



NCTI 2009 Innovators Conference

Games for Therapy for Students with Disabilities

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Summary: In this session, 2 teams of presenters provided data and findings generated from research on:

- a) young autistic learners' skill development and motivation for learning as outcomes of engagement with a game and integrated classroom curriculum (TeachTown), and
- b) developmentally disabled and vision impaired students' increased physical activity resulting from engagement with a range of mainstream Exergames.

Discussion

Mark Barlet

- Everyone wants to be a superhero. We all want to participate, and disabilities can take away from that. People with disabilities can have meaningful relationships through gaming. Both of these talks address accessibility in the gaming market where games can be an equalizer.

John Foley & Stephen Yang

- Individuals with disabilities are not as physically active as their peers without disabilities. "Healthy People 2010" mandate says we should be able to reach 50% of the people with disabilities and engage them in physical activities.
- While research suggests that physical activity of both typical and disabled populations is not meeting goals, the gap for the disabled population is more pronounced.
- Exergames: Active games that require physical movement to play the game. The Wii is an example of an exergame that focuses on the upper body; Dance Dance Revolution is a full body game.
- Using mainstream games is an affordable solution, easy to implement, and able to be customized according to needs and abilities of the users. The games need to work for the children.



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- With the Eye Cam, the child becomes the action hero, the character in the game. Her movements will interact in construct with the user interface. This is different from video game play. In the Exergames, the children themselves are avatars and become the character.
- Xavix: Inexpensive, includes devices such as rackets & bowling balls. With this tool designers can customize the gaming experience for the users.
- Whatever environment you use has to be set up in a way that is easy to operate. For instance, for those with visual impairments, in implementing the game, you modify the environment by lifting the projectors so there is unobstructed view. Kids with visual impairments, even if they have different levels of vision, can be close to the screen and see the action. Good sound is key to the gaming experience.
- Student with autism and visual impairment: One student case was less active during a camp in its regular programming, than with the game experience provided by the researchers.
- Considerations:
 - Must be cautious when reporting the results – for some results, not sure if they are beneficial or not (e.g., punching movement of arms in a given game with autistic children – is it better to use the more standard controlling principles?).
 - Peer support is important, and games also provide auditory cues on where to punch for instance which is a useful affordance for those with disabilities.
- Benefit of games:
 - Can do at home with non-disabled friends and siblings. Some have joined Dance Dance Revolution clubs at school.
 - Students get auditory feedback, increased heart rate, approaching the 60 mins moderate to vigorous physical activity recommended.
 - Wii: Different tracings and perturbations in the body [showed movement charts of students, how different games lead to different physical actions].
 - ViTennis: Haptic feedback vibrates when it is a learner's turn to hit.
 - Game enjoyability is high.
- Advocacy: This team of researchers conducts dissemination and advocacy, for instance in group medical visits in upstate NY, around the Syracuse area and through Games for Health conferences and listservs. Different types of games are available. Working with



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peers, school districts, parents, all learn to advocate for their children in these programs.

- Future of Universal Design:
 - Affordable technologies assisted in terms of usability, user interfaces, finding ways to interact with games and media.
 - Key point on accessibility: Used game systems (Wii, Xbox bought on Ebay) are affordable.
- Customization and interoperability trends:
 - EMG sensors attached to player's face to control game sequences
 - 360 environment that can be used with wheel chairs and a virtual goggle system
 - Can the controllers be used in other ways?
 - Eye-tracking
 - Project Natal
 - Motion Controller
 - Wii, holding controllers

Debbie Moss

- Challenge: Getting young students with autism to interact with people. Games are becoming more interactive.
- Benefits of computer-assisted instruction (applied behavior analysis):
 1. Automated data collection
 2. Reduce training time for staff and cost of treatment
 3. Motivating for children
 4. Accelerate acquisition
 5. Consistent delivery
 6. Ability to allow more time on task
 7. Gives standardization to special education and academic curriculum across districts
 8. Can transition into general education
 9. Access to general education curriculum



- Increased motivation as a key variable they will be looking to study more in the future.
- TeachTown Connection Activities (curriculum offered in conjunction with gameplay) leads to:
 - Increased language
 - Increased motivation
 - Increased engagement
- Teachers don't know what to teach autistic students, or how. This program gives them the map to go through to meet skill and objectives.
- About TeachTown software and approach:
 - Computer lessons
 - Off-computer activities
 - Data tracking
 - Note taking
 - Synchronization and update
- New in 2009: Game to include more of a virtual world-oriented approach, to build motivation and engagement.

Discussion and Q&A

Question: Have you considered anything with augmented reality? Augmented reality is when you look at a world and through technology that portrays realistic images (think google maps, street view). You can overlay more information on physical objects in actual photographed space. Can be used to augment your vision capabilities. How are we going to make the physical world the game? Having somebody walk within the games, in which augmented reality is applied.

Comment: Audiogames: Make a series of games for people who are blind using only audio stimuli. Example, you put a computer on your back and walk through the world and it is 3 speakers in each ear, you get auditory stimuli. It's an exergame because it's a maze, there are no walls, and you use the auditory cues to take actions and orient in the virtual space.

- **Mark Barlet:** Mainstream gaming is very relevant to disabled gamers. Example—a friend with Multiple Sclerosis who uses World of Warcraft and Dungeons and Dragons and has friends all through video games communities. Develops and uses social skills,



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experiences leadership, all through a mainstream video game. AbleGamers advocates for this all the time among mainstream game companies. We have 25 changes that we know went into a mainstream game, based on things we requested.

- **Mark Barlet of AbleGamers:** Consider attending Games for Health in Boston, in June and attending Accessibility Day as a preconference.
- **Chris Whalen:** We created TeachTown for those with autism, but it works with a lot of kids. Pilot in N. Carolina with at risk children, Using TeachTown with those children, who are often improperly placed in special ed classrooms.

Question from Mark Barlet to panel: Are there gender differences in types of games?

- **Chris Whalen:** In autism, there are a lot more boys than girls with autism. When designing games, girls will play boys stuff, boys won't play girls stuff. Wanted to gear more toward the interests of boys because of the demographic of autistic population. But you need to get that balance.
- **John Foley:** Discussed a game design initiative. A professor he knows teaches students gaming design. All the stuff the students develop are class projects. The problem is budget. How far can you get in the game design? The mainstream gaming companies have multi-million dollar budgets. When you're talking small efforts, you are always thinking, what is going to get cut? This professor he knows sees it as teaching future developers.

Question from NCTI: How can we catalog and publicize the mainstream games that are being modded for those with disabilities? What affordances are being provided in the game learning environments, and how can these be duplicated by others? Let's put a catalog together, and write an article on this that reaches a wider audience. Doesn't have to be peer-reviewed. More quick dissemination – simply documenting what are the mods, and how can others do this? Maybe NCTI can help with this.

Question from the audience: How are we going to benchmark which games are the best for whom? Is there a system for this?

- **Chris Whalen:** 2 peer-reviewed research studies. Reason people are buying TeachTown now, it is largely from this study. For kids with autism, look at this data.
- **Debbie Moss:** One of the things that initially turned me off for kids with autism, and one of the reasons why I initially said no to a study with TeachTown in the early days, was because – the game doesn't generalize into the everyday world. But now, TeachTown has the off-computer activities that are part of the curriculum the organization provides that goes with it. This is a main difference and what prompted us



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to get involved in our school district. The results have been impressive. I'm here as an educator to attest to this.

- **Chris Whalen:** In autism, there are few evidence-based products. Sesame Street products are not oriented towards autistic kids necessarily. You need to compare apples to apples. Because no others exist, we're comparing it in our quasi-experimental work to the education done *without* TeachTown.

Question from Eric Morrison of Pima College: Finally we've started looking at neuro-plasticity. It appears that tool based plasticity does occur. I wonder if in your research plan you will look at neuro-plasticity?

- **Chris Whalen:** We believe if we can do the neuroscience research, results will show that we'll have some interesting changes in the brain. I'd love to do that research. I think it would be great.