

Visual Melodies Interactive Installation for Creating a Relaxing Environment in a Healthcare Setting

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ABSTRACT

This short paper presents an overview of our Visual Melodies installation through two of the themes we have created, the 'Sea Theme' and 'Night Sky Theme'. Visual Melodies utilises sound and moving images with the aim of inducing relaxation and stress relief. The key contribution of this project will be to create a relaxing and supportive therapeutic environment for visitors in healthcare settings. Participants will be able to sit on a sofa, listen to the music and control the moving images and sounds using wireless controllers. A computer programme has also been developed to interface sensors with animations, allowing people to interact and play with the installation.

Author Keywords

Therapeutic Environment, Relaxation, Motion Images, Interactive Installation, Waiting Room, Hospital

ACM Classification Keywords

H.5.1 [Multimedia Information systems]: Animations and Audio output; H.5.2. [User Interfaces]: Input Devices and Strategies and Interaction Styles

INTRODUCTION

Artwork has long been thought to have therapeutic uses in health care services, and much research has been done with children in particular. Evans et al. (2009) examined the environmental artwork in hospital settings, looking especially at the effect of nature scenes displayed in producing feelings and sensations of calm and relaxation. Hospital bedside pictures can also help hospitalised children distract themselves from unpleasant situations and can also act as aesthetic interventions for a wide range of communicative purposes (Jordens, Lewis & Kerridge, 2009). There has also been research relating to the efficacy of interactive aesthetic interventions in children. Hand-held video games and interactive computer packages, for example, have been offered to children in facilitating coping behaviour and reducing anxiety in the preoperative area and during induction of anaesthesia (Patel et al., 2006). Non-pharmacological interventions such as clown doctors, hypnosis, low sensory stimulation and hand-held video games, have also

been found to be helpful in reducing childrens' anxiety and improving their cooperation during induction of anaesthesia (Yip et al., 2009). Researchers have shown that play and the creative arts offer a means to prevent psychosocial difficulties and develop coping skills in children (Bratton et al., 2006; Favara-Scacco et al., 2001) as they, generally, process and convey much of their thoughts and feelings at a pictorial level (Lefevre, 2004). Furthermore, there is evidence that the visual arts and performing arts can stimulate communication and develop better working relationships in organisations (Burton, 2004; Naidoo & Naidoo, 2004). This paper will outline some examples of art installations in hospitals, the design elements we have developed for the project and a description of the Sea Jellyfish and Night Sky themes of the installation.

ARTS IN HEALTHCARE SETTINGS

There is a growing interest in using art activities, such as music, drawing and writing, as therapeutic approaches in healthcare settings (Lane, 2005; Walsh et al., 2007). In 2006, an interactive installation in cardiac theatres in Harefield hospital in London was carried out by design consultancy AllofUs. The installation was installed in an area where pre-operative patients wait before being wheeled into theatres. The installation covered four walls, surrounding the room with wooden panels of plants and flowers, with a lake image projected in the centre of the landscape, with which patients could interact using a remote-control handset. The aim of this installation was to support pre-medication with art and to relax patients before surgery. They found that most of their patients fell asleep quickly and this helped to reduce anxiety and was likely to speed post-operative recovery (Hume, 2007).

Another example of an arts-in-healthcare program was undertaken by Moya Sutton of Alder Hey Children's Hospital in Liverpool, UK in 2007. Sound recorder Chris Watson recorded early-morning birdsong from the neighbouring Springfield Park and installed this dawn chorus inside the hospital, with the aim of improving the quality of the hospital experience for children, their families and staff members. Patients and staff were then able to listen to the chorus on a personal audio player. This project is still ongoing to evaluate the cathartic effect of sound on the healing process of the human body (Finn, 2008). However, Ms Sutton has mentioned some early positive observations from this project: "I watched as a patient from our mental health unit simply lost his troubles in a world of nature" (StaffNurse.com, 2008).

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The therapeutic use of new media art in healthcare is still in its infancy. However, there is a growing trend towards the use of interactive new media art in these settings as a means for promoting health and mental well-being.

DESIGN ELEMENTS

Researchers found that music with a slower tempo and less of a heavy beat is more contemplative and relaxing, with slower tempos traditionally considered to be below 60-70 beats per minute (bpm) (Levitin & McGill, 2007). A music tempo of 50-60 bpm was found to help participants shift into deep relaxation (Jaber et al., 2007). Classical music has been widely used for relaxation inducement or task performance improvement (Cooper & Foster, 2007; Labbé et al., 2007).

Psychological analysis of colour has shown green and blue to induce a soothing emotional response (Drew & Meyer, 2005). Those colours are associated with natural landscapes such as sky, oceans, fields and forests.

With regards to relaxing images, the AlfofUs Design Company mentioned earlier conducted a survey at the site of their installation in order to discover patients and visitors' favourite scenes. Their findings were that flowers (especially bluebells), the shifting light and colour of a sunrise, and a panoramic view punctuated by foliage in the foreground were most popular (Cooper, 2006). Another study found that the sounds of brooks and the feel of sunshine through forest leaves can have a calming effect (Nakamura, 2008). Research has also identified nature scenes as important elements in the visual aesthetic of hospital design (Evans, Crooks & Kingsbury, 2009). "When the brain perceives an image of a peaceful scene or engages in creative work, it alerts parasympathetic arousal. Heartbeat slows, blood pressure drops, breathing slows, blood goes to the intestines, and the body shifts into deep relaxation" (Lane, 2005). In these instances, endorphins and other neurotransmitters that affect brain cells and the cells of the immune system are released (Benson, 1975).

With regards to relaxing movements, studies suggest that brightness transformations, such as from dark to bright or vice versa, and transformations from transparent to opacity and vice versa, can elicit calming and relaxing responses (Jeamsinkul & Poggenpohl, 2002). The Visual Melodies Interactive Installation deploys these design principles.

VISUAL MELODIES INTERACTIVE INSTALLATION

Visual Melodies is designed to combine the different principles of art, colour, and music therapy. Our aim is to provide an enjoyable and playful interactive art experience to visitors at a health care service who have time to spare and may be undergoing stress or worry. It is designed to encourage participants to interact and play with relaxing images and sounds and is intended to help parents and carers distract and entertain children, as well as to provide a more relaxing experience for adults who engage with it. The installation itself will consist of a series of landscape-style animations and relaxing music projected onto a screen, with users sitting on a sofa

listening to music through wireless headphones and able to control the moving images and sounds using controllers.

Original music compositions by composer David Sunderland will be employed, consisting of background music as well as foreground sounds that will be played in response when users touch certain symbols. These animations, sounds and their modes of interactivity have been designed following an extensive literature and case study review of the methods, principles and therapeutic outcomes of art, music, and colour therapies. Relaxation is the key consideration.

Technologies

The creation of the Visual Melodies Interactive Installation involves several separate elements of software and hardware. For creating the graphics and animation elements of the installation, Adobe Illustrator CS4, Photoshop CS4, Flash CS4 and After Effect CS4 were used. In terms of interactivity, we used Flash CS4 and ActionScript 3 as an interface to develop the connection between the multimedia and input devices. The Installation hardware includes off the shelf (OTS) sensors, a ceiling mounted projector and two wireless headphones.

INSTALLATION THEMES

In the next sections, we describe the features of the motion images and music we have created for the 'Sea Jellyfish theme' and 'Night Sky theme' of the Visual Melodies Interactive Installation.

Sea Jellyfish

Our first example is the Sea Jellyfish theme with a depiction of calm and fantasy. We chose to use a Sea theme because of the blue and transparency of the colour. The landscape of the sea jellyfish theme begins with a dream-like blue lake scene with mysterious light green foggy mountains in the background. The interactivity begins with the user able to manipulate the reeds simulating a blowing gentle breeze. The user is also able to make ripples appear on the water's serene surface. The user is able to change this environment by using the controller to point the cursor at the bottom of the image. This will cause the image to move from the water's surface to the underwater world below. The user will then see several jellyfish floating underwater. The user is then able to interact with the jellyfish by changing the location of the jellyfish on the X and Y-axis. This is achieved by pointing the interface object at the image with the jellyfish following the controller's position. The user is also able to go back into the previous environment by pointing the interface object at the top of the image. The theme will then transition again if the user manipulates the controller to select the mountains. The scene will then change from the lake view with the users point of view drawing back to a panoramic view of a night sky. The music for the jellyfish theme is an original piano composition of five minutes length. The ambient music is composed to sound like bubbles flowing to the waters surface.

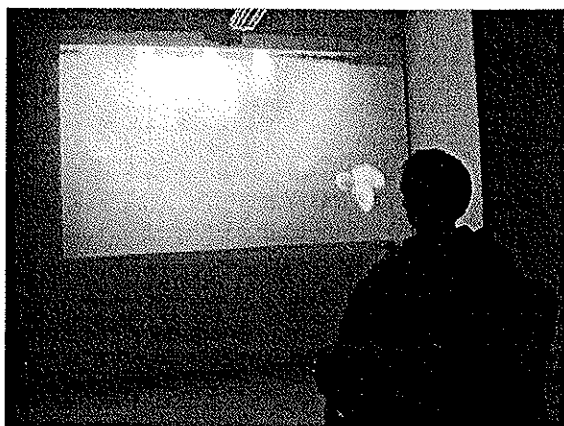


Figure 1. The Sea Jellyfish Theme at the Interactivation Studio, University of Technology, Sydney

The sea jellyfish theme has been shown during the Sydney Design Festival 2009 as part of the open interactivation studio at the University of Technology, Sydney (see figure 1 and the studio website: www.educ.dab.uts.edu.au/interactivation/). During the showing at the Sydney Design Festival, visitors commented about the possible benefits of such an installation when thinking about previous hospital experiences. Visitors were also keen to see the finished installation in a healthcare setting. The audience seemed to become more immersed in the project because of the large size of the projected image. However the bigger the image the harder it was for the audience to follow the sensors to interact with the jellyfish. We also received feedback that the large size of the image caused pixilation to the jellyfish. Audience members were also initially confused as to how the interaction worked. To overcome these problems we are redesigning the jellyfish and trying to develop as a cursor interface an animated bubble of light to help show where the device is located on the image.

Physical Description

The physical set up of the jellyfish theme includes an WXGA projector with a resolution of 1280 x 768 pixels. The projected image is 3.4m wide x 2m high. The controllers include a Freescale semiconductor accelerometer kit. This is a multi-axis acceleration sensor operating in the 2.4 Ghz range and with Zigbee connection protocol. The size of the sensor is 2 x 3.5 cm. A Gyration 2.4 Ghz wireless Optical Air Mouse with 10m range is also used. The projector is a NEC NP3150W 4000 ANSI Lumens, which is WXGA (1268 x 768). The image is projected in widescreen in High Definition 720p. For the sound system, we used two speakers, a Genelec 8020A 20W active studio monitors. The application is running on an Apple Macintosh iMac running MAC OS 10.5.

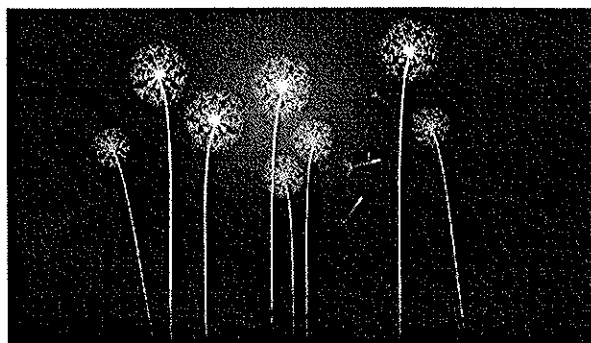


Figure 2. Graphic element of the Night Sky theme

Night Sky

The second example is of the night sky theme. We chose the colours of green and white to elicit a dream-like and peaceful emotional response (see figure 2) and as a conclusion to the storyboard. As the transition from evening to night occurs the colour will cycle from orange to light blue, dark blue, and then to black. An animation will then play showing the moon rising up into the sky and a falling star will fall across the image. The user will be presented with an image of a rolling hillside with tall grass that is moving in the wind. An owl is flying across the background of the image; this is an animation and not part of the user's interaction. The perspective will change to close in on the owl as it lands on a tree branch. When the user selects the owl, the owl will fly to the left of the image. The scene will then change from the perspective of the tree branch slowly panning down to the perspective of being in the grass looking up at several dandelions. The user will be able to select any dandelion, which will cause the seed spores to release into the air. If a period of 30 seconds inactivity occurs the dandelion seeds will regenerate. If the user moves the controller to the top of the image the perspective will pan out to the original image seen at the beginning of the night sky theme. The music for the night sky theme is an original piano composition of 5 minutes length. There is an ambient sound of the owl when it appears in the image. There is also an ambient blowing sound during the image of the dandelions

AUDIENCE FEEDBACK EVALUATION

In order to evaluate the therapeutic effectiveness of the installation, we will approach some users of the installation to be participants in this research. The participants will be visitors at a health care service ranging in age from 8-51 years. The number of participants will be approximately 30. The audience feedback research aims to explore their experiences of the installation in order to establish its therapeutic potential, as well as to identify which aspects might be particularly effective at encouraging relaxation and stress relief.

The feedback sessions will involve interviews and video recording. Each session will be carried out with each participant individually. Participants will be asked a few questions, and, with their permission, a digital video recorder will document their participation in response to the installation and during the interview afterwards. The process will protect the confidentiality of participants at

all times both during and after participation, and should not take more than 30 minutes of their time. The feedback research focuses on observing and understanding participants' feelings, actions and experiences during and after using this art installation.

CONCLUSION AND FUTURE STEPS

The Visual Melodies interactive installation is an interactive display designed to help with the relaxation and relief of anxiety of visitors and friends such as parents and children to healthcare settings. The Jellyfish and Night sky theme are still in the development phase, and some more testing and research is required to develop a more comfortable interface and interaction for the audience to use. We are also committed to developing an interface capable of recognising a blow sensor to interact with the dandelions in the night sky theme. We are also working to develop another 3 themes to be apart of the installation including: a flowers in bloom theme, a garden theme and a forest theme.

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REFERENCES

- Benson, H. 1975, *The relaxation response*, William Morrow and Company, Inc, New York.
- Bratton, S.C., Ray, D., Rhine, T. & Jones, L. 2006, 'The efficacy of play therapy with children: A meta-analytic review of treatment outcomes', *Professional Psychology: Research and Practice*, vol. 36, no. 4, pp. 376-390.
- Burton, J. 2004, 'Using the visual arts to facilitate emergence in organizations', in D. Kernick (ed.), *Complexity and Healthcare Organization: A view from the street*, Radcliffe, Oxford, pp. 171-179.
- Cooper, G. 2006, 'Recovering art', *Hospital Development*, vol. 38, no. 11, pp. 17-19.
- Cooper, L. & Foster, I. 2007, 'The use of music to aid patients' relaxation in a radiotherapy waiting room ', *Radiography*, vol. 14, no. 3, pp. 184-188.
- Drew, J. & Meyer, S. 2005, *Colour Management: a Comprehensive Guide for Graphic Designers*, Roto Vision, Mies, Switzerland.
- Evans, J.D., Crooks, V.A. & Kingsbury, P.T. 2009, 'Theoretical injections: On the therapeutic aesthetics of medical spaces', *Social Science & Medicine*, vol. 69, pp. 716-721.
- Favara-Scacco, C., Smirne, G., Schiliro, G. & Cataldo, A.D. 2001, 'Art Therapy as Support for Children With Leukemia During Painful Procedures', *Medical and pediatric oncology*, vol. 36, no. 4, pp. 474-480.
- Finn, L. 2008, Award winning artist launches FACT's project examining the effect of sound on the body <http://www.chriswatson.net/WildsongatDawn.pdf>.
- Hume, V. 2007, 'The Art of Health', *Breathe*, vol. 4, no. 2, pp. 141-146.
- Jaber, S., Bahloul, H., Guétin, S., Chanques, G., Sebbane, M. & Eledjam, J.-J. 2007, 'Effects of music therapy in intensive care unit without sedation in weaning patients versus non-ventilated patients ', *Ann Fr Anesth Reanim*, vol. 26, no. 1, pp. 30-38.
- Jeamsinkul, C. & Poggenpohl, S. 2002, 'Methodology for Uncovering Motion Affordance in Interactive Media', *Visible Language*, vol. 36, no. 3, pp. 254-280.
- Jordens, C.R.C., Lewis, P. & Kerridge, I.H. 2009, 'Decoration or communication? A qualitative study of images displayed around the bedsides of hospitalized children', *Communication & Medicine*, vol. 6, no. 1, pp. 61-71.
- Labbé, E., Schmidt, N., Babin, J. & Pharr1, M. 2007, 'Coping with Stress: The Effectiveness of Different Types of Music', *Applied Psychophysiology and Biofeedback*, vol. 32, no. 3-4, pp. 163-168.
- Lane, M.R. 2005, 'Creativity and spirituality in nursing: implementing art in healing', *Holistic Nursing Practice*, vol. 29, no. 3, pp. 122-125.
- Lefevre, M. 2004, 'Playing with sound: The therapeutic use of music in direct work with children', *Child & Family Social Work*, vol. 9, no. 4, pp. 333-345.
- Levitin, D.J. & McGill, J. 2007, 'Life Soundtracks: The uses of music in everyday life ', unpublished, Dept. of Psychology McGill University.
- Naidoo, M. & Naidoo, S. 2004, 'Using the performing arts to facilitate emergence in organizations', in D. Kernick (ed.), *Complexity and Healthcare Organization*, Radcliffe Medical Press, Oxford, pp. 180-188.
- Nakamura, A. 2008, 'Forest therapy' taking root, viewed 7th April 2008 <<http://search.japantimes.co.jp/cgi-bin/nn20080502f1.html>>.
- Patel, A., Schieble, T., Davidson, M., Tran, M.C.J., Schoenberg, C., Ellise Delphin & Bennett, H. 2006, 'Distraction with a hand-held video game reduces pediatric preoperative anxiety', *Pediatric Anesthesia*, vol. 16, pp. 1019-1027.
- StaffNurse.com 2008, Birds Sing at Children's Hospital viewed 19th April 2008 <<http://www.staffnurse.com/nursing-news-articles/birds-sing-at-children-s-hospital-2826.html>>.
- Walsh, S.M., Radcliffe, S., Castillo, L.C., Kumar, A.M. & Broschard, D.M. 2007, 'A Pilot Study to Test the Effects of Art-Making Classes for Family Caregivers of Patients With Cancer', *Oncology Nursing Forum*, vol. 34, no. 1, pp. E9-E16.
- Yip, P., Middleton, P., Cyna, A.M. & Carlyle, A.V. 2009, Non-pharmacological Interventions for Assisting the Induction of Anesthesia in Children, Report Number CD006447.

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