Cybertherapy @ Otago
Virtual Possibilities and Current Realities

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Outline

1. Who we are
2. What is Cybertherapy?
3. Selected International Projects
4. Current Work at Otago University
5. Discussion of Pros and Cons
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Who we are

Brian Dixon
Clinical Psychologist

Holger Regenbrecht
Computer Scientist

Applied practitioner:
- Treatment provider (private practice)
- Clinical supervision and teaching
- Professional ethics consulting

Academic and industrial research in:
- Virtual and Augmented Reality
- Teleconferencing
- Presence in Virtual Environments
What is Cybertherapy?

CyberTherapy –
Also known as E-Therapy or Virtual Reality treatment

The use of computers as tools to enable and/or enhance the provision of therapeutic services.

As a therapeutic tool, the computer serves two functions:

- communication device –
  “… accesses new ways of interacting at a distance…”

- simulation device -
  “… creates virtual realities”

Abraham Wolf (2003)
And Virtual reality .... ?

“Reality is merely an illusion ...
It is just a very persistent one”
Albert Einstein

Our common-place experiences of reality can be “virtual”

- dreaming
- using a cell-phone

J. Blascovich, 2005
Rationale:

To be useful adjuncts or alternatives in the treatment of phobias, VR must invoke emotional reactions that are comparable to *in vivo* reactions (or at least positioned between those for imagined and real situations).

Wiederhold, Mendoza, Nakatani, Bullinger, & Wiederhold, 2005 IN Wiederhold (2005)
Study of blood sampling and injection phobias
non-phobic participants had physiological and emotional responses during exposure to VR hospital clinic images that were comparable to those in real environments
Selected Applications::Overview

Treatment of fears, phobias
Other disorders, including:

anxiety eg:

- Fear of heights
- Fear of flying
- Spider/insect phobias
- Public speaking anxiety
- Social phobias
- Fear of medical procedures (eg. needles, dental work)
- Fears related to driving
- Fear of open spaces
- Specific phobias
- Panic disorder/agoraphobia
- PTSD

- Addictions
- Stress management
- Acute pain (eg. burns)
- Body image disturbance
- Navigation/spatial training in children
- Functional skills (CNS dysfunction)
- Assessment/rehab. of attention, memory, spatial skills and executive cognitive functions

Rizzo, Schultheis and Rothbaum (2003)
Virtual Reality Therapy

Fear of Flying
Fear of Driving
Fear of Public Speaking
Fear of Heights
Fear of Thunderstorms

Fear of Closed Spaces
Fear of Open Spaces
Social Phobia (offered in San Diego only)
Panic Disorder
Other Disorders

more information on anxiety disorders...
more information on our VR treatment process...

dixon / regenbrecht
Selected Applications::VR to reduce anxiety in healthy populations: the Relaxation Island

Significant difference among 3 groups (VR, CD recorded instructions, and Control), in terms of anxiety reduction during treatment.

VR>DVD>CTR

(Villani, Riva, and Riva, 2005)
Virtual reality treatment showed similar efficacy to group CBT in a controlled study of young socially phobic patients. *Evelyne Klinger* (2005)
Selected Projects:: Using VR during medical procedures

Brenda K. Wiederhold,
Executive Director, The Virtual Reality Medical Center
Chief Executive Officer, Interactive Media Institute

Virtual Reality Clinical Services
(San Diego, West LA, Palo Alto)

- Specific Phobias
- Flying
- Driving
- Public Speaking
- Claustrophobia
- Heights
- Spiders
- Medical Procedures
- School
- Panic Disorder
- Agoraphobia
- Generalized Social Phobia
- PTSD due to motor vehicle accidents

Research Studies

- Eating Disorders & Obesity
- Distraction during Painful Medical & Dental Procedures
- Cue Exposure
- Health Promotion
- Anger Management
- Autism
- Attention Deficit Hyperactivity Disorder (ADHD)
- Driving Deficits after Brain Injury
- Functional Disorders
- PTSD in Gulf War Veterans
- Quality of Life in Chronic Disease

September 2005
Selected Projects::Examples of studies of VR during medical procedures include:

- Needle phobia
- Dental Pain Management
- Burn Pain Distraction
Selected Projects:: Using VR during medical procedures – an example
(Wiederhold et al, 2005)
Selected Projects: Using VR during medical procedures – an example (Wiederhold et al, 2005)

Mean pain ratings exhibited over a fourfold decrease when participants were exploring the South Pole Fantasy.
VR Effectiveness:: Anxiety disorders - review and meta-analysis

76 studies reviewed (47 on anxiety disorders)

- VR treatment is effective compared to no treatment
- VR compares favorably with standard treatment
- VR exposure treatment is as effective as in vivo treatment

*Miyahira, Folen, and Mezo (2005)*,
Current at Otago: A sample of work

- VR in memory research and neuropsychology: Farrimond and Titov et al
- VR in aviation decision-making: O’Hare et al
- VR in clinical treatment: Dixon
- Interaction Concepts: Wyvill, Burrows, Kerse, Regenbrecht
- 3D Teleconferencing Research: Regenbrecht
The Virtual Street
A web-based network composed of approximately 2000 photographs and 50 sounds. Participants are able to “walk” along a street and move about inside the shops, using a touch screen connected to a computer.

Psychology Department, University of Otago,
Email: samantha@psy.otago.ac.nz
Increasing Awareness of Attention and Memory Problems in Acute Neurological Patients Using the Virtual Street

1100 photographs
30 shops
150 sounds
240 movies
8000 hyperlinks

Each “Page” contains a visual image and sound, and a Navigation Bar

Pressing buttons on the Navigation bar controls movement
Treatment Study: 2005
Can the Virtual Street (VS) be used to help neurological patients increase awareness of attention/memory impairments in acute (inpatient) unit? Does increased awareness correlate with improved treatment motivation?
Current at Otago:: Clinical applications
Brian Dixon

Use of image presentation in fear exposure and desensitisation.
Example: client with phobic avoidance of churches following extensive abuse as a resident pupil at a church school

WARNING SOME VIEWERS MAY FIND THE FOLLOWING IMAGES DISTURBING
Current at Otago:: Clinical applications
Brian Dixon
Current at Otago::Interaction Concepts

- The Watching Window
  CS department (Wyvill)

- Living Gallery
  IS department (Burrows, Regenbrecht)

- Presence Robot
  IS department (Kerse, Purvis, Regenbrecht)
Current at Otago::3D Teleconferencing Research

Goal
Making remote communication and collaboration more **efficient** and **enjoyable**

Approach
- **Simulating** and enriching *face-to-face* meetings with virtual and augmented reality technologies incorporating *documents*, *media*, and *models*

State of Research
- Standard PC-based *prototypes* are ready for *pilot testing*

Research Topics
- **Application Domain specific Interface Research**; Investigations on **Communication in shared spaces**; Tangible, Perceptual, and 3D User Interface (TUI, PUI, 3DUI) Research
- Joint, interdisciplinary Research Projects in preparation

(text and images taken from flyer)
Pros and Cons

Using Virtual Reality for Therapy

- not a substitute - supportive method for clinical psychology
- can increase treatment efficiency (shorter duration)
- easy distribution and delivery of standardised programmes
- enabling for some clients
- permits experiences that may be otherwise unattainable
- increasingly economical (some initial outlay)
- research is easily and exactly replicable
- can provide a controlled, safe environment
- reduces travel demands on clients/therapists
- can be made more collaborative
- ....
Pros and Cons (cont.)

BUT …

- development costs are high
- potential risks in wrong hands (e.g. internet distribution)
- entrepreneurial capture and control of treatment methods
- military applications are attracting most funding
- professional regulation more difficult
- simulator sickness syndromes
- long term human side effects of technology uncertain
- alienation of some clients
- risk of dehumanising psychological therapies
- may be inappropriate for some client conditions
- …. 
Example Project Proposal

Collaborative Cybertherapy – “Virtual Clinic”

- Goal: VR based system for the treatment of various disorders
- Affordable setup (low-cost components) with sufficient quality
- Use of existing technologies and combine them (here VR approach with computer-mediated communication)
- Joint work of Psychology and Information Science
- Phases / Options:
  1. collaborative setting therapist + client as a first working prototype
  2. group work (1 therapist – many clients), extendable to even more therapists or other experts
  3. distant therapy (e.g. rural areas)
  4. Different Technologies (projection, head-mounted display, data glove, ...)

Example Project Proposal::Setup

Virtual World

Client

Therapist
Example Project Proposal: Virtual Exposure

- Therapist Audio/Video (static)
- Pictures or PowerPoint-Slides
- Virtual Models
- Therapist Audio/Video (moving)
Example Project Proposal::Demo

Demonstration
(not an actual working system yet!)
Example Project Proposal: VirtualClinic

Pilot Project „VirtualClinic I“
- One therapist, one client
- Both in one (dedicated) room (co-located)
- Head-mounted display (client), standard PC (therapist)
- Two relevant therapeutic scenarios
- Development of instruments:
  - procedure
  - ethical regulations set
  - picture and model material + interior design
  - hard- and software modifications / development
- Pilot test studies
- Pilot field studies
- Report on lessons learned; Preparation of „VirtClin II“
- Duplication?

- Partners?
- Funding?
Conclusion and Discussion

- proliferation of assistive technology is inevitable
- clinical applications are feasible and a current reality
- interdisciplinary contributions (eg. Psychology, Information and Computer Science, Design)
- collaboration is possible within NZ and internationally and there are opportunities for international linkages
- network of VR researchers/practitioners in NZ is desirable
- exploring future opportunities
- need to develop ethical and safety principles in parallel with development of technology
Virtual possibilities?

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Slides download (as pdf): http://www.hci.otago.ac.nz
References