Evaluation of Game Engines for Cross-Platform Development of Serious Games for Health

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Introduction

- **Benefits of Serious Games**
  - Improvement in patient compliance [1,2]
  - Improvement in learning outcomes [3]

- **Larger target groups through mobile devices**
  - Expensive and time-consuming development

- **Evaluation of Game Engines:**
  - Facilitate development?
  - Raise quality of Serious Games?
  - Recommendation for a certain Game Engine?
Methods

- Systematic research (MEDLINE, ACM, IEEE)
  - No similar evaluation found

- Evaluation Scenario
  - Serious Game for medical education for Android, iOS and Browser
  - Prototype to fully exploit process of development
Methods

- Further evaluation as utility analysis
  - Aspects and importance rating from development process and software tests of relevant magazines
  - End result = $\sum_{aspects}(\text{points} \times \text{importance rating})$

- Process of choosing Game Engines:

  - 79 Game Engines
  - 14 Game Engines
  - Availability
  - 10 Game Engines
  - 3D: Unity3D
  - 2D: Marmalade
  - No UI: Turbulenz
Results

<table>
<thead>
<tr>
<th>Game Engine</th>
<th>Marmalade</th>
<th>Unity</th>
<th>Turbulenz</th>
<th>HTML5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost, License, Installation</td>
<td>202</td>
<td>202</td>
<td>201</td>
<td>190</td>
</tr>
<tr>
<td>Cross-Platform Dev., Deployment</td>
<td>377</td>
<td>345</td>
<td>198</td>
<td>138</td>
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<tr>
<td>Specialties</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total Points</td>
<td>585</td>
<td>550</td>
<td>402</td>
<td>329</td>
</tr>
</tbody>
</table>

- **General benefits**
  - Support in creating and animating scenes
  - Support for realistic graphics and sounds

- **Marmalade**
  - Management Tool “The Hub” supports cross-platform Testing

- **Turbulenz and HTML5**
  - No UI Different to handle
Discussion

- Marmalade offers best support for cross-platform development

- Game Engines without UI difficult to handle

- Significant benefits using Game Engines in development of Serious Games for mobile devices

Source: https://software.intel.com/sites/default/files/managed/4e/57/android_engine_03.jpg
Literature

