, create a more pleasurable environment, and enhance well-being.

What is Waiting Anxiety?

Waiting anxiety is a significant form of anxiety disorder. Patients in hospital waiting rooms often wait for undetermined or unexpected periods of time, whether for test results, procedures, or other health-related services, according to the waiting list order (Silva et al. 2014, p. 1695). During this waiting period, anxiety and stress can develop due to the length of time and the uncertain outcomes that may arise (Osuna 1985, p. 82). Furthermore, this anxiety can lead to increased aggressive reactions in patients, making the management of anxiety more difficult than anticipated (Biddiss et al. 2014, p. 445). Therefore, it is important for people to manage their anxiety, stress, and the range of emotions that emerge from stressful situations (Sweeny & Cavanaugh 2012, p. 150).

There are several factors contributing to waiting anxiety in hospital waiting rooms. For example, the physical environment, or what is known as environmental stimuli, plays a crucial role in shaping mood and affecting anxiety levels. This is because, in many cases, hospital waiting rooms lack distractions such as TV, magazines, relaxing scents, windows with pleasant outdoor views, or information screens and wall visuals (Yoon & Sonneveld 2010, p. 283). Consequently, anxiety can lead to more negative health outcomes, and reducing anxiety disorders is a major goal of healthcare (Biddiss et al. 2014, p. 433). Modern hospital design focuses on creating more comfortable and engaging waiting areas (Becker et al. 2008, p. 35). Emotion regulation and distraction are powerful strategies that people use to reduce waiting anxiety and stress (Sweeney & Cavanaugh 2012, p. 148).

Therefore, modern strategies that help anxious patients focus on pleasant stimuli can make the waiting time feel shorter, a realistic goal for many healthcare centers.

Art Therapy and Technological Interventions in Art Therapy

Art integration in the healthcare experience has had a significant impact on health outcomes and patients' well-being (State of the Field Committee 2009, p. 1). For a long time, creative arts have been incorporated into healthcare programs to address a wide range of health issues, including mental health, autism, stress, Alzheimer's, and various chronic diseases (State of the Field Committee 2009, p. 2). According to Staricoff (2004, p. 8), art has been widely used in mental healthcare because it can improve communication skills and foster better relationships between mental health patients and others. Therefore, the importance of design is clear, as it can create an environment that supports clinical tasks while also providing positive engagement, therapy, distraction, and expression through artworks (Lambert 2016). Several studies have shown that art interventions in healthcare settings help create a healing environment and contribute to a positive atmosphere for patients. These interventions can also support patients' mental, physical, and emotional recovery (State of the Field Committee 2009, p. 1). Most of these interventions have been used as distraction tools to reduce anxiety and stress by creating a healing environment. For instance, TV shows, relaxing music, magazines, fantasy imagery, and interior design are commonly used (Biddiss et al. 2014, p. 445). Healthcare settings often create an atmosphere where people feel out of control, stressed, and anxious, and art can be therapeutic, serving as a healing tool that provides a more relaxing environment to alleviate stress and anxiety (State of the Field Committee 2009, p. 2). However, many of these interventions, which were used in health therapy years ago, were passive distraction tools that engaged patients passively without any interaction with the environment. This approach is insufficient for drawing patients' attention away from their current emotional state in waiting rooms (Psychiatry 2002, p. 2).

Recently, art therapy has increasingly relied on the interaction between media and individuals, with art therapists exploring the best methods to simplify and support this interaction (Kaima et al. 2016, p. 8). As a result, contemporary artwork has shifted from merely producing artifacts to providing services that meet human needs, enhanced by new technology (Erika et al. 2015, p. 131). Mommers (2014, p. 26) noted in his study that, in recent years, hospitals have started incorporating state-of-the-art technology to create a healing environment in waiting rooms to help reduce anxiety. Advanced technology presents new challenges in healthcare, prompting healthcare organizations to shift their focus and operational strategies (Becker et al. 2008, pp. 35-36). Technological interventions in art therapy do not alter the essence of the artwork but instead enable greater exploration and freer expression of the medium (Kaima et al. 2016, p. 12). This technological software has played a crucial role in supporting art therapy projects in recent years, and artists are now exploring how to use technology to create new genres of life art, such as interactive digital artwork (Ahmed et al. 2010, p. 40).

According to Biddiss et al. (2014, p. 445), the development of technological interventions helps give patients more control over their waiting environment and provides them with additional activities, potentially leading to a greater reduction in anxiety. Interactive technology is arguably one of the most promising mediums for healthcare promotion (Street et al. 1997, p. x). Digital or technological interventions in art within the healthcare field offer interactive distractions and foster positive engagement with users. As Sahiner and Bal (2015, p. 2) note, distraction is an effective technique that diverts patients' attention from anxiety-inducing stimuli. Various technologies are associated with this distraction, influencing patients' emotions and mood, and reducing their stress by creating a more pleasant environment (Delbaere 2015, p. 2). Numerous active distractions have been employed in healthcare settings to reduce anxiety and enhance patients' activity skills, including video games, virtual reality, and interactive installation design. These interventions often create healing and virtual environments with interactive systems aimed at alleviating stress and anxiety (Moline 1995, p. 2).

Video games are widely used in healthcare as a distraction technique to modify patients' behaviors (Patel et al. 2006, p. 1020). They engage active attention through cognitive and visual involvement (Patel et al. 2006, p. 1025). Griffiths (1990, p. 11) also argued that video games help reduce anxiety in patients by lowering patient arousal, making them particularly effective in diverting cancer patients' attention away from unpleasant stimuli and side effects, which cause stress and increase relaxation.

However, while video games for adults may be considered enjoyable and potentially beneficial for therapy, not all games contribute to a positive healing environment (Erika et al. 2015, p. 132). Therefore, the emergence of virtual reality (VR) has become a more effective distraction tool in art therapy. VR allows healthcare organizations to assist patients in innovative ways by creating immersive virtual environments using advanced technologies (Moline 1995). This technology enables users to become fully immersed in a computer-generated environment (Schneider & Hood 2007, p. 3). Furthermore, VR helps engage multiple senses simultaneously through the use of high-resolution graphics, making it a powerful behavioral treatment tool for people with anxiety (Psychiatry 2002, p. 5).

However, the use of virtual reality in healthcare and anxiety reduction still faces limitations and potential negative side effects during immersive exposure, such as eyestrain and blurred vision. With these limitations in techniques previously used in art therapy, such as video games and VR, there is a growing need for alternative solutions and more effective techniques to treat anxiety in adults with the advent of art therapy technology.

Interactive installation artwork design has emerged in healthcare worldwide, not just as aesthetically pleasing art but also as a healing tool. What makes this installation technique a powerful feature of art therapy?

Interactivity in Interactive Digital Artwork

An interactive digital artwork installation is both interactive and digital. These are the main components, and such installations can be placed in virtual worlds or integrated into various digital devices or public spaces (Nardelli 2012, p. 1). It

encourages the audience's physical action, participation, and positive engagement with both the digital artwork and the physical environment. Street et al. (1997, p. 34) argued that interactive technology is a valuable resource, and when designed properly, it can lead to a healthier lifestyle. According to Nam (2014, p. 9), what makes it a powerful healing technique is the interactive feature, which involves bodily interaction rather than just a mouse click. The physical interface primarily consists of large screens in open spaces, with the most significant aspect being the participant's active engagement.

According to Rush (2005, p. 183), the term 'interactive' is the most comprehensive term in the art of the digital age. Nowadays, there are high expectations for interactive digital artwork installations to perform better in art therapy, as they add elements of playfulness, voluntariness, and interactivity to therapeutic practices (Lee et al. 2013, p. 110). Several studies have focused on the ideal characteristics of interactivity in installation screens, considering the audience's ability to engage their senses, such as vision, touch, hearing, movement, and speech, all of which are essential for the ideal process of interactivity and emotional engagement (Aminabadi et al. 2012, p. 118).

The notion of interaction has been widely explored from various theoretical perspectives, particularly in relation to psychology (Schneider & Hood 2007, p. 2). This interactivity in an interactive installation involves full-body interaction for patients (Nam 2014, p. 86), allowing emotional and physical transitions during their engagement with the digital installation (Nam 2014, p. 54). It enables the patient to focus more directly on the distraction task on the screen while engaging all of their physical, emotional, and perceptual senses with the installation (Erika et al. 2015, p. 132).

Additionally, interactivity employs indirect effective and emotional techniques, such as using specific characters in the design, visuals, and storytelling through interaction, as well as the aesthetic impact of colors, animations, and text (Lim et al. 2007, p. 246). Street et al. (1997, p. 21) noted that the integration of multimedia elements, such as text, video, and visuals, adds a unique feature to interactive technology that can evoke various psychological responses. These characteristics influence the patient's participation and interaction with the installation screens by affecting their emotions and mood. Some visuals, colors, and other elements have a significant impact on anxiety reduction, mental health treatment, and the creation of a healing environment (Staricoff 2004, p. 24). The interaction here pertains to both physical and emotional engagement through body movement, where there is meaning and purpose behind the interaction (Nam 2014, p. 85).

User Engagement through Body-movement Interactions

"Speculative designs depend on dissemination and engagement with a public or expert audience and are designed to circulate".

Dunne and Raby (2013, p. 139)

With the development of digital technology, the way people participate has changed and improved, offering patients creative activities that enable them to treat themselves rather than relying solely on direct medical treatment (Lee et al.

2013, pp. 110-111). Designing an interactive environment through interactive design installations helps explore new media aesthetics and technologies (Byers 2012, p. 165). Physical and emotional engagement has a unique feature, embodied interaction, which transforms participants from passive viewers into active performers (Nam 2014, p. 86). User engagement is critical in interactive art design, as designers must predict and understand how users experience interactive art (Batra 2008, p. 6). Interactive design installations focus on the participant's bodily aspects of interaction, aiming to stimulate imagination, consciousness, and perception (Byers 2012). This type of full-body engagement allows for a broader range of users and provides an opportunity to better understand participants' experiences with the installation. Users are fully engaged and gain enjoyment through their body movement.

Recent studies have shown that body movement plays a vital role, as it is considered the engine of change in how participants' bodies interact with the interactive environment, which, in turn, affects how they perceive it (Bianchi-Berthouze et al. 2007, p. 102). Furthermore, whole-body engagement is a powerful indicator of emotional effects. This includes the influence of new technology through varying degrees of involvement in interaction design, such as immersive engagement, presence, direct attention to the interactive environment, or involvement for enjoyment (Bianchi-Berthouze et al. 2007, pp. 103-104). The level of movement can be used as a measure of engagement (Bernhaupt 2015, p. 253), and the nature of engagement can predict how effectively the installation serves as a distraction tool that impacts patients' emotional states. Therefore, interactive design installations enhance users' presence and immersive engagement through body movement, offering a new aesthetic in digital media interaction design (Slater et al. 1998).

Designer Engagement in Problem solving and Art Therapy

“Designers are usually seen as problem solvers” (2013)
Anthony Dunne & Fiona Raby

Fuad-Luke (2009) emphasized the importance of transforming people's or designers' thoughts into meaningful social and environmental changes. Designers' engagement and participation in creative activities and interfaces are seen as a new method for improving the quality of a patient's life (Hoey & Zutis 2010, p. 211). Designing an interactive product primarily involves supporting users in their daily lives (Preece et al. 2015). It is an interdisciplinary field that enhances people's lives, communication, work, and interactions (Preece et al. 2015). In interaction design, we observe significant engagement between humans and digital technology, as the goal is to create pleasant and useful artifacts (Kaptelinin & Nardi 2006, p. 5). Brown (2009, p. 2) notes in his book that design thinking now creates needs as demands, and it represents a human approach to problem-solving, helping organizations and individuals across various fields to become more creative and innovative, ultimately improving the quality of patient care.

“If we speculate more—about everything—reality will become more malleable.”
Dunne & Raby (2013)

According to Dunne and Raby (2013), design is a form of speculation, involving the thought process of envisioning how things could be in order to predict and imagine possible futures, with the goal of engaging the audience. Products are always designed for circulation (Dunne & Raby, 2013). With the integration of art in therapy and the combination of art with a solution-focused approach, therapy is evolving faster than expected, driven by the innovation of creative expressions and other interventions (Malchiodi 2003, p. 82). Interactive designers strive to enhance user experience and address current situations and issues people face (Preece et al. 2015, p. xxxiii). They identify user needs and establish useful requirements. In recent trends in interaction design, designers aim to include emotions and provide pleasure through interactive design (Kaptelinin & Nardi 2006, p. 25).

Today, designers focus on finding different methods to engage positively in social and health problem-solving through the use of technology and art installations because digital technology plays a key role in changing how we interact and engage with the various resources around us (Moggridge 2006, p. 1). Numerous modern technological artworks demonstrate how designers intervene in health problem-solving, illustrating the necessity of their contributions to healthcare transformation. For example, the interactive media wall at Boston's Children's Hospital is a digital media design featured on an interactive wall in the hospital lobby, designed to emotionally and physically engage children by allowing them to interact with the visual space around them. The goal of the digital media designers involved in the project is to create a more interactive environment that can help change children's emotions while they visit the doctor (UConn 2015). Another similar project by creative digital designers is the Kinesis Studio's discovery zone interactive wall at Nemours Dupont Hospital. They created a fantasy world called the Living Garden, designed to alleviate the stress and fear children experience due to illness, contributing to the healing process in measurable ways (Kinesis Studio 2015).

These contributions, and many others, primarily focus on children. Should we consider applying similar approaches to adult patients?

Methodology

Introduction and Proposed Aim

The main purpose of this research was to examine the extent to which interactive digital artwork design (installation) can influence adult patient anxiety in waiting areas. Through an interactive design interface, the study aims to alleviate anxiety symptoms in these waiting areas. Interactive digital artwork installations are a recent development in the digital age, but their use in the field of art therapy has not been sufficiently explored. The research purpose was further clarified through a review of previous studies on digital media design and related theories,

which guided the development of the research design. According to Kumar (2005 p. 5), research methodology is a technique used to scientifically approach research objectives, explaining the steps and processes involved in conducting the study. As digital media continues to evolve, various research methods have emerged, reflecting recent changes in the digital media field and the growing discipline of digital media research (Burgess 2013, p. 1).

This research employs a mixed-methods approach, combining both qualitative and quantitative data collection techniques. It is based on a One-Group Pre-test and Post-test experimental design. The study utilizes exploratory, descriptive, and experimental research approaches to test hypotheses and develop related theories. In the pre-test phase, participants' baseline anxiety levels were assessed, followed by the post-test phase, which measured anxiety changes after interacting with the "Revive" installation. The methodology includes a clear description of data collection and analysis methods, an explanation of the sample and participant involvement, and the use of a case study to guide the research design and hypothesis testing. Specifically, this research includes:

1. A brief description of the study's methodology.
2. An explanation of the data collection and analysis methods.
3. A description of the sample and participant involvement.
4. An explanation of the research design and the use of a case study.

Hypothesis and Research Questions

The primary research question of this study is: **To what extent can interactive digital artwork design influence patient anxiety among adults in waiting areas?** In addition, several related questions (or arguments) are raised and discussed throughout the study:

1. What is waiting anxiety?
2. What is art therapy, and how does the combination of art and technology (digital art) enhance healthcare?
3. How do technological interventions in art therapy enhance interactivity for patients and help reduce mental health issues such as anxiety in adults? How have these interventions become powerful tools in both art therapy and healthcare?
4. How does interactive digital artwork create immersive user engagement through its interface?
5. How do interaction design and interactive designers address social concerns, integrate technology, and fulfill user needs?

Hypothesis of Research

H1: Patient anxiety is influenced by both the waiting time and the environment of the waiting room.

H2: An interactive design interface that incorporates body interaction significantly reduces anxiety in adults and enhances healthcare experiences.

Setting

This study included participants from various waiting areas while they awaited treatment. The first location for testing the first hypothesis was the University of Sussex Healthcare Center and the Royal Hospital, followed by other randomly selected health centers. These healthcare settings were ideal for recruiting participants, as they typically experience higher levels of patient anxiety due to extended waiting times. Therefore, selecting appropriate settings for the experiment was crucial to ensuring the relevance and validity of the study.

Population (Sampling and Selection)

Sampling and the selection of participants are critical decisions in ensuring the quality and validity of research. For quantitative research, purposeful sampling is commonly employed to ensure that participants are carefully chosen to meet specific criteria, which is essential for producing valid results (Suri 2011, p. 63). In this study, data were collected from a selected group of individuals based on criteria designed to yield insightful and relevant findings.

As noted by Emmel (2013), purposeful sampling is particularly well-suited for applied research, as it focuses on identifying the most relevant and insightful cases for testing hypotheses. In this context, a sample refers to the group of individuals selected for the study based on their alignment with predefined criteria, such as age, education, and limited exposure to technology.

The sampling design used in this research was non-probability-based, meaning participants were not chosen randomly but selected purposefully according to the study's objectives. The researcher applied judgment to choose participants who best fit the study's criteria (Doherty 1994). A total of 53 participants were selected, which was fewer than initially anticipated due to time constraints and the specific criteria required for the study. The sample consisted of both male and female participants, primarily from universities and colleges, with all participants over the age of 18. This age group was chosen due to ethical considerations regarding minors and because the survey questions were more suited to individuals familiar with new technologies and digital media, such as university and college students.

Research Design

This research is both exploratory and explanatory in nature. It is exploratory because it seeks to familiarize itself with the problem, offering new insights and potential solutions (Kothari 2004, p. 2). It aims to provide greater control over variables and the research environment, particularly through the case study installation project experiment (Denial & Sam 2011, p. 18). The research is also explanatory, as it involves a survey designed to gather facts from participants, providing a description of the project's state, research objectives, and the experimental situation (Kumar 2005,

p. 9; Denial & Sam 2011, p. 24). Furthermore, it is descriptive, as it includes detailed explanations of participant characteristics and reflections on previous work, theories, and conditions (Kothari 2004, p. 2).

The study employs a mixed-methods approach (qualitative and quantitative), incorporating action research aimed at solving social problems (Kumar 2008, p. 9). The applied nature of this research allows for the discovery of practical solutions, with the goal of addressing anxiety in adults through interactive design interfaces. This approach is applied through the “Revive” project, a case study designed to test and implement the proposed solution.

The qualitative approach in this research focuses on gathering in-depth, observational data to understand human behaviors, attitudes, and feelings about the “Revive” project (Kothari 2004, p. 3; Denial & Sam 2011, p. 19). This data will be collected through participant observations, noting feelings and responses to the installation. Qualitative research helps uncover the underlying motives and emotions of participants, particularly in understanding how they interact with the installation and how it impacts their anxiety levels (Kumar 2005, p. 8).

In contrast, the quantitative approach involves collecting numerical data from closed-ended survey questions to test the hypotheses and measure the effect of the “Revive” project on participant anxiety. This approach is used to summarize the data in a form that provides statistical confidence in the results (Abeyasekera 2000, p. 1). Mixed methods are frequently used in health, behavioral, and social sciences to enhance the reliability of research findings by integrating both qualitative insights and quantitative data (Creswell 2015, p. 2).

Data Collection

The data collection took place from July 15 to August 15, 2016. During this period, the digital installation was presented at various locations to test the proposed hypothesis. A survey was conducted each time the installation was shown. Participants were invited to take part in the experiment and were included upon giving their consent.

The data were primarily collected through surveys administered shortly after the installation presentation, rather than through direct observation. The survey included more than ten questions designed to capture participants’ experiences. As previously mentioned, this survey was the primary method of data collection for the study. For detailed survey questions and data charts, see the Appendix.

According to Fowler (2009, p. 1), surveys are a key method for gathering data, involving questions posed to participants, and the responses are then analyzed to draw conclusions. To ensure consistency and valid results, all participants answered the same set of questions in the survey.

Survey as Primary Data Collection

Surveys are commonly used in both descriptive and experimental studies (Denial & Sam 2011, p. 24). They are a widely adopted methodology, particularly in media studies, for collecting qualitative data (Mishra 2013, p. 1). The term

“survey” generally refers to the process of gathering research information from a sample of the population (Scheuren & American Statistical Association 2004, p. 9). In this study, a survey was conducted to collect primary data for the research and experiment.

The primary purpose of using a survey was to describe the current situation, identify the problem from the participants’ perspective, gather information about their feelings, and evaluate their experiences with the installation. Additionally, the survey aimed to collect feedback on related works to improve the experimental interface design and produce more pleasant outcomes. This approach is widely used in experimental studies to gather comprehensive data.

The survey utilized Likert-scale questions to assess participants’ opinions on the “Revive” project. The agree-disagree scale has been a common tool for decades in fields such as opinion polling, market research, and academic studies, providing valuable insight into attitudes, opinions, and values (Johns 2010, p. 1).

The survey was distributed after participants engaged with the project. The questions were designed to align with the aims of the research, specifically to gather feedback on the interactive installation design in healthcare and understand how people prefer to interact with such installations. The rationale behind each question was carefully considered to ensure the collection of relevant data. This survey, based on Likert-scale responses, was conducted in environments that offered quiet and healing stimuli, where participants were more likely to feel relaxed and comfortable.

Figure 1. *Likert Scale*



Observation through the “Revive” Case Study

This was the second primary data collection method used in this study. The goal was to understand the relationship between the installed design and participants’ behaviors, as well as the design’s impact on them within the experiment’s environment. Typically, a case study utilizes this strategy to gather insights from the experiment. The observation process was unobtrusive and did not distract the participants. According to Kawulich (2005, p. 1), the primary aim of the observation method is to directly observe the behavior of participants. In this study, the observation was a direct one, conducted in the field of the presentation, focusing on real-time interactions and behaviors.

Additionally, theoretical analysis as secondary data was used to discuss the topic and relate it to previous studies and theories.

Case Study “Revive”

The main case study for this research is an interactive digital artwork installation called “Revive.” The “Revive” project aims to divert patients’ attention from the anxiety-inducing stimuli often present in waiting areas to more engaging and pleasurable stimuli. This is achieved through an interactive wall, digital art drawings, and animations. The case study was conducted in several healthcare centers’ waiting rooms, as well as other waiting areas, to assess its effect on adults and evaluate the extent to which it can serve as an effective interactive tool for anxiety reduction. As Nam (2014, p. 38) notes, interactive digital installations are valuable methods for engaging participants in meaningful activities with purposeful outcomes.

The “Revive” installation was designed to obtain reliable results from direct interaction between the artwork on the interface screen and users in their environment. This project is intended to be a safe, cost-effective distraction tool for healthcare settings. It also explores how elements such as images, colors, and interactivity can influence an individual’s emotions and overall well-being (Malchiodi 2003, p. 19). In this case study, both hypotheses were tested, and the interaction between the interface and users was analyzed to answer the research question. The results of these hypotheses will be presented in the following section and discussed in the next chapter.

Data Analysis

The analysis of both quantitative and qualitative data in this study was conducted separately for each type of data. However, at the interpretative level, the results were combined, as this study uses a mixed-methods approach to data collection, which follows this strategy for analysis (Sandelowski 2000, p. 252). For the qualitative data, a content analysis method was employed, as it is the most suitable technique for analyzing behavioral data. This method helps to count, categorize, and code data using computer software, while also summarizing key findings and presenting them in a narrative form (Creswell 2015, p. 4).

For the quantitative data, statistical analysis was used to organize and clarify the data in numerical form (Creswell 2015, p. 4). This approach provides interval data, using scales such as agreement or satisfaction levels. While both methods were analyzed separately, the findings were integrated during the interpretative results discussion. To analyze the statistical data, the central tendency method was applied to determine the meaning of the data. The mean, or average, was calculated as the central value derived from the sum of all data points, providing a clear representation of the data set.

$$\text{Mean: } X = \frac{\sum X}{n}$$

Therefore, the average score (or mean) was calculated for each themed question to determine the central response. “Agree” and “strongly agree” responses were

interpreted as indicating a positive correlation with expectations, while “disagree” and “strongly disagree” responses were interpreted as indicating a negative correlation.

Limitations of the Study

The interactive digital installation “Revive” faced several limitations during its implementation. One of the most significant constraints was the limited time available, which prevented the inclusion of a large and diverse sample of participants from different countries. Initially, the plan was to gather opinions from people worldwide regarding digital technology and its role in healthcare interventions. Additionally, technical limitations arose with the use of the Kinect Xbox, a motion sensor that offers high-resolution body detection. However, compatibility issues with the Mac PC meant we were unable to fully utilize the Kinect’s features. As a result, we had to rely on a webcam, which caused the project’s performance to be slower than anticipated. Another limitation involved the difficulty in obtaining permission to access waiting areas in several healthcare centers, as some institutions did not permit such projects. Despite these challenges, the project was carried out successfully, and these limitations will provide valuable insights for future research.

Research Findings and Discussion

The primary objective of this study was to investigate how interactive digital installations influence adult anxiety in waiting areas. Based on the data presented in the previous section and the field experiments conducted, it is essential to analyze this data in relation to the research question. This chapter presents the interpretations and results of the main data findings, which were obtained through surveys and observations during the experiment, as well as through participant feedback. The data in this chapter were analyzed using statistical methods and content analysis. Additionally, this chapter discusses the findings, evaluates the validity of the data, and compares the results with previous studies.

Participants and Response Rate of the Case Study

The original sample size for this study was estimated to be over 80 participants. However, by the end of the study, only 53 participants had engaged in the experiment and completed the survey. Out of the 53 responses, only two were missing. All participants were eager to take part in the experiment and complete the survey.

Additionally, all participants had a high level of education, with most being university or college students. All participants were over the age of 18, with the majority aged between 20 and 26 years. Both male and female participants were randomly selected.

Statistical Analysis (Survey Statistics)

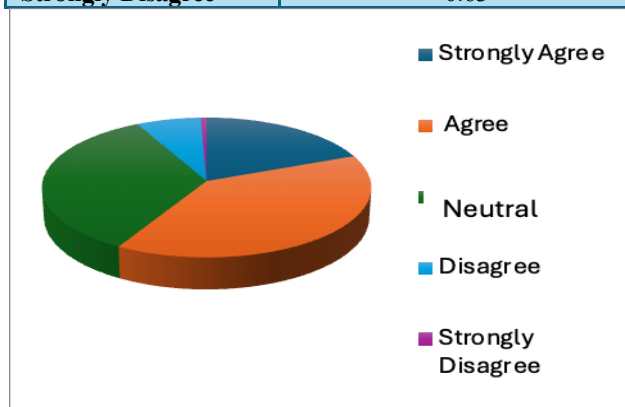
This section presents the key results and findings derived from the survey conducted during the experiment. It offers evidence for each aspect of the study, supported by relevant statistical findings. The section aims to analyze and discuss the primary themes of the research, including waiting anxiety, the effectiveness of interactive installations in reducing anxiety, and the potential impact of interactive installations on healthcare improvements. The analysis is organized into specific categories, each accompanied by relevant statistics and detailed analysis. For more details (see Figures 2-5).

Waiting Anxiety in the Hospital Waiting Rooms

Questions one, two, and six in the questionnaire were designed to examine and explore the issue of anxiety, specifically how the waiting environment and waiting time contribute to stress and anxiety in patients. The results provide insight into the extent to which people experience anxiety while waiting in hospital waiting rooms (see figure 2). As indicated by participants' responses, the highest percentage of answers were in agreement, with fewer participants selecting the disagreement option. The "agree" response had the highest mean of 39.28%, surpassing all other responses for this question. This suggests that the majority of participants feel anxious due to the waiting time and environment. These findings align with previous studies that have highlighted the impact of waiting time and environment on patient anxiety in healthcare settings. The results are summarized in Table 1 and Figure 2.

Table 1 & Figure 2. *Illustration of Participant Responses to Waiting Anxiety in Hospital Waiting Rooms*

Options	Percentage (Mean %)	Participants (Mean)
Strongly Agree	18.49	10
Agree	39.28	21
Neutral	34.21	18
Disagree	6.94	4
Strongly Disagree	0.63	0

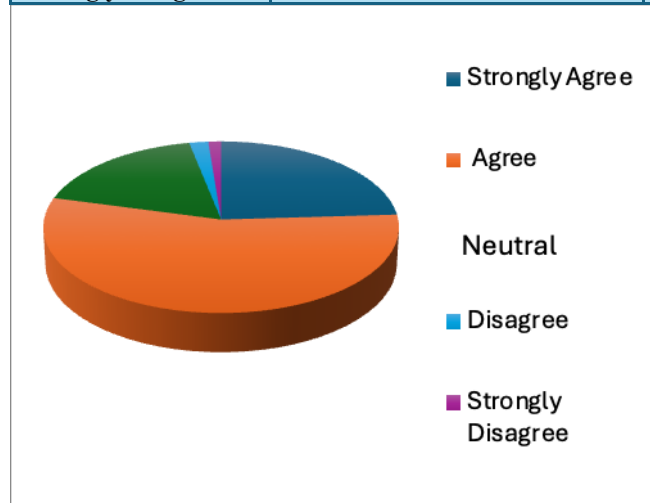


Interactive Installation Ability in Anxiety Reduction

In the following section of the questionnaire, questions were designed to assess the extent to which interactive installations can alleviate anxiety in adults in waiting areas. Participants provided multiple responses based on their opinions of the interactive screens and the type of interaction offered during the experiment. According to the statistical analysis of questions four, five, and eight, the highest percentage of participants agreed that the interactive installation was more effective at reducing anxiety than other techniques used previously in waiting rooms, with a mean percentage of 47.28%. Additionally, from question eight, 22 out of 53 participants indicated that the installation served as a valuable distraction tool, helping to reduce the discomfort often associated with medical procedures. Only a small percentage of participants disagreed (3.15%) or strongly disagreed (1.89%), suggesting that a minority did not fully support the concept, which could slightly influence the overall study's findings. Furthermore, several responses appeared to depend on the amount of time participants spent interacting with the installation during the experiment. Some participants completed the experiment quickly and did not fully engage with the different levels of interaction offered. The results are summarized in Table 2 and Figure 3.

Table 2 & Figure 3. *Illustration of Participant Responses on the Effectiveness of Interactive Installations in Reducing Anxiety*

Options	Percentage (Mean %)	Participants (Mean)
Strongly Agree	23.39	12
Agree	47.44	25
Neutral	25.39	13
Disagree	3.15	2
Strongly Disagree	0.63	0

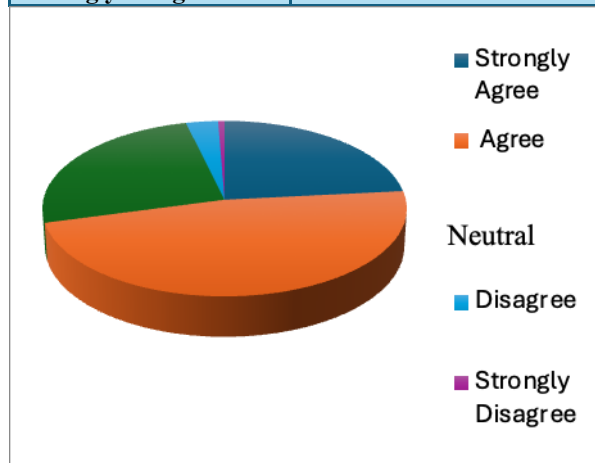


Interactive Installations Can Improve Healthcare

The survey also included questions aimed at assessing the potential of the interactive installation to facilitate and improve healthcare, motivate patients to seek treatment, and alleviate some of the efforts required by doctors to reduce patient anxiety before treatment. Questions seven, nine, and ten provided insights into participants' views on how the digital interactive installation could contribute to healthcare improvements. The responses to these questions revealed that many participants recognized the value of new technology in improving their lives. According to the data, a significant number of participants (29 individuals) agreed that the interactive installation had the potential to improve healthcare, with a mean of 55.09%, the highest mean among all options. The remaining responses were spread across various opinions, with most falling between "strongly agree" and "neutral." This variation in responses may reflect demographic differences and how individuals relate to and understand the role of digital technology and interactive installations in modern life. The results are summarized in Table 3 and Figure 4.

Table 3 & Figure 4. *Participants' Views on Interactive Installations Improving Healthcare*

Options	Percentage (Mean %)	Participants (Mean)
Strongly Agree	24.07	13
Agree	55.09	29
Neutral	17.69	9
Disagree	1.89	1
Strongly Disagree	1.26	1

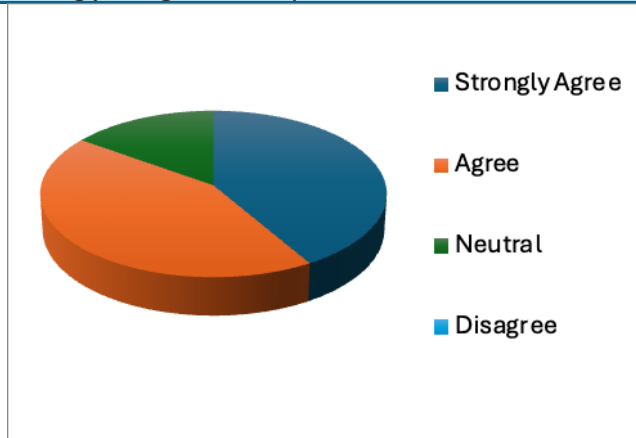


Another question in the survey aimed to determine whether people prefer interacting with still images or with interactive designs. This question sought to explore if individuals are more inclined towards traditional art or if they are drawn to the engagement offered by new digital art with interactive features. The highest percentage of responses were "agree" (43.40%), with a slight difference between "agree" and "strongly agree," while no participants chose the "disagree" option. This indicates that people are generally more engaged with the interactive features

of the installation design, as it actively involves them and creates a positive experience. The results are summarized in Table 4 and Figure 5.

Table 4 & Figure 5. *How People Prefer to Interact with Interactive Designs More than with Still Images*

Options	Percentage	Participants
Strongly Agree	41.51	22
Agree	43.40	23
Neutral	15.09	8
Disagree	0.00	0
Strongly Disagree	0.00	0



Summary

This chapter presents the main statistical data analysis of the findings. It focuses on three key points from the survey questions, analyzing them using the mean of all the results obtained.

Discussion

As discussed earlier, this section provides a deeper analysis of the research findings in relation to existing literature and the research questions. It also introduces new developments and concepts that have not yet emerged in previous studies but are essential to analyze based on the experiment's findings. In recent years, interactive media installations have become a new form of design, where designers aim to create and explore innovative experiences across various fields of human life and environments (Fischerr et al. 2007, p. 2836). These installations seek to provide social value and services by offering fresh perspectives on usage, particularly in public spaces. The creation of the "Revive" installation, in particular, is driven by the intention to express ideas and speculate on future applications, ultimately aiming to benefit society and address challenges like healthcare issues in innovative ways.

Research Questions

Through the “Revive” experience and its connection to previous findings in other studies, the research questions were answered, and new concepts emerged that require further exploration. The central question of this research was: *To what extent can interactive digital media installations influence anxiety in adults in hospital waiting rooms?* The answer aligns with previous research, which supports the idea that interactive installation design can act as a distraction tool, diverting patients’ attention away from the negative stimuli of the waiting room and the anxiety caused by waiting times (Hathorn & Nanda 2008). This experimental study supports this approach, as evidenced by survey responses, where participants agreed that interactive installations could improve healthcare and function as a distraction tool in waiting rooms, allowing them to focus on more pleasant stimuli and engage positively with the installation.

To understand what makes this interactive installation effective in healthcare, we must consider each element of the design, such as color, visuals, and most importantly, the type of interaction. Various studies and literature discuss the impact of design elements like visuals, color, and music in healthcare, highlighting their potential to reduce anxiety (Staricoff et al. 2003, p. 7). In this experiment, some participants particularly enjoyed the visual elements, such as the animated designs, which contributed to feelings of happiness. We found that the choice of colors and reflective images must be carefully considered, as they can affect people differently based on their backgrounds and personal associations. Common sense tells us that certain images evoke emotions and influence our reactions (Malchiodi 2003, p. 20). For example, the blue background in this installation, typically associated with relaxation and calmness, fostered a sense of healing. Colors have coded meanings that convey sensations, feelings, and moods (Zammitto 2005, p. 1).

The interactivity of the installation further enhanced its effectiveness by engaging participants actively. Features like the motion sensor webcam, which mirrored participants’ facial expressions with humorous faces, and the interactive bouncing ball game, where participants used body movements to track and manipulate the ball, encouraged engagement. These bodily interactions represent a new design aesthetic for interactive installations, where users are active participants. The dynamic interactivity employed in this design involves whole-body engagement, making users active players in the experience (Batra 2008, p. 5). Observations from the experiment, as well as participants’ feedback, indicated that this dynamic interactivity was key to the success of the installation in reducing anxiety. This type of interaction supports its effectiveness in healthcare settings, offering an innovative aesthetic and approach to design.

Hypothesis

H1: The patient’s anxiety is affected by the waiting time and environment in waiting rooms.

As indicated in the previous section, three of the research survey questions provided answers to the hypothesis that waiting time and the environment in waiting rooms negatively affect patients, playing a significant role in shaping their anxiety and stress. Waiting anxiety is a prevalent feeling, especially since patients are uncertain about how long they must wait for treatment, which can lead to heightened stress (Silva et al. 2014, p. 1695). Typically, waiting environments are filled with pressure and lack engaging distractions, leaving patients with little to focus on except their anxiety. According to the survey, 31 out of 53 participants strongly agreed or agreed that waiting environments and waiting times made them feel anxious and stressed. This statistic supports the first hypothesis and aligns with findings in previous studies on waiting anxiety. Therefore, waiting anxiety is a common human experience in healthcare settings, and there is an increasing trend in design to address this issue by reducing anxiety in hospital waiting rooms (Becker et al. 2008). This study has deepened our understanding of the anxiety faced by adults in waiting rooms, emphasizing the need for digital media contributions to alleviate this issue. By offering distraction techniques that engage patients and encourage active participation, the perception of waiting time can be minimized, helping to reduce anxiety.

H2: Interactive design interfaces with the features of body interaction have a great impact on anxiety reduction in adults and improving healthcare

To fully understand the findings related to this hypothesis, we must reflect on the insights gathered from participants in the “Revive” experiment and the survey responses. Based on the feedback from 53 participants in the case study, the hypothesis has been confirmed. Specifically, 39 of the participants (59.62%) agreed that the interactive installation has the potential to improve healthcare and reduce anxiety in waiting rooms. These results align with prior research discussed in the literature review, which suggests that such installations can serve as an effective distraction technique, redirecting participants’ attention away from anxiety-provoking stimuli and focusing them on engaging, interactive screens.

The increasing trend of using installations in public spaces highlights the potential for integrating aesthetic elements into such projects, making them more impactful and beneficial for public needs and services. This supports the theory of speculative design, which advocates for using digital media and technology to create interactive designs that anticipate future desires. This approach encourages digital media designers to incorporate aesthetics, codes, and visuals into products that serve multiple purposes across various fields (Dunne and Raby 2013). It aims to engage participation, enhance welfare, and fulfill public interests, extending the scope of digital art beyond galleries and museums to practical applications in sectors like healthcare and education (Fischerr et al. 2007, p. 2837).

One key feature of the “Revive” installation is its incorporation of bodily movement interaction, a relatively new element in interactive design. This type of interaction encourages physical and emotional engagement, helping participants engage more deeply with the installation. It fosters creativity, imagination, and immersive experiences, which can positively impact users’ emotional states,

including reducing anxiety (Byers 2012). The success of this approach in the “Revive” installation demonstrates how digital artwork can create a healing environment, offering an active and supportive atmosphere that benefits individuals’ cognitive and emotional well-being.

Overall, both hypotheses and research questions were largely addressed through the experiment with the “Revive” installation. While some aspects still warrant further exploration, the findings clearly indicate that interactive installation design is an effective distraction tool. Future efforts from digital-age designers should focus on refining and implementing this concept in service-oriented products, particularly in healthcare settings.

Conclusion and Recommendations

In conclusion, this final chapter summarizes the research questions, objectives, hypotheses, and key points of the study. The primary research question of this study focused on understanding the extent to which interactive digital installations can influence anxiety in adults in hospital waiting rooms. The study aimed to assess the effectiveness of interactive installation design in reducing anxiety, improving healthcare, and facilitating human experiences, as well as contributing to problem-solving in healthcare environments. This research was grounded in interaction design and speculative design theoretical perspectives, providing an in-depth look at the factors that influence anxiety in waiting rooms and how interactive activities can create a healing environment. The interactive installation engages patients by distracting them from anxiety-inducing stimuli, offering a positive and immersive experience.

This study also focused on adults, filling a gap in existing research that often centers on children in similar contexts. Interactive installation design presents an exciting opportunity to explore human interaction with digitally mediated environments through interactive screens. It serves as a new form of distraction, engaging individuals physically and emotionally, including body movement as part of the interactivity. By encouraging active participation, the design fosters immersion and engagement. The study's hypotheses—the effect of waiting time on human health and mood, and the impact of interactive installations on healthcare improvement—were addressed through reliable data obtained from the survey responses and case study observations. The findings confirmed that interactive digital installation design plays a role in improving healthcare and reducing anxiety, with the aesthetic features of the design and the designer's intentional choices contributing to its therapeutic effects.

This study also demonstrated the speculative design perspective, as the project was conceived as a future-oriented solution to the current issue of anxiety in healthcare settings. The experiment showed that this interaction design could potentially lead to new solutions for managing healthcare-related anxiety.

Throughout the experiment, several key concepts emerged, particularly concerning the role of visuals, colors, and the nature of interaction in therapeutic environments. These elements contributed to creating healing stimuli, extending the

scope of the study and suggesting areas that require further exploration. Future research should focus on developing interactive products that cater to adults with varying levels of body movement engagement. Additionally, improving screen resolution and accessibility in healthcare settings, particularly hospitals, is an important consideration.

Finally, one critical question remains open for future exploration: How can the integration of new technologies and media provide better behavioral treatment options in healthcare, potentially reducing the reliance on conventional medical drugs?

Recommendations

This study offers several key recommendations for healthcare institutions and digital media designers:

1. **Focus on Interactive Design in Healthcare:** Healthcare centers should prioritize the integration of interactive design and digital media products to enhance the quality of service provided to patients. Interactive technologies have the potential to improve patient experiences and wellbeing in various healthcare settings.
2. **Behavioral Techniques as Treatment Alternatives:** Healthcare institutions should recognize that treatment options are not limited to medications. Behavioral techniques, such as distraction and engagement through interactive installations, should be explored and integrated as natural treatment alternatives to help reduce patient anxiety and improve overall health.
3. **Tailored Design for Healthcare Environments:** Digital media designers should give careful consideration to creating designs that have a positive impact on patient wellbeing. This includes selecting visuals and interaction features that are culturally and age-appropriate, ensuring safety, and avoiding elements that could cause harm. The design should be therapeutic and engaging while maintaining a user-friendly approach.
4. **Invest in Distraction Technologies:** Health institutions should place significant focus on the effectiveness of new technologies, such as distraction techniques, in improving patient experiences. Digital tools that help reduce anxiety, improve mood, and create a calming atmosphere in healthcare environments are essential for patient comfort.

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Appendix

Questionnaire

Introduction

Everybody worries or experiences the occasional case of butterflies in the stomach. Anxiety is a natural response that everyone encounters at some point in their life. However, some people experience constant worry and anxiety that affect their daily lives. For instance, the anxiety of waiting is a universal feeling, such as when waiting in a clinic and feeling nervous before receiving treatment or meeting the doctor. What do you think and experience?

This research aims to find several ways to use interactive design to alleviate anxiety. The project also focuses on how the interactive environment can help create a sense of calm and reduce anxiety by fostering motivation and happiness. In this experiment, we are exploring how interactive design can help reduce anxiety and create a sense of motivation. We are optimistic about the role of technology as a tool for developing strategies that explore how we can integrate interactive technology into healthcare and meet human needs.

Please take this seriously. Your response will be used for an experimental research paper.

Age:

Occupation:

No	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Anxiety interferes with your life.					
2	You often experience shortness of breath or choking feelings when you visit the health centre.					
3	People interact with animated designs more than still images as it encourages physical interactions with what is presented on the screens.					
4	Feelings of fear and anxiety reduced upon interactive content contained in such interactive screens such as colours and visuals, and body interaction.					
5	Interactive installation has a great ability to overcome anxiety, and it creates healing and interactive environment more than the atmosphere of the clinic waiting rooms.					

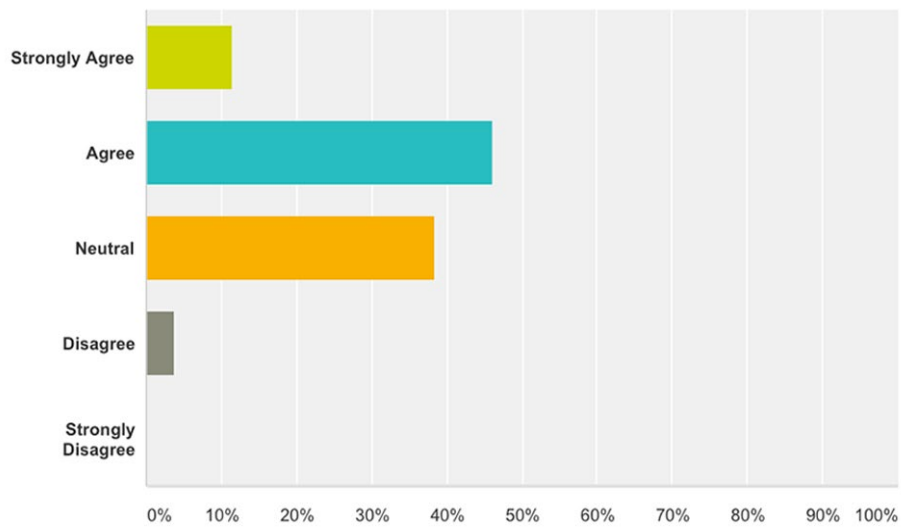
6	The clinic waiting room's environment and waiting time can affect you badly and make you anxious.					
7	This interactive installation gave you a greater incentive to receive treatment.					
8	Attention distraction installations are so engaging that they can also be used as a distraction tool for young people to reduce the discomfort in medical procedures and treatments.					
9	This interactive idea can ease the effort made by the doctor to reduce the anxiety of the patient before treatment.					
10	Interactive technology can facilitate and improve health care.					

Practical Project Process and Instruments Explanations

In the first phase of the project, we began by testing a simple prototype using After Effects. This initial test was conducted with users to gather feedback and further develop the project. The main feature of the “Revive” project is motion detection and the screen representation of human movement. To implement this, we used a webcam with an Apple desktop, featuring a high-resolution display (1920 x 1080) on a 21.5-inch screen. The webcam served as the motion sensor to detect the individual’s movements. Additionally, Illustrator CC 2015 was used to create smiley and funny faces, as well as butterflies. These drawings were then processed through Processing 3.1 to create the different phases of the interface and incorporate the images. Markup language (code) was used in Processing 3.1 to provide the necessary commands and instructions, enabling the processing software to perform the intended actions. Later stages of the project included the presentation of “Revive” in public spaces, utilizing a projector to display images on a wall. The webcam was used as the input, while the PC screen and projector served as the output.

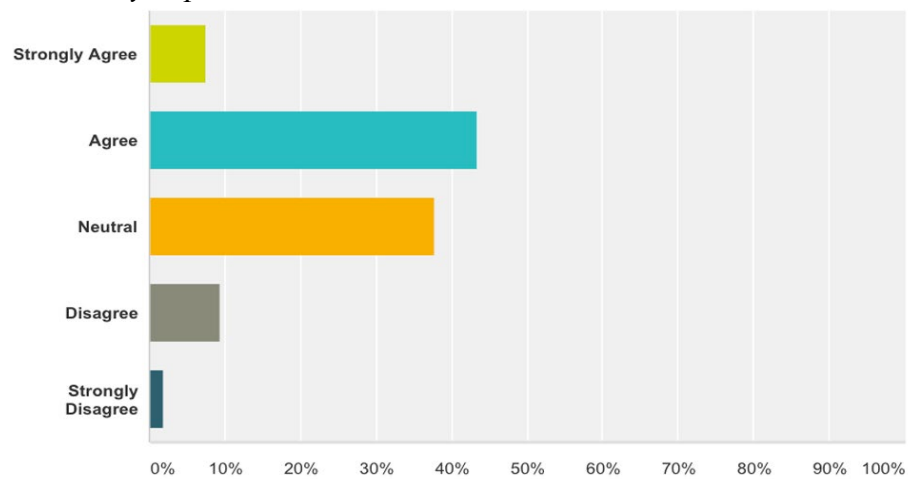
All Data Charts: (Tables and Figures of Each Question Separately)

All the result figures for each survey question have been analyzed. The "n" represents the total number of participants in the experiment. All questions are multiple-choice, using interval data (Likert Scale). All figures and tables are provided here as evidence of the accuracy of the findings, as discussed earlier.

Figure 1. *Anxiety Level*

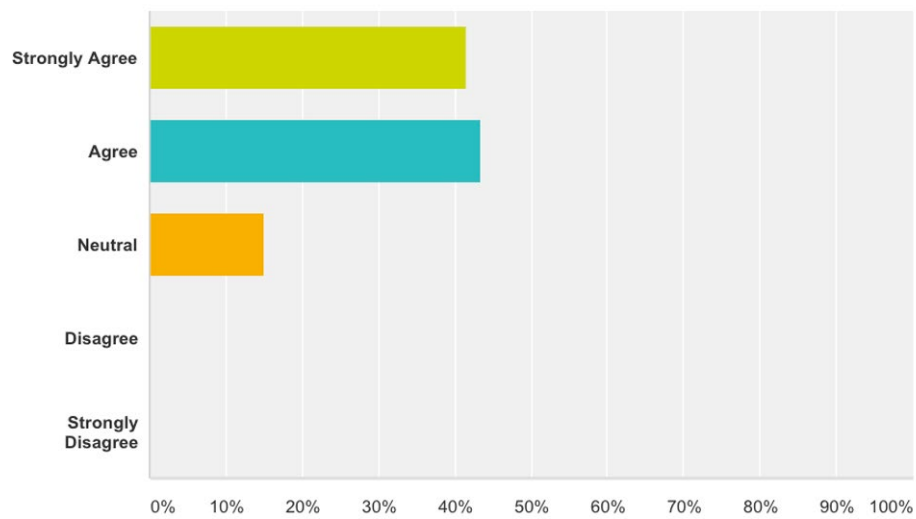
Answer Choices	Responses	
Strongly Agree	11.54%	6
Agree	46.15%	24
Neutral	38.46%	20
Disagree	3.85%	2
Strongly Disagree	0.00%	0
Total		52

The first question is: Is anxiety interfering with your life? The highest answer is agreed, so many people feel that anxiety is interfering with their daily lives. See (figure 1) (n = total 53). This question was skipped by one person, so $n=52$.

Figure 2. *Anxiety Experience*

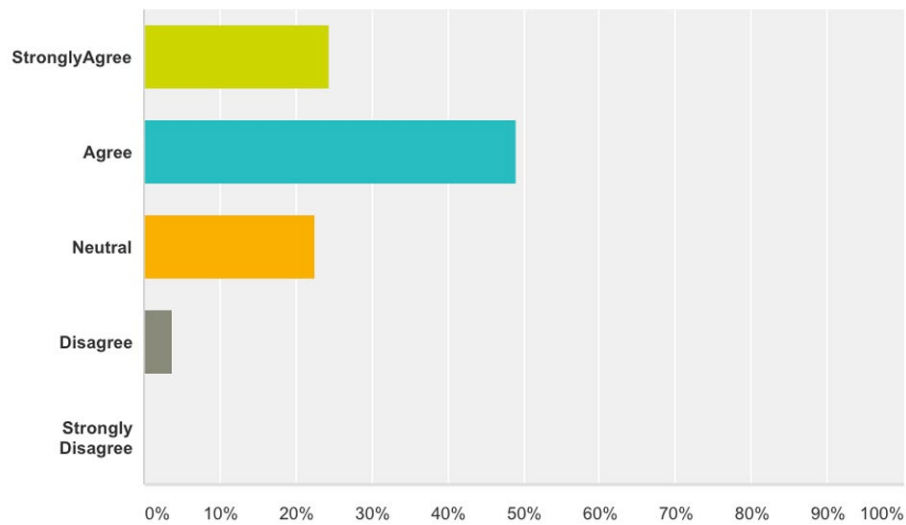
Answer Choices	Responses	
Strongly Agree	7.55%	4
Agree	43.40%	23
Neutral	37.74%	20
Disagree	9.43%	5
Strongly Disagree	1.89%	1
Total	53	

The second question is: Do people often experience short breathing or choking feelings when visiting doctors and health centers? The highest percentage is agreed in this question with little differences with neutral. See (*figure 2*) / $n=53$.

Figure 3. Comparison of Interactive Design and Still Images

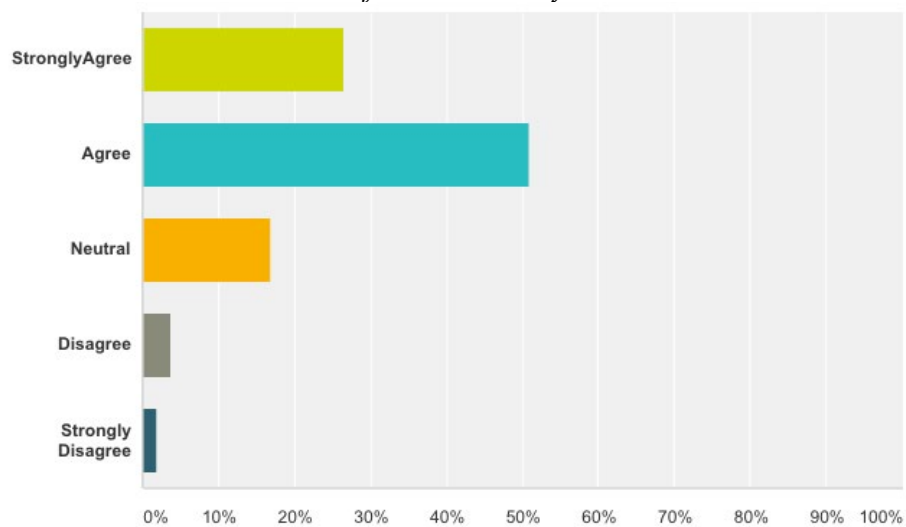
Answer Choices	Responses	
Strongly Agree	41.51%	22
Agree	43.40%	23
Neutral	15.09%	8
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Total		53

The third question is: Do people interact with animated designs more than still images as they encourage physical interactions with what is presented on the screen? The highest percentage is agreed, and small differences are strongly agreed. See (figure 3) / $n=53$.

Figure 4. *Anxiety Reduction Using Interactive Screens*

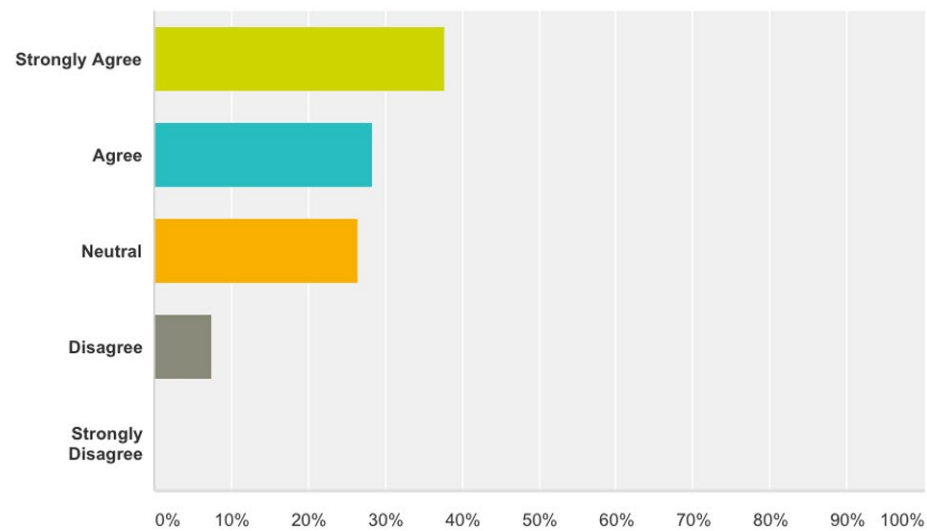
Answer Choices	Responses	
Strongly Agree	24.53%	13
Agree	49.06%	26
Neutral	22.64%	12
Disagree	3.77%	2
Strongly Disagree	0.00%	0
Total		53

The fourth question is: Did feelings of fear and anxiety reduce upon witnessing interactive content on such interactive screens, such as colors and visuals and whole-body interaction? The highest percentage is agreed, and few people disagree in this question. See (figure 4) / $n=53$.

Figure 5. *Interactive Installation Influences Anxiety*

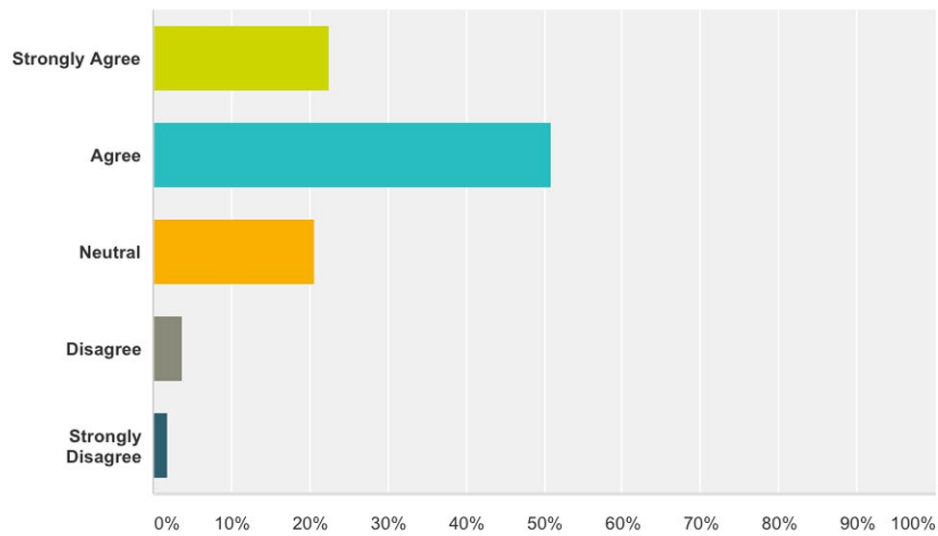
Answer Choices	Responses
Strongly Agree	26.42% 14
Agree	50.94% 27
Neutral	16.98% 9
Disagree	3.77% 2
Strongly Disagree	1.89% 1
Total	53

The fifth question is: Interactive installation has a great ability to overcome anxiety, and it creates a healing and interactive environment more than the atmosphere of the clinic waiting rooms. The highest percentage is agreed with good correlation with strongly agree. While disagree and strongly disagree which is negative correlation is low. See (figure 5) / $n=53$.

Figure 6. *Clinical Environment Effects on People*

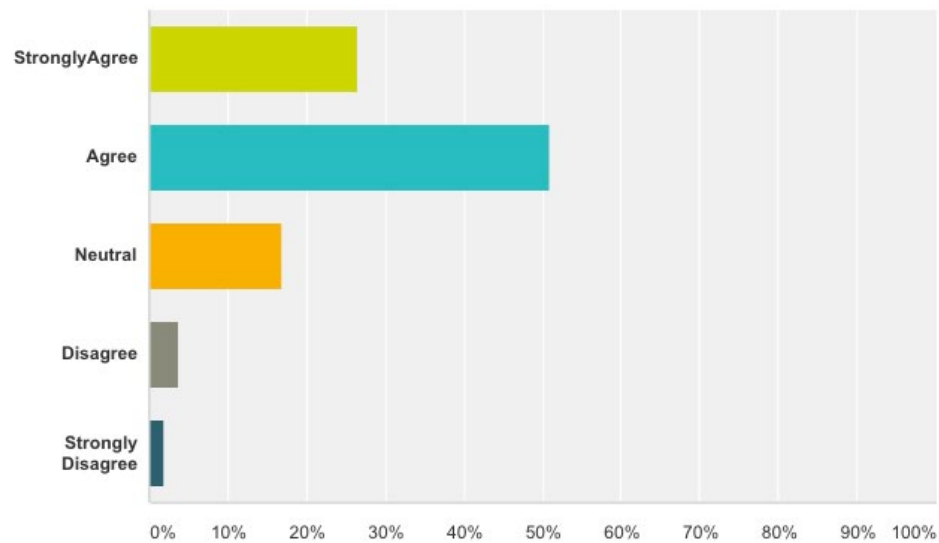
Answer Choices	Responses	
Strongly Agree	37.74%	20
Agree	28.30%	15
Neutral	26.42%	14
Disagree	7.55%	4
Strongly Disagree	0.00%	0
Total	53	

The sixth question is: Can the clinical environment affect you badly (negatively)? The highest percentage is strongly agreed, and a few people disagree with this question with no strongly disagree percentage. See (figure 6) / $n=53$.

Figure 2. *Interactive Installation Provides Incentive to Receive Treatment*

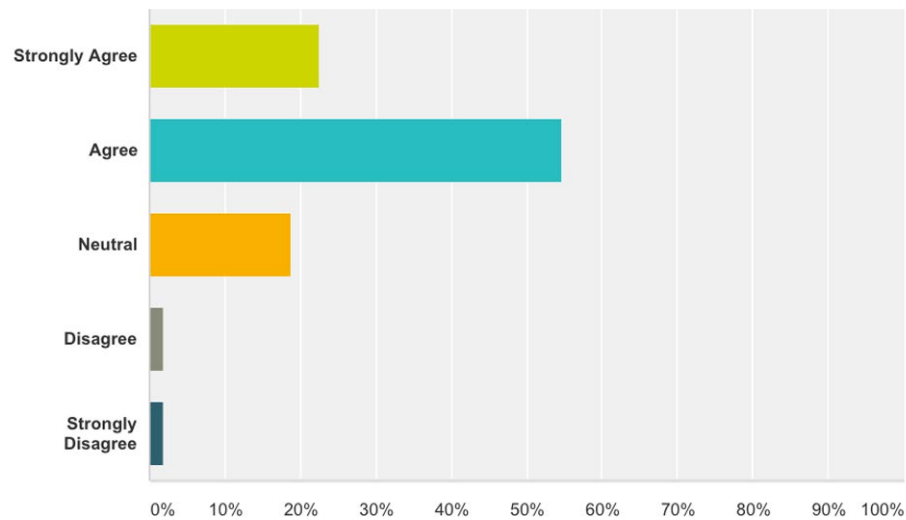
Answer Choices	Responses	
Strongly Agree	22.64%	12
Agree	50.94%	27
Neutral	20.75%	11
Disagree	3.77%	2
Strongly Disagree	1.89%	1
Total		53

The seventh question is: Did the interactive installation give you a great incentive to receive treatment? The highest percentage is agreed and there are strongly disagree percentages this time. See (figure 7) / $n=53$.

Figure 8. *Interactive Installation as Distraction Tool*

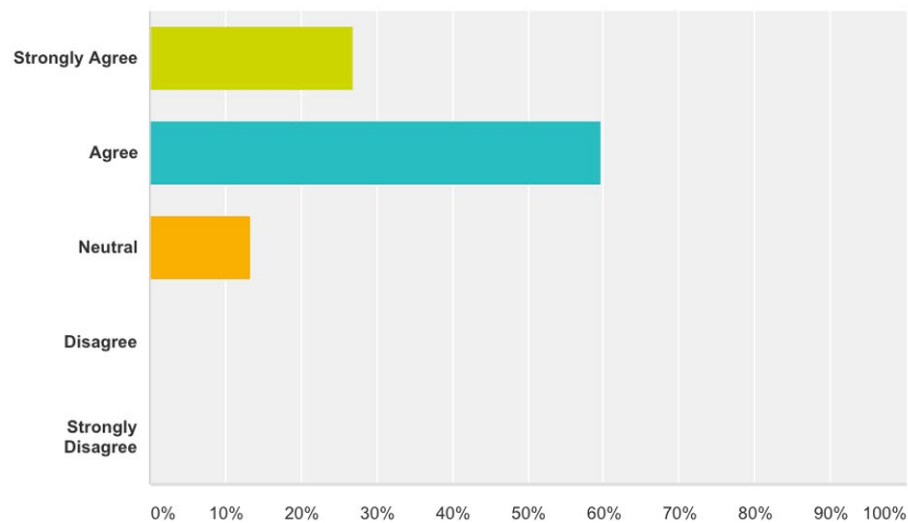
Answer Choices	Responses	
Strongly Agree	26.42%	14
Agree	50.94%	27
Neutral	16.98%	9
Disagree	3.77%	2
Strongly Disagree	1.89%	1
Total	53	

The eighth question is: Attention distraction installations are so engaging that they can also be used as a distraction tool for young people to reduce the discomfort in medical procedures and treatments. The high score came in the agreed and neutral with few differences between the strongly agreed. One answer is skipped by one of our participants. See (*Figure 8*) / $n=52$.

Figure 9. *Interactive Installation Reduce the Doctor Effort with his Patients*

Answer Choices	Responses	
Strongly Agree	22.64%	12
Agree	54.72%	29
Neutral	18.87%	10
Disagree	1.89%	1
Strongly Disagree	1.89%	1
Total		53

The ninth question is: Can interactive installations ease the effort made by the doctor to reduce the anxiety of patients before receiving treatment? The highest percentage is agreed, and few people disagree in this time. See (figure 6) / $n=53$.

Figure 10. *Interactive Installation Improve Healthcare*

Answer Choices	Responses	
Strongly Agree	26.92%	14
Agree	59.62%	31
Neutral	13.46%	7
Disagree	0.00%	0
Strongly Disagree	0.00%	0
Total		52

The last question is: *Can interactive installation facilitate and improve healthcare?* The highest percentage of participants agreed, with no disagreement or strong disagreement. See (figure 10) / $n=52$, one participant skipped this question.

These are the key figures that provide valid information and data for this research. The remaining figures and tables can be found in the Appendix. Further discussions and analyses of the results will be presented in the next chapter, as mentioned earlier.

