Data, Design, Games and Teachers
ECD

Delivery Model

Mislevy et al. 2003
Total revenue generated by arcades (US) correlates with Computer science doctorates awarded (US)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total revenue generated by arcades (US)</th>
<th>Computer science doctorates awarded (US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1,196</td>
<td>861</td>
</tr>
<tr>
<td>2001</td>
<td>1,176</td>
<td>830</td>
</tr>
<tr>
<td>2002</td>
<td>1,269</td>
<td>809</td>
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<td>2003</td>
<td>1,240</td>
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<td>2004</td>
<td>1,307</td>
<td>948</td>
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<td>2005</td>
<td>1,435</td>
<td>1,129</td>
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<td>2006</td>
<td>1,601</td>
<td>1,453</td>
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<tr>
<td>2007</td>
<td>1,654</td>
<td>1,656</td>
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<tr>
<td>2008</td>
<td>1,803</td>
<td>1,787</td>
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<td>2009</td>
<td>1,734</td>
<td>1,611</td>
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</table>

Correlation: 0.985065
Per capita consumption of mozzarella cheese (US) correlates with Engineering doctorates awarded (US)

<table>
<thead>
<tr>
<th>Per capita consumption of mozzarella cheese (US)</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds (USDA)</td>
<td>9.3</td>
<td>9.7</td>
<td>9.7</td>
<td>9.7</td>
<td>9.9</td>
<td>10.2</td>
<td>10.5</td>
<td>11</td>
<td>10.6</td>
<td>10.6</td>
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<tr>
<td>Engineering doctorates awarded (US) Degrees awarded (National Science Foundation)</td>
<td>5,323</td>
<td>5,510</td>
<td>5,081</td>
<td>5,281</td>
<td>5,777</td>
<td>6,427</td>
<td>7,185</td>
<td>7,745</td>
<td>7,859</td>
<td>7,634</td>
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</table>

Correlation: 0.947352
Per capita consumption of mozzarella cheese (US) correlates with Engineering doctorates awarded (US)

Correlation: 0.947352
XCD

Content Model
What knowledge, skills, abilities are you targeting?

Evidence Model
How do you know when someone has mastered that content?

Task Model
What tasks will engage them in that content, and elicit the evidence you need?

Next Gen Learning Game Design

Groff et al. 2015
Learning
Action Reflection Cycle

Experience

Resources  Reflection
Quests and Tools

Clawphur

It's good for animals with claws! It means they can climb trees to get food and get away from other animals that want to eat them, which helps them stay alive.

How do you know all that?
Physical and Biological Models
Experiment Centered Design

Student model
Evidence model
Task mode

Conrad, Clarke-Midura and Klopfer

Flow of a Quest
- Prompt
- Hypothesis
- Test
- Revise
- Solution
- Feedback
- Game

EXPERIMENTATION
Figure 16: 16 Experiments of type A, Ab, and B flower breeding.
Feedback to Students

Side Quests

Let's look more closely at the refectory plans. You saw Marabola’s unfinished plans, but I have another set of plans for the refectory.
**Sp 2015 Individual Interviews**

**Evolution 1: Geographic Trait Differences**

<table>
<thead>
<tr>
<th>Class Progress</th>
<th>1.1</th>
<th>1.2</th>
<th>1.3</th>
<th>1.4</th>
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<tr>
<td>Susannah Gordon-Messer</td>
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<td>T One</td>
<td></td>
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<td>T Eight</td>
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</tr>
</tbody>
</table>

- Green: 75% of students passed
- Red: Failure
- Yellow: In progress
- 1.7: Roll over to view question info
- I: Click to open failure report
Student Response
- Menji

Taking the Trash Out Attempt 1
Students collect information about traits for a certain environment.

Learning Objectives:
- Recognize species variation
- Create data summary

Failure:
Student did not turn in the correct data summary or they turned in the wrong animal. There are 3 possible reasons why their data summary...
Where and When Are Successes

Evolution and Statistics

Mean Percent Correct

- Homework: 0.84 ± 0.02
- In Class: 0.85 ± 0.03
- Other: 0.86 ± 0.02

Mean Percent Correct

- Homework: 0.62 ± 0.01
- In Class: 0.63 ± 0.02
- Other: 0.64 ± 0.03

Mean Percent Correct

- During Unit: 0.73 ± 0.02
- Post-Unit: 0.74 ± 0.03
- Other: 0.75 ± 0.04
- Pre-Unit: 0.76 ± 0.05

Mean Percent Correct

- During Unit: 0.52 ± 0.01
- Post-Unit: 0.53 ± 0.02
- Other: 0.54 ± 0.03
- Pre-Unit: 0.55 ± 0.04