Exergaming

Comp 585 Serious Games

By: Aaron Brown
A Brief History of Exergaming
JoyBoard

- Regarded as the first example of Exergaming
- Released in 1982 by Amiga
- A balance board that acted like a joy stick for the feet
- Mogul Maniac was the only game released for it
  - Skiing game
PowerPad

- Developed by Bandai and released in 1986
- 12 sensor plastic mat to be used with the NES
- Released alongside World Class Track Meet
Power Glove

- Made by Mattel in the US
- Designed for the NES
- Released in 1989
- Could move hand and fingers to control character on screen
- Criticized for being hard to use

https://www.youtube.com/watch?v=93iDhnBcMGo
Tectrix VR Bike and VR Climber

- User would watch a screen as they pedaled or climbed
- The screen would provide a nice view
- Six different worlds were available to users
- Released in 1992
Dance Dance Revolution

- Released by Konami in 1998
- Originally released as an arcade game in Japan
  - Then released as a PlayStation game
- Involves stepping on arrows to match arrows on screen
- Used in schools for physical education
Yourself! Fitness

- Developed by Respondesign
- First released for the Xbox in 2004
- The player is lead in exercises by a fitness coach
- Exercises are personalized for your current fitness level
Wii Fit

- Released in North America in 2008
- Over 22 million sold
- Game comes with a balance board
- Games to make exercising fun
  - Yoga
  - Strength Training
  - Aerobics
  - Balance
Kinect

- Motion Sensing Input Device
- Released by Microsoft in 2010
- Senses depth with an infrared laser projector
- There are a variety of exercise games available
  - Zumba
  - Kung Fu High Impact
  - NBA Baller Beats
Does Exergaming Work?
**Dance Dance Revolution Study**

- In 2007 researchers at Wisconsin University found that players burned on average
  - 5.9 cal/min in light mode (354 cal/hour)
  - 6.7 cal/min in standard mode (402 cal/hour)
  - 8.1 cal/min in difficult mode (486 cal/hour)

- In 2009 researchers at the University of Oklahoma found that the energy expended from playing DDR games was
  - similar to walking 3.66 miles in an hour when on middle levels
  - double the energy expended watching TV when on beginning levels
In 2009 the American Council on Exercise and the University of Wisconsin studied the average calorie expenditure for Wii Fit games:

- Free Run and Island Run burned 165 calories per 30 min (330 cal/hour)
- Rhythm Boxing burned 114 calories per 30 min (228 cal/hour)
- Super Hula Hoop burned 111 calories per 30 min (222 cal/hour)
- Advanced Step burned 108 calories per 30 min (216 cal/hour)
- Free Step burned 99 calories per 30 min (198 cal/hour)
A study was published in the Archives of Pediatric and Adolescent Medicine where 18 children ages 11 to 15 tried boxing and dancing on Kinect. They found that the games increased calorie burning by 150 percent for the game Dance Central and 263 percent for Sports Boxing. The kids were able to burn up to 172 extra calories per hour compared to playing a traditional video game.
## Numbers for Comparison

Approximate calories used (burned) by a 154-pound man

<table>
<thead>
<tr>
<th><strong>Moderate</strong> Physical Activities</th>
<th>In 1 hour</th>
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</thead>
<tbody>
<tr>
<td>Hiking</td>
<td>370</td>
</tr>
<tr>
<td>Light gardening/yard work</td>
<td>330</td>
</tr>
<tr>
<td>Dancing</td>
<td>330</td>
</tr>
<tr>
<td>Golf (walking and carrying clubs)</td>
<td>330</td>
</tr>
<tr>
<td>Bicycling (less than 10 mph)</td>
<td>290</td>
</tr>
<tr>
<td>Walking (3.5 mph)</td>
<td>280</td>
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<tr>
<td>Weight training (general light workout)</td>
<td>220</td>
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<tr>
<td>Stretching</td>
<td>180</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Vigorous</strong> Physical Activities</th>
<th>In 1 hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running/jogging (5 mph)</td>
<td>590</td>
</tr>
<tr>
<td>Bicycling (more than 10 mph)</td>
<td>590</td>
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<tr>
<td>Swimming (slow freestyle laps)</td>
<td>510</td>
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<tr>
<td>Aerobics</td>
<td>480</td>
</tr>
<tr>
<td>Walking (4.5 mph)</td>
<td>460</td>
</tr>
<tr>
<td>Heavy yard work (chopping wood)</td>
<td>440</td>
</tr>
<tr>
<td>Weight lifting (vigorous effort)</td>
<td>440</td>
</tr>
<tr>
<td>Basketball (vigorous)</td>
<td>440</td>
</tr>
</tbody>
</table>

- DDR standard (402 cal/hour)
- DDR light (354 cal/hour)
- Free/Island Run (330 cal/hour)
- Rhythm Boxing (228 cal/hour)
- Super Hula Hoop (222 cal/hour)
- Advanced Step (216 cal/hour)
- Free Step (198 cal/hour)
- DDR difficult (486 cal/hour)
Conclusion

- Exergaming won’t burn much more calories than regular exercises
- Exergaming will burn more calories than traditional video games
- Exergaming won’t help one’s health that much if it replaces other exercises
- Exergaming will help one’s health if done in addition to a person’s normal routine
Sources

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- http://zozimo.files.wordpress.com/2008/03/nintendo_accessories_power_pad_box.jpg?w=450