Placing a Value on Aesthetics in Online Casual Games

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Revolutionizing Education with Games
Concept map refinement
How can we gather a huge number of participants for user studies?
Kongregate

- Per month:
  - 10 million players
  - 23 million hours played
Hello Worlds!
Refraction
Metrics

• Levels completed
Metrics

• Levels completed

• Time played
Metrics

• Levels completed

• Time played

• Return rate
The Experiment
Music

• Hello Worlds:
  – eleven songs
Music

• Hello Worlds:
  – eleven songs

• Refraction:
  – title screen
  – intro / ending movies
  – a song for each of the seven worlds
Refraction

• Music: 1939 people
• No music: 1944 people

No significant effects
Hello Worlds

- Music: 2491 people
- No music: 2424 people

No significant effects
Sound Effects

• Hello Worlds
  – coins, doors, applause, bouncing
Sound Effects

• Hello Worlds
  – coins, doors, applause, bouncing

• Refraction
  – moving pieces, menu navigation, fireworks
  – overpowered and underpowered targets
Refraction

- Sound: 1951 people
- No sound: 1941 people

No significant effects
Hello Worlds

- Sound: 2491 people
- No sound: 2493 people

No significant effects
Animations
Refraction

- **Animation:** 3938 people  
  - 11 levels completed

- **No Anim:** 3827 people  
  - 9 levels completed  
    - (p = 0.01)
Refraction

• Animation: 3938 people
  – 11 levels completed
  – 570 seconds played

• No Anim: 3827 people
  – 9 levels completed
    • (p = 0.01)
  – 480 seconds played
    • (p < 0.0001)
Refraction

• Animation: 3938 people
  – 11 levels completed
  – 570 seconds played
  – 13% return rate

• No Anim: 3827 people
  – 9 levels completed
    • (p = 0.01)
  – 480 seconds played
    • (p < 0.0001)
  – 11% return rate
    • (p = 0.02)
Hello Worlds

- **Animation**
  - 6 levels completed

- **No Animation**
  - 6 levels completed
    - (not significant)
Hello Worlds

• Animation
  – 6 levels completed
  – 390 seconds played

• No Animation
  – 6 levels completed
  • (not significant)
  – 330 seconds played
  • (p = 0.004)
Hello Worlds

- **Animation**
  - 6 levels completed
  - 390 seconds played
  - 19.2% return rate

- **No Animation**
  - 6 levels completed
    - (not significant)
  - 330 seconds played
    - (p = 0.004)
  - 16.5% return rate
    - (p = 0.02)
Gameplay change
Gameplay change
Refraction

- Coins: 2281 people
  - 11 levels completed

- No Coins: 2294 people
  - 17 levels completed
  - (p < 0.0001)
Refraction

• Coins: 2281 people
  – 11 levels completed
  – 570 seconds played

• No Coins: 2294 people
  – 17 levels completed
    • (p < 0.0001)
  – 690 seconds played
    • (p = 0.003)
Refraction

- Coins: 2281 people
  - 11 levels completed
  - 570 seconds played
  - 10.6% return rate

- No Coins: 2294 people
  - 17 levels completed
    - (p < 0.0001)
  - 690 seconds played
    - (p = 0.003)
  - 9.6% return rate
    - (not significant)
Hello Worlds

- Coins: 4207 people
  - 6 levels completed

- No Coins: 4162 people
  - 9 levels completed
  - (p < 0.0001)
Hello Worlds

• Coins: 4207 people
  – 6 levels completed
  – 330 seconds played

• No Coins: 4162 people
  – 9 levels completed
  • (p < 0.0001)
  – 510 seconds played
  • (p < 0.001)
Hello Worlds

- Coins: 4207 people
  - 6 levels completed
  - 330 seconds played
  - 17.2% return rate

- No Coins: 4162 people
  - 9 levels completed (p < 0.0001)
  - 510 seconds played (p < 0.001)
  - 20.2% return rate (p<0.01)
Conclusion

In 2 free online Flash Games:

Gameplay   >   Animations   >   Audio
Mass Usability Testing

• Over 100,000 people played each game over two weeks
Mass Usability Testing

• Over 100,000 people played each game over two weeks

• Can quantitatively answer many questions of
  – Usability
  – Playability
  – Learnability
Acknowledgments

**Refraction Team:** Erik Andersen, Yun-En Liu, Marianne Lee, Eric Butler, Brian Britigan, Stephen Sievers, Roy Szeto. Mai Dang, Christian Lee, Ethan Apter, Emma Lynch, Happy Dong, Justin Irwen. Seth Cooper, François Boucher-Genesse, Zoran Popović

**UT-Austin:** Carmen Petrick, Taylor Martin

**K12:** David Niemi, Ellen Clark
Future Work #1

- What is the value of optional rewards?
Future Work #2

• How do people play online Flash games?
Players per hour after release
Time of day effect
Front page effect

![Graph showing plays per hour over time. The graph has a y-axis labeled 'Plays' and an x-axis labeled 'Time'. There is a red box highlighting a particular data point.]
Player consistency
Did people realize there was an experiment going on?
Did people realize there was an experiment going on?

Friz 65
Sep. 16, 2010

I can't get any music/sound. Tried muting/unmuting and raising/lowering volume on game. If anyone has any ideas, please whisper me.
Comments about coins

Broderick 20
Sep. 22, 2010
Is it possible to complete 7:6 with both coins at once? I can’t figure out how!

(1)

nori 26
Sep. 22, 2010
Got all the coins and cards! Great game.

(2)
Comments about coins

**Broderick** 20  
Sep. 22, 2010  
Is it possible to complete 7:6 with both coins at once? I can't figure out how!  

**nori** 26  
Sep. 22, 2010  
Got all the coins and cards! Great game.

**Hamersmid** 36  
Sep. 23, 2010  
100% completion, great game 5/5.

**Rhymelord** 7  
Sep. 20, 2010  
Wow this is a lot harder than it looked! Is it possible to get all the coins on all the levels? I really hope they say no otherwise I'm going to feel a little dim!!

**sarseny** 54  
Sep. 19, 2010  
Nice puzzle game, I had some fun with it :) keep up the good work. btw, to those who wonder how to get all the stars on the last level, here is my solution: http://img409.imageshack.us/img409/5095/sols.jpg
Non-normal distributions
Non-normal distributions

Levels completed and time played:
Wilcoxon / Kruskal-Wallis 2-sample test
(Mann-Whitney U-test)
Non-normal distributions

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Wilcoxon / Kruskal-Wallis 2-sample test
(Mann-Whitney U-test)

Return rate: Pearson $\chi^2$ test