Class 33:

Games with a Purpose, Part 2
11/20
11/13
Newgrounds Release 1
11/15
Newgrounds Release 2
11/17
Newgrounds Release 3
11/10
Games with Purpose 2

Newgrounds Release Report due 10:10am
Newgrounds Release 11/13

• New requirements:
  • 12 levels
  • A/B test with 2 conditions and 50/50 player split
  • Privacy policy

• Logistics:
  • Upload to CMS before class
  • Release in class
  • Strongly suggested: upload to Newgrounds test page before class (but do not actually release)
Newgrounds Report 11/20

- Instructions on website
- Due BEFORE CLASS on Monday, 11/20
Games for good
# Games for Education

<table>
<thead>
<tr>
<th>Stop</th>
<th>(9 + 9 =)</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>30</td>
</tr>
<tr>
<td>18</td>
<td>65</td>
</tr>
</tbody>
</table>

Score: 210  LAUNCH  Countdown: 9

Image source: www.giantbomb.com
Outline

• Introduction and motivation
• **Discussion**: design challenges
• Role of analytics: *DOGeometry* and *RumbleBlocks*
• Case study: *DragonBox*
Outline

- Introduction and motivation
- Discussion: design challenges
- Role of analytics: DOGeometry and RumbleBlocks
- Case study: DragonBox
The classics
Math Blaster

Image source: www.giantbomb.com
The problem
Outline

- Introduction and motivation
- **Discussion**: design challenges
- Role of analytics: *DOGeometry* and *RumbleBlocks*
- Case study: *DragonBox*
5-minute discussion

- Is this fun? Why or why not?
- What is *missing*?
- What could you do to make it better?

Image source: childrenofthenineties.blogspot.org
Games have:

- Players
- Challenges
- Rules
- Goals
- Decisions
Oregon Trail

Joe has typhoid.

Press ENTER to size up the situation

Date: April 27, 1848
Weather: warm
Health: very poor
Food: 0 pounds
Next landmark: 213 miles
Miles traveled: 341 miles

Press SPACE BAR to continue
Refraction: Teaching Fractions through Gameplay
Outline

- Introduction and motivation
- **Discussion**: design challenges
- Role of analytics: *DOGeometry* and *RumbleBlocks*
- Case study: *DragonBox*
DOGeometry

It is now possible to also mirror around the borders of the tile.
State transition diagrams
State transition diagrams

Wallner et al. CHI 2012
RumbleBlocks!
Preliminary evidence

Which is more stable?

Christel et al. CGAMES 2012
5-min discussion: which metrics?

Harpstead et al. CHI 2013
Metrics

- Width of base
- Center of gravity
- Symmetry
More stable =

*larger*  base width

*lower*  center of gravity

*more*  symmetrical
## What improved?

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (SE)</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Base</td>
<td>0.60 (.01)</td>
<td>0.64 (.01)</td>
<td></td>
</tr>
<tr>
<td>Symmetry Angle</td>
<td>5.98 (.34)</td>
<td>5.20 (.27)</td>
<td></td>
</tr>
<tr>
<td>Center of Mass</td>
<td>1.61 (.02)</td>
<td>1.63 (.02)</td>
<td></td>
</tr>
</tbody>
</table>

Right direction?
- Yes
- Yes
- No

174 children

Harpstead et al. CHI 2013
Outline

- Introduction and motivation
- Discussion: design challenges
- Role of analytics: DOGeometry and RumbleBlocks
- Case study: DragonBox
DragonBox

Image source: Wired
...well played
\[3x + 5 = 2\]
Large-scale Algebra Challenges

**Washington State Algebra Challenge 2015**

We did it!

**EQUATIONS:** 390,935

**TOTAL EFFORT:** 6 months 28 days 2 hours

**Norway Algebra Challenge 2014**

7 700 000 Likninger løst


36 110 elever løste likninger sammen
1711 klasser deltok i utfordringen
93% oppnådde “mestring” innen 1½ time

**Minnesota Algebra Challenge 2016**

We did it!

**EQUATIONS:** 644,936

**TOTAL EFFORT:** 9 months 29 days 22 hours
Erna Solberg

Image source: Office of the Prime Minister, Norway
1st and 2nd graders played for 90+ minutes then solved three in-game equations in a row
96% of students who played 90+ minutes could solve three *in-game* equations in a row
Challenge: transfer to paper

DragonBox: no statistically significant learning gains for solving equations on paper

Long et al. ITS 2014
Newgrounds Release Reminders

• Upload to CMS *before class*
• *Strongly suggested:* upload to Newgrounds *test page* before class (but *do not release*)
• Release *in class*