The Virtual Reality Research Group at UEL

VR in Memory Assessment and Rehabilitation

Cybertherapy 2005

University of East London

Outline of presentation

- The Virtual Reality Research Group at UEL
- The assets of VR for memory assessment and rehabilitation
- VR and everyday memory
- Prospective memory: The virtual bungalow
- VR and prospective memory: Current work
- VR and prospective memory: Future studies

The VR Research Group (VRRG): Background

- Formed in 1995.
- Part of the School of Psychology.
- Headed by Professor David Rose.
- Assisted by Dr Barbara Brooks (senior research fellow) Dr Paul Penn (research assistant) Elizabeth Attree (Principal Lecturer) Tony Leadbetter (programmer) Ambi Ambihaipahan (Programmer).

The VRRG

- Remit: to investigate the use of computer generated virtual environments in neurological assessment and rehabilitation.
- The laboratory is equipped with a head-mounted display system, a 10-foot rear projection screen with stereoscopic facility, 3D motion trackers, a data glove, and a number of "desktop" VR systems.

The ‘assets’ of VR for memory assessment/rehabilitation and research

- The capacity to provide more ecologically valid and dynamic assessments of memory.
- Total control of the environment, stimuli and feedback.
- The capacity to modify an experimental set up to take account of a user's impairments.
- Precise performance measurements and the capacity for replaying participants’ performance.
- See, for example, Rizzo, Schultheis, Kerns & Mateer, (2004) for an excellent account of the assets of VR for cognitive assessment and rehabilitation).

Previous research on the domains of memory in VR

- Capacity of VR to reconcile ecological validity with experimental control has generated exciting possibilites to study everyday memory phenomena, which have proved problematical for conventional assessment and rehabilitation.
- Research has been directed at the domains of: spatial memory, incidental memory and, recently, prospective memory.
- See Brooks & Rose (2003) for a good overview.

Prospective memory

- Remembering to perform actions in the future.
- Includes a prospective component (remembering to do something) and a retrospective component (remembering what that something is!)
- Prospective memory retrieval occasions may be classified as event-based, time-based or activity-based (Kvavilashvili & Ellis, 1996).
- In event-based tasks, an action is required to be performed in response to a cue. In time-based tasks, an action is required at a previously specified future time. In activity-based tasks, an action is required before or after performing an activity.
- Prospective memory is difficult to study owing to problems with ecological validity and no comprehensive assessment tools being available.
- Deficits in prospective memory are very disabling and potentially dangerous. PM should be assessed following TBI (Mathias & Mansfield 2005)

The Virtual Bungalow

- 'Virtual Bungalow' consists of four rooms interconnected by a hallway.
- In development at UEL to assess prospective memory.
- Scenario involves a furniture removal task.

Virtual Bungalow methodology

- Participants are told that the owner of the virtual bungalow is moving to a new house.
- The task for the participant is, ostensibly, to help with the removal.
- Participants are given a list of rooms in the new house.
- Participants are then asked to work through the list of the rooms of the new house. For each room, they make their way around the virtual bungalow selecting the furniture and other items in the bungalow appropriate for that room.
- The participants are given three stipulations to adhere to whilst performing the removal task (prospective memory tasks).

Time-based prospective memory task

- Participants were asked to check the clock in the hall at the outset of the experiment and return every five minutes to press a button which will allow the removal men access to the bungalow.

Event-based prospective memory task

- Participants were asked to place fragile notices on any glass items (e.g. a television, microwave) before selecting them for removal.

Activity-based prospective memory task

- Participants were asked to close the kitchen door immediately after opening it to prevent the cat from getting out.

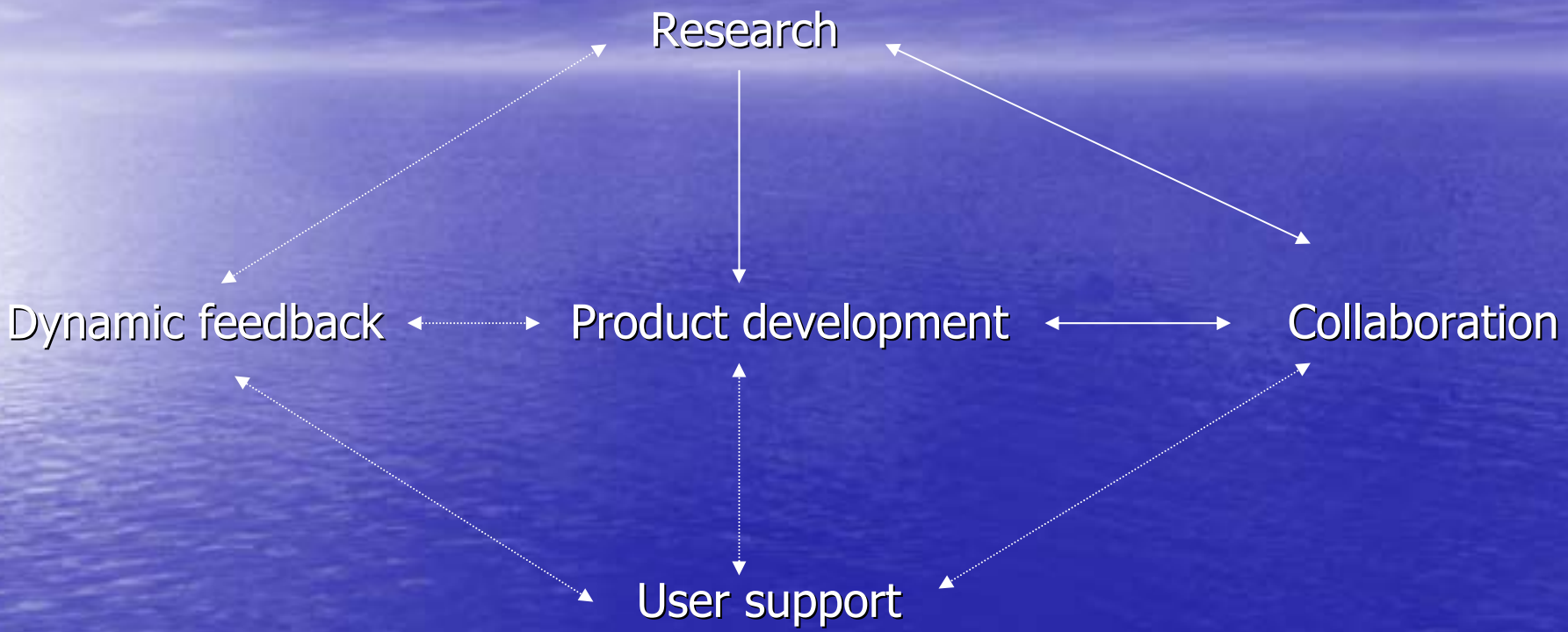
Prospective memory experiments to date

- Brooks et al (2000) Prospective memory in elderly individuals and younger counterparts. Brooks et al (2002). Prospective memory in stroke patients vs aged matched controls.
- Deficits in remembering to perform time-, event- and activity-based prospective memory tasks in the virtual environments found in elderly individuals and stroke patients relative to controls.
- Both groups of participants did not show impairment relative to controls when tested on a component of the RiverMead Behavioural Memory test.
- Cognitive demands of the removal task affected the time-based prospective memory task to a greater extent than the event- or activity-based tasks, but did not significantly compound the age-related deficit.
- Task salience may be a relevant factor in performance in each of the prospective memory tasks.

Planned studies/work

- Can prospective memory performance be manipulated by altering the salience of each of the retrieval occasions?
- To be achieved by the experimenter nominating one of the three prospective memory tasks as being "most important to the experiment" when administering the instructions across the participants in addition to a 'no salience' control group.
- Standardization of the virtual bungalow.

Translating research into benefits for users



- VRRG Trying to 'complete the cycle' with the standardisation and distribution of Virtual Bungalow.

Thank you for your attention

- Visit the VRRGs website at: http://www.uel.ac.uk/psychology/research/vrrg.htm
- You can contact me via E-mail: P.R.Penn@uel.ac.uk
- Or phone

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