Game-Based Assessment Literature Review

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Agenda

1. Overview of Game-Based Assessment
2. Methods
3. Findings
4. Future Recommendations
5. References
What is Game-Based Assessment (GBA)?

GBA can be defined as the utilization of game and game elements to measure individuals on certain skills and abilities (Bhatia, 2018).

Popularity has grown in research for three main reasons:
1. Technologically driven society → four out of five US households own a video game device (ETA, 2015).
2. Education becoming independent and online (Verhaegh, et al., 2013).

Commonly used in education, research on diagnoses and screening of disease and disability, and in business.
Method

Preliminary database search:
- PsychINFO
- PsychARTICLES

Keywords:
- “Game based assessment”
- “Game based assessment” and “cognitive ability” or “memory” or “performance” or “motor skills”
- “Game based assessment” and “education” or “disease” or “workplace”
Articles coded for:

1. Study Demographic Characteristics
2. Constructs Assessed
3. Research Methodology
4. Game Attribute Categories

43 potentially relevant articles
- 2 non-empirical studies
- 2 commentaries
- 1 editorial
- 1 irrelevant
- 5 review papers

32 studies coded with 47 independent samples
Study Demographics

Total number of participants = 5,652

Sample Information
- Children: $k = 18; N = 3,181$
- Undergraduate students: $k = 18; N = 1,383$
- Graduate students: $k = 1; N = 30$
- Adults – Non-employed: $k = 6; N = 251$
- Employees: $k = 4; N = 807$
Constructs Assessed

<table>
<thead>
<tr>
<th>Construct Category</th>
<th>Number of studies</th>
<th>Number of games</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Assessment</td>
<td>32</td>
<td>22</td>
</tr>
<tr>
<td>Motor Skills</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Motivation</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Math knowledge</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Other Content Knowledge</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
## Research Methodology

<table>
<thead>
<tr>
<th>Research Design</th>
<th>Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>16</td>
</tr>
<tr>
<td>Repeated Measures</td>
<td>5</td>
</tr>
<tr>
<td>Correlational</td>
<td>21</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
</tbody>
</table>

Other includes one case study, two quasi experimental
Game Attribute Categories

1. Action Language
2. Assessment
3. Conflict/Challenge
4. Control
5. Environment
6. Game Fiction
7. Human Interaction
8. Immersion
9. Rules/Goals

Bedwell et al., (2012)
<table>
<thead>
<tr>
<th>Number of Game Elements</th>
<th>Percent of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00%</td>
</tr>
<tr>
<td>2</td>
<td>0.00%</td>
</tr>
<tr>
<td>3</td>
<td>3.12%</td>
</tr>
<tr>
<td>4</td>
<td>12.50%</td>
</tr>
<tr>
<td>5</td>
<td>3.12%</td>
</tr>
<tr>
<td>6</td>
<td>21.87%</td>
</tr>
<tr>
<td>7</td>
<td>15.62%</td>
</tr>
<tr>
<td>8</td>
<td>15.62%</td>
</tr>
<tr>
<td>9</td>
<td>18.75%</td>
</tr>
</tbody>
</table>

https://appgrooves.com/app/cosmic-cadet-by-arctic-shores-ltd#app-screenshots-4
Future Recommendations & Conclusions

In regard to game elements:
- How individual game elements impact assessment
- What elements actually engage individuals
- How it impacts user experience

Are people using good research designs?
- Majority of studies have a correlational design
- Cross sectional validation to predictive validation designs

GBA in business
- Little work has been done in an organizational setting
- Companies designing and selling games for employees are conducting validation studies
References


Entertainment Software Association. (2015). *Essential fact about the computer and video game industry*
