Immersive multi-user decision training games with ARLearn

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What is a mobile serious game?
Mobile Serious Games

• Mobile Serious games allow connecting learning, gaming and situation
  – Embedded in Context
  – Exploration and utilization of context
  – Augmentation of reality
Research focus

• Current (mobile) serious games focus on factual knowledge
• Decision situations require different skills:
  – cooperation,
  – willingness to help,
  – situational awareness
• 3 case studies in decision training performed
  – Bystander decisions processes in emergency situations
  – Hostage taking situation
  – Decisions in logistical value chain
Case 1 – EMURGENCY
Decision and behaviour training for cardiac arrest

- Cardiac arrest one of the main causes of death
- Only 20% of affected people survive
- The survival rate could be doubled if
  - Immediate help by laymen would be in
  - Professional help would earlier be in place
- But:
  - Bystanders often don’t know what to do
  - Bystanders don’t help when they fear to do the wrong things
Case 2 – UNHCR
Decision training for hostage taking situations

- Office of the United Nations High Commissioner for Refugees (UNHCR) works in crisis regions worldwide and is constantly confronted with kidnappings
- Employees confronted with such situations need to be trained
- UNHCR uses role-playing as training method
Case 3 – SALOMO
Decision training for exception handling in logistics

Klemke, R., Kurapati, S., & Kolfschoten, G. (2013, 6 June). Transferring an educational board game to a multi-user mobile learning game to increase shared situational awareness. Presentation at the 3rd Irish Symposium on Game Based Learning, Dublin, Ireland.
Container terminal: complex logistic processes involve many independently operating stakeholders

Source: Voss et al. (2008)

Klemke, R., Kurapati, S., & Kolfschoten, G. (2013, 6 June). Transferring an educational board game to a multi-user mobile learning game to increase shared situational awareness. Presentation at the 3rd Irish Symposium on Game Based Learning, Dublin, Ireland.
Internal disruptions

External disruptions

APP.com

www.portstrategy.com

usnews.nbc.com, 2012

www.cargolaw.com

The Huffington Post, 2002

The Huffington Post, 2002
Requirements for immersive mobile serious games

(R1) Multi-user game play with teams and roles
(R2) Individualised information visibility, tasks, communication, and process steps
(R3) Personalized game processes according to player roles
(R4) Interweaving of player decisions and game events
(R5) The game process should be supported on mobile devices.
(R6) Re-use of games shall be possible.
(R7) The environment should log game activities for later game reviews, debriefings, and the necessary reflection.
(R8) Offer an immersive game play, which puts the player into a realistic scenario.
Case 1 – EMURGENCY
Game design

• Roles
  – AED player: needs to find defibrillator and bring it to victim
  – CPR player: needs to find victim and perform CPR
  – Documentation player: needs to document behaviour of other players for later reflection

• Game goal
  – Teach concrete skills and motivate behavioural aspects
Case 1 – EMURGENCY
Game design

AED Player
- AED notification
- POI Arrival & AED pickup
  - Scan
- POI Arrival & AED application

CPR Player
- Incident notification
- POI Arrival & CPR steps
  - Scan
- Coordination
- Debriefing with gold-standard
- Debriefing with instructor

Documentation Player
- Performance recording
- Upload
- Synch point
- Routing Support
Case 1 – EMURGENCY Game

Welcome message

Welcome to the Heart Run game. It will help you to be prepared in case of emergency. The instructions on your device will tell you how to save a life.

Scan AED

Go to the next AED.

If you stand in front of it, scan the barcode attached to it.

To do this, press the barcode icon below and hold the advice in front of the barcode. It will scan automatically.

CPR

Push hard and fast in the center of the person’s chest to the beat of the disco song “Stayin’ Alive.” It has more than 100 beats per minute — the correct rate to push on the chest during CPR.

Continue CPR until an AED arrives or emergency providers can take over.

If other bystanders are present, change the person giving chest compressions.
Case 2 – UNHCR
Game design

• Roles
  – Head of Office
  – Security Officer
  – Staff Welfare

• Game goals
  – Creation of reusable variations of a game-design
  – Enabling ‘on the fly’ messaging and real-time assessments
  – Semi-automatic management of the game
  – Logging game activities for debriefing
Case 2 – UNHCR
Game design
Case 2 – UNHCR
Game
Case 2 – UNHCR Game

Assemble team
Correct
Question
Important Message

Planning

A message has arrived from the DO, please click the play button below to listen to the voice message.

As requested by the DO, please list the required actions to be taken if the hostage is released using maximum one sheet of flip-chart paper. You have 10 minutes to complete this activity.

When the list is complete, please take a photograph of the list and upload it for review by the DO.

To do this, please press the menu button below and select provide answer.
Case 3 – SALOMO

Game design

• Roles
  – Control tower – overview, permissions to other actions
  – Vessel planner – plans the unloading and loading of the ship
  – Yard planner – decides the storage positions for containers
  – Sales – responsible for the bookings and financial transactions between the clients and the terminal
  – Resource planner – Assigns resources to each vessel

• Game goal
  – Generate situational awareness among different roles to improve their behaviour in disruption situations

• Approach
  – Give increasing access to communication means during the game process
Case 3 – SALOMO
Game design – Level 2
Case 3 – SALOMO Game

Version 1: Board game
Version 2: Mobile game in ARLearn
ARLearn: platform for mobile serious games

- Open Source
- Authoring Environment
- Clients for Android and iOS

http://ou.nl/arlearn
## Coverage of Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Logistics</th>
<th>Hostage</th>
<th>HeartRun</th>
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<tbody>
<tr>
<td>R1 Multi-User</td>
<td>O</td>
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<tr>
<td>R2 Multi-Role</td>
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<td>R3 Individualisation</td>
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<td>R4 Decisions</td>
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<td>R5 Mobile Devices</td>
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<td>R6 Re-Use</td>
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<tr>
<td>R7 Logging / Debriefing</td>
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<td>R8 Immersiveness</td>
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Conclusion

- ARLearn meets requirements for multi-user, multi-role serious games
- Different game processes, role constellations and team sizes are possible
- Authoring ARLearn games is possible for educators
- Small scale studies in our three cases involving educators and learners yield positive results
Conclusion

• Recent empirical study shows positive effect on helping behaviour in HeartRun case:

Putting Yourself in Someone Else’s Shoes: the impact of a location-based, collaborative roleplaying game on behaviour.
But ...

• Immersiveness is still key issue
• Main problem: switching between device and situation
Augmented reality glasses

Hands free operation: serious games with environmental interaction
Future Work

- ARLearn with Google Glass
- First prototype available
- Research needed to show effectiveness
Thank you!

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