

Game-Based Virtual Worlds for Health:

Self-managed chronic care games

Walt Scacchi, Jill Berg, Yunan Chen, Alfred Kobsa, Jung-Ah Lee

Institute for Software Research
and

Center for Computer Games and Virtual Worlds

<http://cgvw.ics.uci.edu>

9 July 2011

UCI faculty investigating Games for Self-Managed Chronic Care for Asthma, Diabetes, Obesity, etc.

- **Walt Scacchi**, Research Director, ISR and Center for Computer Games and Virtual Worlds – *interested in games for health*
- **Jill Berg**, Associate Professor of Nursing Science – *interested in self-managed chronic care for asthma, diabetes, etc.*
- **Yunan Chen**, Assistant Professor of Information – *interested in personal medical health records, and personalized systems*
- **Alfred Kobsa**, Professor of Informatics – *interested in personalization technologies and privacy*
- **Jung Ah Lee**, Assistant Professor of Nursing Science -- *interested in self-managed chronic care for asthma, diabetes, etc., and US-Korean self-managed care practices*

Quest for the Code: Game for learning about asthma

Learning objectives:

- Early warning signs and symptoms
- Identifying and avoiding asthma triggers
- Myths about asthma
- How asthma affects the lungs
- Proper use of asthma medication devices
- Long-term control medicine and quick-relief medicine
- Measuring and monitoring peak flow
- How to answer questions from peers about asthma



Game-based virtual worlds and e-health

- **Game-based virtual worlds can be used to support various kinds of tele-medicine, robotic surgery training, and other medical device applications.**



- **Self-managed health care support can include:**
 - Remote observation, tele-consultation, role-playing and identity switching through avatars, medical device data collection, device software updates, collaborative product/prototype development, and more.

Some findings on Games for Health/Therapeutic Applications

- The design and utility of a game to realize therapeutic value or improve health is not obvious.

- E. Flores, G. Tobon, et al.,
Improving Patient Motivation in
Game Development for Motor
Deficit Rehabilitation, *ACM 2008
Intern. Conf. Advances in Computer
Entertainment*, 381-384.

Table 1. Gaming design criteria for stroke rehabilitation programs serving elderly users

Criteria for Stroke Rehabilitation	Criteria for Elderly Entertainment
<ul style="list-style-type: none"> ▪ Adaptability to motor skill level ▪ Meaningful tasks ▪ Appropriate feedback ▪ Therapy-Appropriate ROM ▪ Focus diverted from exercise 	<ul style="list-style-type: none"> ▪ Appropriate cognitive challenge ▪ Simple objective/interface ▪ Motivational Feedback ▪ Element of social activity ▪ Appropriateness of genre ▪ Creation of new learning following guidelines of experts ▪ Sensitivity to decreased sensory acuity and slower responses

		Pong	Driver's SEAT	Whack-a-mouse	Tetris	Computer Chess	Trivial Pursuit
CRITERIA	Stroke Rehab	Adaptability to motor skill level	✓	✓	✓		
		Meaningful tasks	✓	✓			
		Appropriate feedback		✓	✓		
		Therapy-appropriate ROM		✓			
		Focus diverted from exercise	✓	✓	✓	✓	✓
	Elderly Entertainment	Appropriate cognitive challenge			✓	✓	✓
		Simple objective/interface	✓	✓	✓	✓	✓
		Motivational Feedback	✓	✓	✓	✓	✓
		Element of social activity	✓			✓	✓
		Appropriateness of genre	✓	✓	✓	✓	✓
		Creation of new learning				✓	✓
		Sensitivity to decreased sensory acuity	✓	✓	✓	✓	✓
		Sensitivity to slower responses	✓	✓	✓	✓	✓

Selected research findings and results in Games for Health

- Viable group presentation, communication, and social interaction
- Prototyping and review of virtual objects, composite systems, etc.
- Training, education, rehearsal, learning
- New commercial product demonstration
- Identity role-playing, team building, and other social processes
- Multi-media storytelling
- Avatar control and choreography
- Mirrored worlds and memorialization
- Game development and modding
- Semi-automated socio-technical process discovery
- Modeling, analyzing, and developing complex intellectual property regimes accommodating multiple heterogeneous IP licenses
- Enabling human behavior transformation (health care)