Mobile and Seamless Learning - Design of contextualized learning scenarios

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Theoretical foundations & goals
Situated Learning (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991)
Pragmatism (Dewey)
Seamless Learning (Wong & Looi, 2011)
Decrease inert knowledge
Increase transfer of knowledge
Bridge contexts
Examples

1. Location-based learning scenario (Cultural sciences)
2. Mindergie: Work-based learning
3. Crisis simulation/training UNHCR
4. HeartRun: First aid & resuscitation
5. Inquiry-based learning: WeSpot
Example 1

Wolten Institute
Research Centre for Learning, Teaching and Technology
Cultural science pilot
Cultural science pilot
Environmental learning @ work

• Gamification at work
• How can we actively decrease energy consumption @ work?
• DBR: Which design aspects are meaningful and can have an impact?
Welcome to the Mindergie Game!

Welcome to the game that helps you become the greenest employee of the Open Universiteit!

Mindergie

The game is played using the ARLearn app developed by Stefaan Ternier working at CELSTEC. Within the app you will mainly use the Menu and the Back button of your phone to navigate around. From time to time you will also make use of the built-in camera and microphone as well as a web browser.

All game messages will appear in the list you will see when closing this message by using the Back button. Some messages open automatically (like this one) while others open when you click on them. Once you opened a message it will grey out in the list, but stay there until the end of the game.

Some messages will ask you to provide either an answer to a question, recording an audio, take a picture, or even capture a short video. When using media, simply add or record it and then press the appearing Publish button.

Great you found the Mindergie flags. The first thing you have to do here is to find the small QR code attached to the 'Athabasca' flag pole.

When you found it, simply press the scan icon below and use your camera to scan the code.
Game design
Generate ideas
Reflectie
## Study results

<table>
<thead>
<tr>
<th>Game Element</th>
<th>Energy Consumption Behaviour (Mean)</th>
<th>Environmental Consciousness (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>5.50</td>
<td>5.67</td>
</tr>
<tr>
<td>Video</td>
<td>4.42</td>
<td>4.83</td>
</tr>
<tr>
<td>Action</td>
<td>4.33</td>
<td>4.08</td>
</tr>
<tr>
<td>Challenge</td>
<td>4.33</td>
<td>4.17</td>
</tr>
<tr>
<td>Activity</td>
<td>4.58</td>
<td>4.42</td>
</tr>
<tr>
<td>Badge</td>
<td>3.92</td>
<td>3.42</td>
</tr>
<tr>
<td>Prizes</td>
<td>3.17</td>
<td>2.83</td>
</tr>
</tbody>
</table>

Critical decision making/crisis training

- 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

Serious mobile location-based simulation game?
Example 3: UNHCR

- Starting point: Need for innovation of training scenario
- High costs and very little flexibility
- Goal: A flexible, authentic and mobile solution
Example 3: 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.
Fallstudie 1: Learning/Game Design
Example 3: Summary

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

<table>
<thead>
<tr>
<th>Results</th>
<th>Behavior</th>
<th>Learning</th>
<th>Reaction</th>
</tr>
</thead>
</table>

- 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
Example 3: 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
Example 4: 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
Example 4: 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
HeartRun: Screen design

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.

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.
Example 4: Learning/Game Design
Research Model

Theory of Planned Behavior
(Ajzen 1985)
Example 4: 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)
Example 5: Inquiry-based learning
Inquiry-based learning

**Challenge 1:** A lack of inquiry skills

**Challenge 2:** Curiosity is not supported

**Challenge 3:** Construct personal conceptual knowledge.

**Challenge 4:** Linking e-learning with inquiry.

**Challenge 5:** How to measure impact?

**Objective 1:** To provide smart, adaptive inquiry support.

**Objective 2:** Bridge formal and informal learning activities.

**Objective 3:** Personal inquiry projects and link everyday life and classroom teaching.

**Objective 4:** Create an open source toolset.

**Objective 5:** We SPOT will evaluate the impact.
Inquiry-based learning
Zarraonandia, Aedo, Díaz, & Montero, 2013
No one’s been able to demonstrate a high-performance see-through display. This side-view display that you seen in Google Glass and in the Oakley Airwave Snow goggles is...a recognition of the fact that no one has solved the transparent display problem.

Justin Rattner
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

Title: Not breathing normally?

Set Font... Set Font Size ...

- If somebody collapsed:
  - look for chest movement;
  - listen at the victim’s mouth for breath sounds;
  - feel for air on your cheek;
  - decide if breathing is normal, not normal or absent.
Related papers by our group


Related papers by our group


Thanks!

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