GeniConnect: Game-based learning, connections with scientists, and laboratory experiences: A model for industry/afterschool partnerships

Geniverse is an immersive digital game for learning genetics – by breeding dragons. In GeniConnect, middle school students play Geniverse with local biotechnology professionals to build personal connections and increase awareness of STEM careers.

Game-based Learning
Learning from digital games holds great potential due to their immersive nature, interactivity, and sound learning principles. In classrooms, well-designed educational games can lead to learning gains commensurate with or significantly higher than non-game instruction. We are adapting a genetics game made for classrooms to be used in out-of-school settings such as afterschool centers with middle school students.

Middle school students embark on an adventure where they uncover genetic mechanisms.
- NGSS places new emphasis on the central role of proteins in genetic phenomena starting in middle school.
- Students become immersed in a fantasy world where they select challenges and missions to solve.
- Students are motivated to play by earning crystals.

The Research
Evaluating Questions for Content Understanding
Following the 2016 pilot implementation of GeniConnect, we conducted interviews with 8 students to assess our content instrument in its effectiveness at eliciting information about proteins and genetics understanding.

Student responses were scored using a binary scoring system (0, 1), with a score of 0 indicating that the student was unable to provide a meaningful response and a score of 1 indicating that the question elicited the type of information intended.

The Average Question Rating is an average of scores assigned to all student responses per question.

<table>
<thead>
<tr>
<th>Average Question Rating</th>
<th>Description</th>
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<tbody>
<tr>
<td>≤0.5</td>
<td>Question does not elicit information as intended and requires major revision.</td>
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<tr>
<td>0.51 - 0.89</td>
<td>Question elicits information as intended from some students and requires minor revision.</td>
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<tr>
<td>≥0.9</td>
<td>Question elicits information as intended and does not require any revision.</td>
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