Development and implementation of an interactive online resource linking foundation knowledge to anatomy, physiology and microbiology units for first year students

Presenters:
Tracy Douglas and Susan Salter
(School of Human Life Sciences; University of Tasmania)
Role of “games” in higher education?

- Student fascination
- Embraces interactive learning (auditory, visual and kinaesthetic)
- How valid is it to use educational games in first year learning?
Background of project

- Recognition of inability for first year students to link content between successive units of study
- Foundation knowledge taught in first year is extended and applied in second and third year units
- Academics frustrated "re-teaching" foundation knowledge
- MCQ-based game piloted in first semester unit; increased student engagement
- Positive student feedback on game use:
  
  *I loved the game, it was most exciting and interesting and I learnt something too!*
  *It was good to answer questions and get rewarded, I also liked attacking other students.*
  *The cell biology game was lots of fun, learning at the same time.*
Awarded a University of Tasmania Teaching Development Grant in 2008 to develop an interactive online resource linking 3 first year HLS units

Investigators/Collaborators on TDG project:
- Tracy Douglas (Lecturer, School of HLS)
- Susan Salter (Lecturer, School of HLS)
- Dr Karen Swabey (Senior Lecturer, Centre for Human Movement Studies, UniTas)
- Mike Capstick (IT Lecturer, TAFE Tasmania)
- Kevin Lyall (Instructional Designer, School of HLS)
- Laura Maddock (Tutor, School of HLS)
- HLS students (Two 3rd year undergraduates and one postgraduate)
The Learning Resource

- Game platform developed involving specific assignments to be achieved through correctly answering MCQ, achieving upgrades and/or challenging other players
- MCQ are at 5 levels of difficulty; negative scoring occurs for incorrect answers
- Students accrue energy points (ATP) for correct answers
- Students will be introduced to the game resource during a compulsory practical session
Student logs onto game

Student enters level 1 (cell biology)

Student successfully completes level 1 assignment

Access to level 2 (anatomy and physiology)

Access to level 3 (microbiology)

Complete level 2 and level 3 assignments

Complete game and receive reward
Xenophage Laboratories - Login

Xenophage Laboratories is a secure facility. Select a Laboratory and Login to Enter.

The Cell Biology Lab must be completed before Accessing other Labs

Select a Laboratory

UserName

Password

New Account	Login
Xenophage Laboratories is a secure facility. Select a Laboratory and Login to Enter.

The Cell Biology Lab must be completed before Accessing other Labs

Select a Laboratory

Cell Biology Lab

Anatomy & Physiology Lab

Microbiology Labs

New Account Login
Alien Tissue II

<table>
<thead>
<tr>
<th>Researcher</th>
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Cell Biology - Background Information

Memo: Cell Biology Mission
From: CC Black, CEO - XeroPhage Labs
To: beep

You and several other researchers have been asked to independently prevent a group of cultured cells from becoming cancerous. This population of cells has been repeatedly attacked by a rare virus which is destroying the metabolic and reproductive machinery of the cells. As a result, the cells are losing control of their growth and division processes.

In order for the population of cells to survive you need to slow down the mutational effect of the virus and improve the enzyme and immune status of the cell population. Energy in the form of ATP will help you complete this assignment.

You can increase your ATP level by using your knowledge of cell biology to correctly answer questions, and by successfully attacking other researchers, hindering their progress. You can buy upgrades when your ATP level is high enough. To successfully attack another researcher, you need to upgrade your immune cells, mutation resistance and enzyme levels.
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Earn ATP Level

Earn ATP Level by Answering Questions
Additional ATP Level earned so far 0

Click the Next Question button to earn ATP Level.
To Quit the Quiz, click the **Bank ATP Level** button.

Bank ATP Level

Next Question
Question 186: An erythrocyte (red blood cell) placed in isotonic saline would:

A) shrink
B) stay the same
C) dissolve
D) explode
E) swell
Question 186: An erythrocyte (red blood cell) placed in isotonic saline would:

A) shrink
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### Earn ATP Level

Earn ATP Level by Answering Questions
Additional ATP Level earned so far: **10**

Click the Next Question button to earn ATP Level.
To Quit the Quiz, click the Bank ATP Level button.

### Question 186: An erythrocyte (red blood cell) placed in isotonic saline would:

- **A**) shrink
- **B**) stay the same
- **C**) dissolve
- **D**) explode
- **E**) swell
### Alien Tissue II

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### Earn ATP Level

Earn ATP Level by Answering Questions
Additional ATP Level earned so far: 20

Click the Next Question button to earn ATP Level.
To Quit the Quiz, click the Bank ATP Level button.

Selecting the Correct Answer is worth: 10

**Question 126: The genetic material of a human cell is:**

A) RNA
B) the nucleus
C) DNA
D) a single chromosome
E) an amino acid
Question 126: The genetic material

A) RNA
B) the nucleus
C) DNA
D) a single chromosome
E) an amino acid
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### Earn ATP Level

Earn ATP Level by Answering Questions
Additional ATP Level earned so far: **10**

Click the Next Question button to earn ATP Level.
To Quit the Quiz, click the **Bank ATP Level** button.

Incorrect, the Correct response was C. You have lost 10 units.

**Question 126:** The genetic material of a human cell is:

- [ ] A) RNA
- [ ] B) the nucleus
- [ ] C) DNA
- [ ] D) a single chromosome
- [ ] E) an amino acid
**Alien Tissue II**

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**ATP Level Update**

beep, your ATP Level has been updated
Current Status

- ATP Level: 60
- Mutation Resistance: High
- Enzyme Levels: Elevated
- Immune Cells: 8
Infect Another Player

If you decide to infect another player,
Your Mutation Resistance, Enzyme Levels and Immune Cells will be compared.
If you win you will gain some of their ATP Level.
If you lose you will lose some of your ATP Level.

Choose a Player to Infect
or another Menu option to Cancel

dougal
Infect
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<td>7</td>
<td>72</td>
<td>High</td>
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### Infect Results

#### Report: You Won

- The results of your attack on zeppity
- Your attack strength was 72 units
- zeppity had a strength of 63 units
- ATP Level Won: 12
- Immune Cells Lost: 1
- Immune Cells destroyed: 1

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### Current ATP Level Rankings

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Player</th>
<th>ATP Level</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>dougal</td>
<td>310</td>
</tr>
<tr>
<td>2</td>
<td>pseudomonas</td>
<td>115</td>
</tr>
<tr>
<td>3</td>
<td>dougolt</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>guest3</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>guests</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>headcase</td>
<td>100</td>
</tr>
<tr>
<td>7</td>
<td>viral</td>
<td>100</td>
</tr>
<tr>
<td>8</td>
<td>guest</td>
<td>90</td>
</tr>
<tr>
<td>9</td>
<td>herbertk</td>
<td>90</td>
</tr>
<tr>
<td>10</td>
<td>beep</td>
<td>72</td>
</tr>
<tr>
<td>11</td>
<td>guest2</td>
<td>50</td>
</tr>
<tr>
<td>12</td>
<td>laura007</td>
<td>50</td>
</tr>
<tr>
<td>13</td>
<td>q</td>
<td>32</td>
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Challenge of the Project

- To enable student to make connections between their academic units of study
- To cater for students covering a wide range of diverse academic backgrounds, learning styles, generic skills and interests
- To cater for first year students from 7 different degree programs
Discussion

- How can students be encouraged to participate in educational games? Is it educational to include games which involve “combat”?

- What game format(s) would be most suitable to fulfil the pedagogical role in cementing foundation knowledge?

- How can educational games be successfully implemented into the first year curriculum?

- What mechanisms can be utilised to successfully evaluate the success of game-based first year learning?