SIDH – a Game Based Firefighter Training Simulation

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SIDH - Overview

• A serious game
  – Developed in collaboration with Swedish Rescue Services Agency (SRSA)
  – Firefighter training – BA entry
  – Half-Life 2 mod
  – Cave-based
  – Novel interaction model

• Experiments
  – Firefighter students
  – Game sessions
  – Traditional BA entry exercise
Traditional BA Entry Training

- SRSA is responsible for the training of fire and rescue operatives
- Students practice search methods in different physical buildings
  - Fire and smoke may be generated
  - When no smoke is present a translucent visor is used
- Instructors are present
- A great number and types of buildings are required
The SIDH Game

• Complement to traditional methods
• Flexible training
  – Different environments
  – Individual and voluntary training
• Learning objective: to scan a building and search for people
• Based on computer game hard- and software
• Additional aspects: Use of real equipments, novel interaction mode, heat, physical pressure
• Emphasis on entertainment aspects
  – Combine learning goals with entertainment
Demonstration

• 2D map showing search behaviour
• Player inside a cave (4 screens) interact with the game
  – Player is rotating
• A single-computer view of the game
  – The virtual world is rotating
Game Details

• 16 levels
  – 1 tutorial
  – 2 bonus levels
  – 13 ”proper” levels – objective is to search a building to find and evacuate victims
• Radio communication through air mask
• Accelerometer sensors attached to boots
• Player orientation and vertical height detected from the Fogfighter nozzle
Crouching in Smoke

• When a player is crouching in smoke-filled areas
  – the sight is better
  – there is a lower ”health penalty”
Game Rules

• In each level the player should search a building for victims
• A level fails if:
  – A victim is missed
  – A room is not visited
  – The maximum time is used
  – The player dies
• A score is computed based on:
  – Percentage of the area searched
  – Remaining time
  – Number of attempts
Experiments

• 31 participants. All first year students at the SRSA
• Two groups: A (15 persons) and B (16 persons)
  – Group A played the game 2×30 minutes followed by a traditional BA entry exercise
  – Group B performed a traditional BA entry exercise followed by game session (30 minutes)
• Learning effects and player response was studied through questionnaires, video recordings and game logs
Results – Player Response

• They understood what they should do and managed to do it
• The players were engaged in the game
  – They enjoyed the game
  – They were exhausted
  – They wanted to play again
• They improved their search performance in the game
• Experience from real search missions seem to improve game performance
  – The two players with the highest game score had most real firefighter experience
Results – Learning Effects

• 77% state that they have learned things from the game:
  – “I must be 100% convinced that there is no one left in the room when I have searched it”
  – “To search everywhere – even in closets”
  – “To be careful and to search everywhere”
  – “To be calm and to have trust in myself and not wander around too much”
  – “I’ve got an understanding of how to search an apartment. I’ve also realized that it is tiresome”
  – “To search systematically and make sure all areas are covered”
  – …
Preliminary Results – Evaluating the BA entry exercise

• Experienced SRSA teachers have evaluated the search performance
• Preliminary results show that:
  – Search quality depends heavily on sight conditions
  – SIDH users are more efficient and systematic
  – SIDH users lost orientation less often
Conclusions

- Games and game modifications can be used to train firefighters
- The modification of a commercial game for a cave environment with novel interaction model was possible
- Coarse body movement interaction is possible
- SIDH is a successful serious game project
  - Collaboration between firefighter instructors, researchers and game developers
  - Iterative development
  - Balancing between pedagogical content and entertainment
- Players get exhausted, learn and enjoy playing the game!