Seamless Learning in Serious Games

How to Improve Seamless Learning-Content Integration in Serious Games

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Motivation

Problem

- Digital Educational Games still lack acceptance
  - Among professionals/teachers
  - Among players

- Games are either
  - Not fun
  - Not useful for teaching purposes

- Barrier between learning and gaming
Motivation

Combine the needs of players and professionals/teachers

Need for design guidelines for DEGs taking into account

- Learning
- Gaming
- Adaptation & Personalization
- Assessment
- Feedback
- Degree of reality
Design Issues

Learning

- What is the learning content?

- How will assessment be performed?
  - Questionnaire
  - Indirect assessment

- How will feedback be given?
  - Immediately
  - At the end
  - By the teacher/trainer
## Design Issues

### Gaming

<table>
<thead>
<tr>
<th>Genre</th>
<th>Content</th>
<th>Degree of realism</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPG / Adventures</td>
<td>Historical scenarios</td>
<td>Important for immersion</td>
</tr>
<tr>
<td>Simulation</td>
<td>„what-if“</td>
<td>High (for objects to be simulated)</td>
</tr>
<tr>
<td></td>
<td>Explorative learning</td>
<td>Low (for concepts)</td>
</tr>
<tr>
<td>Multiplayer (Strategy) Game</td>
<td>Communication</td>
<td>High or low</td>
</tr>
<tr>
<td></td>
<td>Negotiation</td>
<td>(depending on desired atmosphere)</td>
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<tr>
<td></td>
<td>Teamplay</td>
<td></td>
</tr>
<tr>
<td>Shooter/</td>
<td>Reaction</td>
<td>High or low</td>
</tr>
<tr>
<td>Shoot-em-up</td>
<td>Cognitive Skills</td>
<td>(depending on desired atmosphere)</td>
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<tr>
<td></td>
<td>Hand-Eye Coordination</td>
<td></td>
</tr>
<tr>
<td>Logic / Puzzle Game</td>
<td>Logical structures</td>
<td>Not important</td>
</tr>
<tr>
<td></td>
<td>Logical thinking</td>
<td></td>
</tr>
</tbody>
</table>
Design Issues

Adaptation & Personalization

- Adaptive degree of difficulty -> Flow
  - Due to learning
  - Due to gaming

- Different learner types

Active and Passive Elements

- Which elements of the game may be changed by the player?
Look at successful Serious Games

**EnerCities**
- Energy-awareness
- „Best ICT for Energy Efficiency Project Award 2009“

**Winterfest**
- Basic reading/writing/calculating
- „Lara Games Award 2010“ / „Serious Games Award 2010“

**Global Conflict**
- Political Awareness
- Nominated for different awards
Design Issues

Our DEG Design Guiding Principles

- Define the learning content and the target group
- Decide on game genre
- Decide on desired degree of realism
- Decide on active and passive elements
- Define how evaluation will be performed
- Define methods of feedback and usefulness of a game master
- Decide about adaptation of degree of difficulty
- Decide about other adaptation and personalization algorithms
Our own approach - DragonLair

**Serious Game for learning Mendel’s Laws**

- Mendel’s Laws embedded in an interesting story
- Students can play around freely
- In order to achieve goals they have to apply Mendel’s Laws correctly
Our own approach - DragonLair

- Learning content: Mendel’s Laws
- Target group: Students grade 8-10
- Genre: Simulation
- Degree of realism: low/abstract
- Active elements: Simulated dragons (can be breeded)
- Passive Elements: Background narration
- Evaluation: Questionnaire at the end of the game
- Feedback: In-game / afterwards
- Adaptation mechanisms: not yet integrated
Thank you!

Any questions?