Mobile Learning Games for Critical Decision Making and Crisis Simulation

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Critical Decision Making/Crisis Situations

- Time-pressure
- Different perspectives on problems
- Wicked problems
- Systemic impact of decisions on decision chain
- Knowledge & Skills & Personality factors
Current solutions

High-fidelity simulations

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Current solutions

Fully modeled digital environments/ 3D environments
... and some findings

No proven correlation between learning gain and immersion level...future research should focus on limited immersion experiences, for example augmented reality

Chris Dede/Harvard
The MR continuum

- Real environment
  - enriched with virtual objects

- Virtual environment
  - enriched with virtual objects

Milgram & Kishino, 1994

IEICE Transactions on Information and Systems, E77-D(12), pp. 1321-1329.
Serious mobile location-based simulation game?
ARLearn: Mobile Serious Game Platform

- Web-based authoring environment
- Game repository with CC-licensing
- Portfolio-view for debriefing
ARLearn: Mobile Serious Game Platform

ARLearn open-source suite for educators and learners

Scripting a logic reusable game-logic description
Case study 1: Hostage taking/UNHCR

- Starting point: Need for innovation of training scenario
- High costs and very little flexibility
- Goal: A flexible, authentic and mobile solution
Case study 1: Setup

- Roles:
  - Director
  - Security manager
  - HR Manager

- Goals:
  - Reusable mobile learning scenarios
  - Notifications and ‘in-situ’ Assessment
  - Semi-automatic management of the scenario
  - Recording of activities for debriefing
  - Higher level of preparedness
After informing your country’s representative, what do you do next?

- Make contact with the hostage takers to find out the demands
- Liaise with other UNHCR staff to establish when, where and why the hostage was taken.

Submit answer
Fallstudie 1: Learning/Game Design
Case study 1: Summary

- Evaluation on Level 1 and partly 2 of Kirkpatrick evaluation model (1994)

- High acceptance of participants and trainers, increase of awareness for efficient communication and central role of head of staff

- Alternative scenarios replaces partly classical training - new application areas in preparation
Case study 1: Future work

• Impact of specific game patterns (e.g. counter for decision making) on stress level and authenticity of experience

• Focus on learning transfer rather than knowledge building
Case study 2: HeartRun

• Societal Problem:
  – Approx. 350,000 people die each year from a cardiac arrest in Europe (ERC Statistic)
  – Limited amount of training, and even if people are trained, limited willingness to help

• Problem: Huge gap between training situation and application situation
Case study 2: Setup

• Roles:
  – Resuscitation player
  – Defi player
  – Documentation player

• Goals:
  – Impact on retention on knowledge
  – Impact on willingness to help
  – Attitudinal changes
HeartRun: Example

What is the most important information when calling the ambulance?

Click on PROVIDE ANSWER below and start recording your answer. Afterwards click on Publish to make your answer accessible.

21 Mar - 13:30:44

Provide Answer
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.

The game is based on messages which will appear on your device. When closing this message, you will already see the next one. You close this message by using the BACK Button. To open a message, you have to click on it. Messages which you have read are greyed out.

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.

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 study 2: Learning/Game Design
Case study 2: Summary

• Formative study about game design finalized (Kalz et al., 2013; Schmitz et al., 2013)

• Currently data collection with regard to level 2 of evaluation model of Kirkpatrick (1994)
Research Model

Theory of Planned Behavior
(Ajzen 1985)
Case study 3: Logistics in Rotterdam

SALOMO Project
Situational Awareness for Logistic Multimodal Operations in container supply chains and networks
Case study 3: Logistic in Rotterdam
Unforeseen events
Case study 3: Setup

• Roles:
  – Control-Tower
  – Bulk loader
  – Space planner
  – Sales
  – Load planner

• Goals:
  – Increase of ‘situational awareness”
  – Less accidents, Optimization of processes
  – Cost reduction/less additional costs
  – Systemic view of all employees
Case study 3: 2 Spielversionen

Version 1: Brettspiel

Version 2: Digitale Version
Case study 3: Screendesign

[Images of mobile devices showing interface screens with maps, text lists, and question prompts]

- assemble team
- Correct
- Question
- Important Message

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 study 3: Learning Design/Game Design
Caste study 3: Summary

- Currently scenario and game development and formative evaluation
- Future evaluation scenario: Comparison between board game and ARLearn game
Issues for evaluation

<table>
<thead>
<tr>
<th></th>
<th>Classroom</th>
<th>School museum visit or field trip</th>
<th>Personal or family visit</th>
<th>Personal mobile learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical setting</strong></td>
<td>✓ Conventional and static</td>
<td>✗ Moving around a fixed location</td>
<td>✗ Moving around a fixed location</td>
<td>✗ Unpredictable &amp; changing</td>
</tr>
<tr>
<td><strong>Social setting</strong></td>
<td>✓ Fixed</td>
<td>✓ Pre-arranged</td>
<td>✓ Pre-arranged</td>
<td>✓ Unpredictable and changing</td>
</tr>
<tr>
<td><strong>Learning objectives and outcomes</strong></td>
<td>✓ Externally set</td>
<td>✓ Externally set</td>
<td>✓ Personally set or contingent</td>
<td>✓ Personally set or contingent</td>
</tr>
<tr>
<td><strong>Learning method and activities</strong></td>
<td>✓ Pre-determined</td>
<td>✓ Pre-determined</td>
<td>✓ Pre-determined or contingent</td>
<td>✓ Pre-determined or contingent</td>
</tr>
<tr>
<td><strong>Learning progress and history</strong></td>
<td>✓ Pre-determined</td>
<td>✗ Pre-determined or contingent</td>
<td>✗ Mostly contingent</td>
<td>✗ Contingent</td>
</tr>
<tr>
<td><strong>Learning tools</strong></td>
<td>✓ Provided</td>
<td>✓ Provided by school or museum</td>
<td>✓ Provided &amp; personally owned</td>
<td>✓ Personal &amp; serendipitous</td>
</tr>
</tbody>
</table>

Vavoula & Sharples, 2009
Future work

• Development of evaluation framework with regards to learning transfer

• Extension of training scenarios with multimodal dialogue systems (see for example EU project METALOGUE http://www.metalogue.eu)

• Preparation of scenarios with more partner from crisis simulation domain
Submission deadline May 19
http://www.mlearn.org
Related papers by our group


Related papers by our group


Thanks!

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