Teaching young children about microbes, hygiene and antibiotics using educational games – the e-Bug experience

Project Introduction
- The e-Bug project is a European-wide, EC-funded, antibiotic and hygiene teaching initiative.
- e-Bug works on an awareness of microbes, hand and respiratory hygiene and the benefits of prudent antibiotic use.
- The e-Bug consists of lesson packs which will make available to junior and senior schools and a website with educational games.

Objectives
- To create a game targeted at suitable for 9-11 year olds.
- To create a game that’s enjoyable enough to be played by the audience in their own time.
- To create a game which complements but can be used independently of the e-Bug pack.
- To cover a series of aligned learning outcomes as defined by the project’s domains.

Methods
- Focus groups to elicit opinion on play experience
- Post and post questionnaires built into game to gather knowledge and attitude change
- Automatic data capture to assess interactivity play sessions without direct researcher intervention

Sample
Total Plays of game: 1736
Plays to end of Round 1: 652
Plays to end of Round 2: 317
Plays to end of Round 3: 181
Plays to end of Round 4: 81
Plays to end of Round 5: 54
973 Players were female, 763 were male.

Learning Outcomes
- Introduction to Microbes
  - Bacteria, viruses and fungi are three different types of microbe
  - Microbes are found everywhere
  - Microbes come in different shapes and sizes
- Good and Bad Microbes
  - Good microbes keep us healthy
  - Bacteria are bad for some circumstances
- Hand, Respiratory and Food Hygiene
  - Infections can be spread through unclean hands
  - Hand washing can prevent the spread of infection
  - Infections can be spread through eating and coughing
  - Eating or coughing in your hands can spread infection
  - Microbes can be found on our food and can transfer to humans
- Cooking food properly can kill harmful microbes.
- Antibiotic and Vaccine Use
  - Many common infections get better on their own throughout time, not, legal intake and healthy living.
  - If antibiotics are taken, it is important to finish the course.
  - There are no vaccines for all infections

Qualitative Results
Teacher Comments
- "I do love it. It’s really interesting to help children."
- "It wasn’t too much about science and more about video games which is good."
- "It was lots of fun but I think if you’re on level 3 and you lose, I think you should start from the round you were in."
- "I blood taking photos and riding in the skateboard."
- "It was entertaining. It challenged me a lot and asked me questions to evaluate my knowledge."
- "The game had too many questions and was slow."
- "It gives you information. Not too easy. Rad graphics."

Antibiotics
Overall, a very positive response from players.
- In initial focus groups, the game ran slow.
- Overall, a very positive response from players.
- Technical problems had been addressed and I know that many of them have accessed the game.
- It was easier to deal with at the future work.

Introduction to Microbes
- Introduction to Microbes
- Round 1 Correct Answers
- Round 2 Correct Answers
- Round 3 Correct Answers
- Round 4 Correct Answers
- Round 5 Correct Answers

Harmful Microbes
- Harmful Microbes
- Round 1 Correct Answers
- Round 2 Correct Answers
- Round 3 Correct Answers
- Round 4 Correct Answers
- Round 5 Correct Answers

Useful Microbes
- Useful Microbes
- Round 1 Correct Answers
- Round 2 Correct Answers
- Round 3 Correct Answers
- Round 4 Correct Answers
- Round 5 Correct Answers

Hygiene
- Hygiene
- Round 1 Correct Answers
- Round 2 Correct Answers
- Round 3 Correct Answers
- Round 4 Correct Answers
- Round 5 Correct Answers

Table of plays to end of Round:
<table>
<thead>
<tr>
<th>Round</th>
<th>Plays</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>652</td>
</tr>
<tr>
<td>2</td>
<td>317</td>
</tr>
<tr>
<td>3</td>
<td>181</td>
</tr>
<tr>
<td>4</td>
<td>81</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
</tr>
</tbody>
</table>

Future Work
- The areas of the game which have shown little impact or which have had a negative impact need to be improved.
- The "Bird-Question Round" will be removed since the game is no longer in evaluation and the feature was unpopular.
- A more rigorous analysis of the data will be published.

Contact Details
Web: http://www.e-bug.eu
David Farrell email: david.farrell.1@city.ac.uk
Donna Lecky email: donnalecky@phs.org.uk
Telephone: 0044 845 422 5062

Game Flow
- Introduction to Microbes
- Round 1: Introduction to Microbes
- Round 2: Hand, Respiratory and Food Hygiene
- Round 3: Good and Bad Microbes
- Round 4: Antibiotic and Vaccine Use
- Round 5: Introduction to Microbes
- Game Show Intro and Questions
- Game Show Summary Questions
- Testing Game
- Sorting Game
- Hoverboard Game Round
- Game Show Summary Questions
- Future Work

Learning Outcomes
- Introduction to Microbes
- Round 1: Introduction to Microbes
- Round 2: Hand, Respiratory and Food Hygiene
- Round 3: Good and Bad Microbes
- Round 4: Antibiotic and Vaccine Use
- Round 5: Introduction to Microbes
- Game Show Intro and Questions
- Game Show Summary Questions
- Testing Game
- Sorting Game
- Hoverboard Game Round
- Game Show Summary Questions
- Future Work

Contact Details
Web: http://www.e-bug.eu
David Farrell email: david.farrell.1@city.ac.uk
Donna Lecky email: donnalecky@phs.org.uk
Telephone: 0044 845 422 5062