Educational Games & Health Sciences

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Educational Games & Health Sciences

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*University of Waterloo & The Games Institute*

Allison Herrera  
*University of Massachusetts Medical School*

F. Zeb Mathews  
*University of Tennessee Health Science Center*
Outline

Overview & Introduction – 10 min

Rina Wehbe – 20 min
*Above Water*

Zeb Mathews – 20 min
*Pub Wizard*

Game Exercise – 20 min
Wrap Up – 10 min

Learning Objectives

Objectives:

• Understand some of the benefits and advantages of game-based learning
• Better general understanding of the process of creating an educational game
• Become acquainted with 2 educational games that intersect with health sciences
• Analyze a NIH or NLM endorsed health sciences game
Allison Herrera - Technology & Communications Coordinator

The University of Massachusetts Medical School
National Network of Libraries of Medicine, New England Region
National Public Health Coordination Office
Game Types
Notable Terms

**Educational Games**

Games explicitly designed with educational purposes or have secondary educational value.

Oregon Trail was produced by the Minnesota Educational Computing Consortium in 1974.
Notable Terms

Gamification

The application of game-design elements and game principles in non-game contexts.

Uber has used gamification to maximize their growth and reward drivers.

https://www.nytimes.com/interactive/2017/04/02/technology/uber-drivers-psychological-tricks.html?_r=0
Gamification vs Game Based Learning Infographic

Gamification
- Adding Game Inspired Elements to Your Course
- Applying Game Mechanics to a non-game environment to encourage behavior
- Typically Incorporates Badges, Awards, Achievements
- Experience Points (XP) may be Used as Substitutes for Traditional Grades
- Could Provide Students with Choice in Learning Path

Game Based Learning
- Using Games to Meet Learning Outcomes
- The Learning Comes from Playing the Game
- Can be Accomplished Using Commercial (AAA) or Education Oriented Games
- Promotes Critical Thinking and Problem Solving
- Can be Accomplished With Digital or Non-Digital Games
- Might Involve Simulations to Allow Students to Experience the Learning

Gamification in Action
- 3D Game Lab
- Classcraft
- My Starbucks Rewards
- Portal 2

Game Based Learning Examples
- World Peace Game Foundation
- World of Warcraft in School
- Samsung Nation
- MineCraft Edu
WHY GAMES?

• GAMES AS EXPLORATORY “SAFE” SPACE

• BUILT IN REWARD SYSTEMS

• ACCESSIBLE LEARNING PLATFORM
OPERATIONALIZED GAMES

• GAMES WITH PURPOSE

• SERIOUS GAMES

• PERSUASIVE GAMES

• GAMES FOR WELLBEING, MENTAL HEALTH, VS. EXCERGAMES
EXAMPLES OF GAMES AND GAMIFICATION APPLICATIONS FOR HEALTH

EDUCATION, EMPOWERMENT, OR EXPRESSION
SUPER BETTER BY JANE MCGONIGAL
The time to leave rolls around and you grab your overnight bag. Alex's apartment is a short walk away, and there are already people hanging out on the porch. You feel your chest tighten as you approach the building, and try to steel your nerves.

You quickly find your partner, chatting away with the birthday girl, and Alex immediately lightens up when she sees you.

'I'm so happy you came! I wasn't sure if you were going to make it!'

A young man taps her on the shoulder, and she turns back to you to apologize and let you know they have to do something for the party. Alex hands you a beer and plants a kiss on your cheek before going off to deal with whatever came up.

As you look around, you don't see anyone else you recognize.

**Enthusiastically socialize!**

2: Awkwardly stand in the same spot, unsure of what else to do.
3: Put your bag in your Alex's room and avoid the crowd in there for a while.
4: Cling to the back wall, sip your beer, and wait for your girlfriend to return.
5: Proceed to drink in earnest, hoping it makes you less uncomfortable.

---

You are very depressed. You spend a large amount of time sleeping, hating yourself, and have very little energy or motivation.

You are not currently seeing a therapist.

You are not currently taking medication for depression.
Above Water
Treatment
Support a Friend
Help a friend remove 1 anxiety card

Treatment
Avoid Caffeine
You stop consuming food and drinks that contain caffeine, such as coffee, tea, chocolate, and soda. Caffeine can heighten symptoms of anxiety and should be avoided if you have an Anxiety or Panic disorder.

Share
Mini-game: Share

Anxiety
Mini-game: Mythbuster

Above Water

Education
In the Above Water app you can find more information about Anxiety and Panic disorders by clicking on “Resources” on the Home screen.
Treatment

Exercise
You start living an active lifestyle. Exercise helps your body produce endorphins which relieve stress and make you feel happier overall.

Mini game: Yoga
Support Group

All players discard 1 anxiety card
Reshuffle deck

Treatment

Support a Friend

Help a friend remove 1 anxiety card
Above Water

Treatment

Relaxation Technique
You start using relaxation techniques to reduce your anxiety symptoms, such as breathing exercises or counting to calm yourself.

Healthy Living
You start exploring ways to improve your lifestyle by eating healthy foods, exercising, and avoiding unhealthy habits.

Support a Friend
Help a friend improve their mental health.

Education

Treatment

Support a Friend

Help a friend improve their mental health.

Cognitive Behavioral Therapy (CBT)

Treatments

Supportive

Experiencing
<table>
<thead>
<tr>
<th>Resources</th>
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<tbody>
<tr>
<td>The resources below are only some of the many resources available online.</td>
</tr>
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<table>
<thead>
<tr>
<th>CAMH</th>
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<tbody>
<tr>
<td>Canadian Center for Addictions and Mental Health</td>
</tr>
<tr>
<td>See the section on Anxiety disorders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ThoughtSpot</th>
</tr>
</thead>
<tbody>
<tr>
<td>A service run by CAMH for locating mental health resources in your community. (non-crisis)</td>
</tr>
</tbody>
</table>
CONTRIBUTIONS OF ABOVE WATER

• EDUCATIONAL GAME **NOT** A TREATMENT
• GAME CUSTOMIZED FOR ANXIETY AND PANIC DISORDER
• TAKES ADVANTAGES OF SURFACES AND SPACES FOR PLAY
• ESTABLISHES SOCIAL TIES
• ALLOWS FOR TAKE-AWAY INFORMATION
• DIRECTS PARTICIPANTS TO TRUST RESOURCES
FUTURE WORK

- CURRENTLY IN TESTING PHASE
- CONDUCTING EXPERT REVIEW
- PUBLISHING
REFERENCES


REFERENCES


IMAGE & MEDIA SOURCES:

• HTTPS://ZOMBIESRUNGAME.COM/
• HTTPS://WWW.SSBWIKI.COM/WII_FIT_TRAINER_(SSB4)
• HTTPS://WWW.SUPERBETTER.COM
• HTTP://WWW.DEPRESSIONQUEST.COM/

CONFERENCES AND JOURNALS OF RELEVANCE:

• HTTP://WWW.LIEBERTPUB.COM/OVERVIEW/GAMES-FOR-HEALTH-JOURNAL/588/
• HTTPS://GAMESFORHEALTH.ORG/CONFERENCES/
• CHI2017.ACM.ORG
• CHIPLAY.ACM.ORG
MY RESEARCH


ABOVE WATER DESIGN TEAM:

RINA R. WEHBE, DIANE K. WATSON, GUSTAVO F. TONDELLO, MARIM GANABA, MELISSA STOCCO, ALVIN LEE, LENNART E. NACKE
Special thanks to

- Stephanie Kinsler – Embedded Librarian

- MHIM 609 - concepts of research methodology

- Sajeesh Kumar – Informatics Professor
Video Game Planning factors to consider

1. Game purpose
   - Teach, Assess, Reinforce?

2. Target audience
   - Undergrads, grad students, adult learners?

3. Technology Needs/Concerns/Limitations
   - What tools will be needed to create the game?
   - What platform/container to store game?
   - How will game be distributed?
   - Where will data be stored? Can it be easily collected?
   - Student privacy concerns?

4. How can I measure game Effectiveness?
   - User surveys?
   - Analyze gameplay data?
Game Creation: Unity Game Engine

- 2d and 3d game creation capabilities
- **free to use** option
- Editor - create dynamic virtual worlds in a rich, graphical user interface
- **Scripting of events** in the virtual world is used to create gameplay elements
- **Cross platform** tool - publish your work on MANY different platforms such as **HTML5, PC, Mac, Android, Apple App, etc.**
- **Collaboration features** - collaborate with project members online
Graphic Elements

- **Photoshop** – edit finished image files
- **Illustrator, Inkscape** *(free)*, etc. - 2d vector graphics creation software
- **SpriterPro** – 2d animation suite has features that integrate with unity brashmonkey.com ($60)
- **Texture Packer** – take sprites from an animation and makes sprite sheets you can use in unity *(has a free version)*
- **Creative Commons licensed resources**
Initially wanted to record my own audio to narrate the game but due to time limitations that did not happen. *(maybe for future projects)*

Exclusively used *creative commons licensed resources* for Music and Sound effects.
Web Hosting/Data Collection

GoDaddy.com – Zmtestservers.com

- Web hosting services and domain name
- Data collection – MySQL servers, create a MySQL database, and then run php scripts to record data
Gameplay Data

**Data Recorded:**
- Player score for each module
- Time spent playing each module
- Number of attempts made on each module
- Date and time of each attempt

**Additional Data Options (not utilized):**
- Game difficulty players chose
- Game settings (sound, music)
- Did players skip the opening instructions
- Time spent on each individual question
- Custom data collection options are almost limitless.
Gameplay

http://www.zmtestservers.com/InformaticsTestNoData/index.html
Which of these best describes your overall experiences with video games?

- I play video games on occasion but not regularly.
- I play or have played video games regularly for fun.
- I have never been interested in playing video games and have limited experience with them.

Most students had at least some experience with videogames.
Did the PubWizard game help you to learn about (or reinforce your knowledge of) primary and secondary sources?

Most students felt like the game helped them to learn about or reinforced their knowledge of the subject.
Engaging Users

What was the most engaging aspect of the PubWizard game?

- Improving your score and use of humor got the highest favorability ratings
- Time limit, sound effects/music, graphics/images, game mechanics (drag & drop), and story/narrative.
What could be done to make this game more engaging or relevant to the material?

“less annoying music”

“Make it easier to view the available Runes. Clicking and closing each one became repetitive.”

“different levels and different obstacles you’d have to face in order to win”
What could be done to make this game more engaging or relevant to the material?

“I think the game could give a brief narrative as to why the answer was wrong. Even though I may get quite a few incorrect, seeing a pop up of why my selection was incorrect will help me remember and learn more.”

“More examples rather than the same ones over and over.”

“give a little more time to read the citations.”
Questions?

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Game Exercise: Elements to Consider

Conflict: There should be a challenge for you to overcome. Is the challenge too difficult? Too easy? Just right?

Strategy: Do you have too little or too much control over your game play?

Aesthetics: What do you think of the visuals?

Theme: Is there a story or subject that makes the game more interesting?

Educational value: Are you learning anything? Do you think another person would learn from this game?
Game Exercise

Game: Tic Tac Toe

Weaknesses:
I think I would get bored of playing this after ten minutes. There is no subject or theme for me to connect to.

Strengths:
The strategy aspect is fun and the rules are easy to understand for all ages. The visuals are minimalistic and straightforward. I think this is nice because they’re not overwhelming.

Overall rating: 8
Game Exercise

1. Choose a game
2. Play the game! (take notice of what you like and dislike)
3. Use the activity form to give your feedback

Extra time?
Feel free to try another game or share your opinions in the chat box with everyone!

Game Choices

The Blood Typing Game
MRI: The Magnetic Miracle
Malaria
Vitamin B1: Chicken Farm
NIH & NLM Games

MedlinePlus/NLM promoted Games
https://medlineplus.gov/games.html

MNIH – Kids Environment, Kids Health: Games
https://kids.niehs.nih.gov/games/

Games to Learn by: NLM

Health & Human Services, NLM, Outreach Activities:
https://sis.nlm.nih.gov/outreach/k12.html (scroll down to Games)
Contact

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Questions & Comments

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