Multiplayer Serious Games

Second Research Talk

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2. Dezember 2013
Motivation

Educational Serious Games target group
- Players
- Parents/Teachers/Trainers
  -> put different expectations in the game

Players' needs
- Fun, Excitement, Story, Graphics, Sound, Challenge -> Flow
- Same needs as for every video game

Parents'/Teachers'/Trainers' needs
- Learning
- Usability in class
- Additional value to traditional learning, i.e.
  - Motivation
  - Clearification / Example

Agenda

Motivation
- Vision
- First Research Talk

Concept
- Scenarios
- Goal
- Approach
- Model
- Prototypes

Conclusion
- Publications…
- Timeline…
Motivation – Vision

Challenges

- **Seamless** Combination of learning and gaming[VW2011]
- **Collaborative** Learning
  - Is an established method of teaching []
  - Need to be guided (instructor) []
- **Collaborative** gameplay [LotR…]
- Support of the instructor in games
- Adaptation & Personalization in Multiplayer Games

Envisioned

- Instructor properly included in collaborative learning games
  - Comprehensive Observation
  - Control / Influence
- Multiplayer games enabled to adapt to heterogeneous player groups
  - Optimal challenge
  - Individual learning paths
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First Research Talk 1/3

Related Work

- Multiplayer Technology
- Learning in Multiplayer Games
- Collaborative Games
- Collaborative Learning
- Game Mastering
  - Roleplay Games
  - Virtual Game Master
- Player/Learner Modelling, Adaptation & Personalization
First Research Talk 2/3

Definition of a Player Model

Definition of a Group Model

First Architecture Scheme
First Research Talk 3/3

Design and implementation of prototypes

- “Woodment” [WBH+10]
  - Bachelor exercise lab (SS2010)
  - Student thesis Christopher Rodenberger (WS10/11)
- “Escape from Wilson Island”
  - Bachelor exercise lab (WS10/11)
  - Bachelor thesis Stefan Krepp (SS2011)
- “GeoHunt”
  - Lab exercise (SS2010)
  - Diploma thesis Felix Hertin (SS2011)
- RoboWars
  - Bachelor exercise lab (WS10/11)
- “DragonLair”
  - Diploma thesis Sabine Gund(SS2011)
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Concept - Scenarios

Scenario 1:
- Collaborative learning in groups in classroom
- As an alternative teaching method
  - Training of soft skills
  - For students with motivation problems

Scenario 2:
- Team Building: Collaborative Problem solving

Scenario 3:
- Team Leader training
  - Leading a team at problem solving in a game
Concept - Goal

Support of collaborative Multiplayer Serious Games –
Development of a generic framework for **instructed collaborative** multiplayer Serious Games

- Development of Game Mastering concepts for **collaborative** multiplayer Serious Games
- **Group** Adaptation & Personalization concepts and algorithms
- Definition of a **generic** interface for collaborative multiplayer Serious Games to use Game Mastering

- **Automatic** Group Adaptation & Personalization algorithms,
- **Automatic** Game Mastering in collaborative multiplayer Serious Games

- **observing**
- **controlling**
Concept - Approach

1. Development of prototypes for collaborative multiplayer Serious Games
2. Conception of Game Mastering Toolkit
   - Observation
   - Controlling
3. Implementation using 2 prototypes
   - Woodment
   - Escape From Wilson Island
4. Evaluation
   - Measurable Effects
   - User Experience
   - -> which parts can be automatized
   - Adaptation of relevant parameters
   - Interface Definition for collaborative 3D 3rd Person Serious Games
6. Implementation using 2 prototypes
7. Evaluation
## Prototypes

### Usability of Prototypes

<table>
<thead>
<tr>
<th>Feature</th>
<th>Woodment</th>
<th>Escape from Wilson Island</th>
<th>GeoHunt</th>
<th>RoboWars</th>
<th>Dragon Lair</th>
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</tr>
</tbody>
</table>
Prototypes

Woodment

Applicable Scenarios
- S 1: Collaborative learning in groups
- S 2: Team Building - Collaborative Problem solving
- (S 3: Team Leader training)

Evaluation
- (Player) / Learner / Interaction Model
- Game Master Toolset
- Competitive Scenarios

Escape From Wilson Island

Applicable Scenarios
- S 2: Team Building - Collaborative Problem solving
- S 3: Team Leader training

Evaluation
- Player / Interaction / (Learner) Model
- History / Learning path (BatCave)
- Game Master Toolset
Concept - Goal

Support of collaborative Multiplayer Serious Games – Development of a generic framework for *instructed collaborative* multiplayer Serious Games

- Development of Game Mastering concepts for *collaborative* multiplayer Serious Games
- **Group** Adaptation & Personalization concepts and algorithms
- Definition of a *generic* interface for collaborative multiplayer Serious Games to use Game Mastering

- **Automatic** Group Adaptation & Personalization algorithms,
- **Automatic** Game Mastering in collaborative multiplayer Serious Games

- observing
- controlling
Concept - Model

Player/learner Modeling
- Track game-related decisions
- Track learning performance
- Track communication/social interactions
- -> player/learner group model

Adaptation
- Input Parameters
  - History (of player decisions)
  - Problem: Identification of game relevant moments in an open 3D game environment
  - Player/Learner group model
- Output parameters
  - Modified game rules
  - Modified difficulty
  - Help / Support
Concept

Game Master Toolset

- Information
  - Relevance?
  - Visualization?
- Influence on game
  - On What?
  - How?
  - When?
  - Why?

GM Toolset

GAME

Player 1
Player 2
Player n

Game relevant infos

Interaction / Communication infos

influence
Concept

Information

- Current Game State
- Current Group Model
  - Player State
  - Learner State
  - Communication
- Player Actions
- Other Events

Influence

- Manipulation
  - Game mechanics/rules
  - Game objects
  - Virtual environment
  - Player Attributes
- Communication [irgendwas über communi. In spielen]
  - Direct communication
  - Indirect communication
Concept

Information - Current Game State

- GM needs overview over whole game
  - Needs to be able to observe appropriately
    - Free camera
    - Following camera
    - Splitscreen
    - Player locations
- Player Attributes
- Player inventories (if any)
Information - Current group Model

- History/decisions
  - Identify game relevant moments in an open 3D game environment
- Player / Learner / Communication model
Concept

Information - Player and Other Actions

- Notification system
- Logging system
- Player History
Concept

Influence - Manipulation

- Game mechanics/rules
  - Game objects
  - Virtual environment
  - Player Attributes
Concept

Influence - Communication

- Direct communication
  - Chat

- Indirect communication
  - Via NPC
Concept

Constraints

- Limitation to
  - collaborative
  - Multiplayer
  - Serious Games
  - For learning or training
  - Genre: 3D 1st/3rd person

Automatic A&P, automated GM

- Based on the findings of the evaluation using the GM Toolkit
- Questions to answer
  - Which GM tasks can be automatized
  - Which rules can be derived
  - Is the player / learner /communication model valid
  - Which (game) adaptation rules have to be designed by the game author
Evaluation 2-3 Folien

Questionnaire
- Based on a 10-scale User Experience Questionnaire
  - Escape From Wilson Island (July 2011)
  - Dragon Lair (September 2011)
- Qualitative Feedback

Results positive
- Details…

GM evaluation
- in october/november 2011
- Evaluation of
  - GM toolkit
- GM efficiency (can GM improve learning, gaming, training of soft skills)
- Findings used to
  - Improve model
  - Specify algorithms for automatic GM
Architecture

- Game Master
- Team Leader
- Learner Group

Components:
- GM-Toolset
- Team leader Interface
- GAME Engine
- UMAP Engine
- Player Interface
- Group Model
- Assets
- Knowledge
- Social
- Rules

Interactions:
- Modify

Roles:
- Game Master
- Team Leader
- Learner Group

Tasks:
- Team leader Interface
- GAME Engine
- UMAP Engine
- Player Interface
- Group Model

Data Flow:
- From Game Master to Team Leader
- From Learner Group to Player Interface
- From Player Interface to Group Model

Knowledge Areas:
- Assets
- Knowledge
- Social
- Rules
Agenda

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Summary

Motivation

- Serious Games have great potential for educational support

Challenges

- Serious Games often lack acceptance
- No Multiplayer support for a teacher / trainer

My Contributions

- Framework for an integrated support of Multiplayer Serious Games at runtime
  - Group Adaptation & Personalization concepts and algorithms
  - Game Mastering for Multiplayer Serious Games
- First prototypes: Woodment, Escape from Wilson Island, Lerpz over Europe, Geo Hunt, Virtual Sports Instructor
- Preparations for first evaluation
Status - Timeline

2009

STAR

2010

[WHGS10] ICWL 2010

[GWRS10] Edutainment 2010

[WBH+10] Edutainment 2010

2011

[WBH+10] EI 2010

“Virtual Sports Teacher” Ed-Media (in progress)

[WHGS10] Dvs-Tagung 2010

2012

[WGS11] CSEDU 2011 (submitted)

“First Results” ACMMM (planned)

“Coll. Gaming” CSCW (in preparation)

2013

“Game Mastering” FDG doctoral Consortium (planned)

“Multiplayer Serious Games” ACM Surveys (planned)

“Multiplayer Serious Games” ACM Surveys (planned)
Thanks for Your Attention! Any Questions?

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Appendix 1: Own publications


Appendix 2: References


Appendix: References


Manipulation

Influence

Game mechanics

Control of game objects

Virtual Environment

Player Attributes

Communication

Indirect Communication

Direct Communication