CS/INFO 4154:
Analytics-driven Game Design

Class 15:

Incentive Structures
Review: coins vs. fruit
Today: coins vs... nothing
Outline

1. Video game incentives
2. Experiments regarding game incentives
3. Design considerations
4. Group activity
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Pair activity: quick discussion

- Do you consider yourself a *completionist*?
- Pick your favorite game
  - Brag about your famous achievements.
  - How many hours have you played it?
  - What motivated you to play that long?
  - What were you *doing* for most of that time?
  - Do you regret spending that much time?
High scores

Pacman (1980)
High scores

Pacman (1980)
Side quests

_Elder Scrolls IV: Oblivion_ (2006)
Leveling up

South Park: S10E8 – “Make Love, Not Warcraft”
Progress Quest
Farmville (2009)
Cow Clicker

Ian Bogost (2010)
Clicker Heroes
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Experiment #1

How Players Lose Interest in Playing a Game: An Empirical Study Based on Distributions of Total Playing Times

Christian Bauckhage, Kristian Kersting, Rafet Sifa, Christian Thurau, Anders Drachen, Alessandro Canossa

IEEE Computational Intelligence in Games (CIG 2012)
## Distribution of Play Time

<table>
<thead>
<tr>
<th>Game</th>
<th>#players observed</th>
<th>Observation period</th>
<th>#months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just Cause 2</td>
<td>5,331</td>
<td>03-23-2010 to 10-07-2010</td>
<td>7</td>
</tr>
<tr>
<td>Tomb Raider: U.</td>
<td>146,233</td>
<td>12-01-2008 to 01-31-2009</td>
<td>2</td>
</tr>
<tr>
<td>Battlefield B.C. 2</td>
<td>87,126</td>
<td>03-14-2010 to 12-26-2011</td>
<td>21</td>
</tr>
<tr>
<td>Crysis 2</td>
<td>4,364</td>
<td>04-13-2011 to 11-23-2011</td>
<td>6</td>
</tr>
<tr>
<td>Medal of Honor</td>
<td>12,328</td>
<td>11-03-2010 to 12-18-2011</td>
<td>14</td>
</tr>
</tbody>
</table>
Visualizing Engagement

% of players

Time (minutes)

100

0
Pair Activity: pick one game and plot

% of players

Time (hours)

BF2: Battlefield Bad Company 2
CR2: Crysis
MOH: Medal of Honor
JC2: Just Cause 2
TRU: Tomb Raider: Underworld
Distribution of Play Time

BF2: Battlefield Bad Company 2
CR2: Crysis
MOH: Medal of Honor
JC2: Just Cause 2
TRU: Tomb Raider: Underworld

Bauckhage et al. Computational Intelligence in Games 2012
Experiment #2

To Three or not to Three: Improving Human Computation Game Onboarding with a Three-Star System

Jacqueline Gaston and Seth Cooper

CHI 2017
Foldit
3-star system

NO-STAR

Score: 8083 of 8000

You have completed 3 of 31 intro puzzles!

3-STAR

Score: 8083 of 8000

You have completed 3 of 31 intro puzzles!

3-STAR-R

Moves: 🌟🌟🌟

 Moves: 🌟🌟🌟

626 players
Hypotheses

1. Players will make fewer moves and think more
2. Players will revisit previously-completed tasks
3. Players will play longer overall
With stars (3-STAR),
With stars (3-STAR),
With stars (3-STAR),

no change
Time per move (s)

- NO-STAR
- 3-STAR
- 3-STAR-R

Gaston and Cooper, CHI 2017
Levels Completed

Gaston and Cooper, CHI 2017
Experiment #3

On the Harmfulness of Secondary Game Objectives

Erik Andersen, Yun-en Liu, Richard Snider, Roy Szeto, Seth Cooper, Zoran Popović

Foundations of Digital Games (FDG 2011)
Players

24,000 players

3,000 players

Andersen et al., FDG 2011
With coins, engagement…

Andersen et al., FDG 2011
With coins, engagement…

Andersen et al., FDG 2011
With coins, engagement…

Andersen et al., FDG 2011
With coins, engagement…

Andersen et al., FDG 2011
With coins, engagement...

Andersen et al., FDG 2011
% of players

Levels Completed

Andersen et al., FDG 2011
The Hope: people play longer

% of players

Levels Completed

With Coins

Andersen et al., FDG 2011
Reality: coins distracted players

Andersen et al., FDG 2011
The Hope: people play longer

Andersen et al., FDG 2011
**Reality: some do, some do not**

Andersen et al., FDG 2011
Making things easier
Making things easier

Andersen et al., FDG 2011
With *easy* coins, engagement...
With *easy* coins, engagement...
With *easy* coins, engagement...
With *easy* coins, engagement...
With *easy* coins, engagement...

no change  no change

Andersen et al., FDG 2011
Andersen et al., FDG 2011
Distribution of Time Played in Refraction

- No Coins
- Off-Path Coins
- On-Path Coins

Time Played (minutes)

Percentage of Players
Key Lesson of this Class #4

Incentive design is tricky
Israeli Daycare

Figure 1.—Average number of late-coming parents, per week

Gneezy and Rustichini “A Fine is a Price” Journal of Legal Studies 2000
Playtesters are biased
Key Lesson of this Class #2

Nobody reads and nobody listens
Key Lesson of this Class #1

Generating, sharing, and testing multiple ideas leads to better outcomes.
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100 FLAGS?

*Saracens Flag Collected*

9 / 100 Saracens Flags were collected from Damascus.

*Assassin’s Creed* (2007)
Braid’s Slow-moving Cloud
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Group Activity

- Consider incentive design for your game
  - Extra points?
  - Score?
  - Side quests?
  - Badges?
  - Achievements?

- How do you prevent them from distracting the player?