Serious games at the UNHCR with ARLearn, a toolkit for mobile and virtual reality applications

Atish Gonsalves

UNHCR
The UN Refugee Agency,
Global Learning Centre, Budapest, Hungary
gonsalve@unhcr.org

**Stefaan Ternier, Fred de Vries,
Marcus Specht**

Open Universiteit Nederland
Valkenburgerweg 177, 6419 AT Heerlen, NL
{stefaan.ternier|fred.devries|marcus.specht}@ou.nl

ABSTRACT

This article presents experiences and lessons learned with the implementation of a serious game for simulating the management of a hostage taking scenario. The game was created with ARLearn, a toolkit for mobile and virtual reality serious games, developed at the Open University of the Netherlands. In collaboration with the United Nations Refugee Agency (UNHCR), ARLearn use cases for crisis situations were developed. This manuscript covers the games that were designed with UNHCR's Global Learning Centre (GLC) and discusses the training pilot with UNHCR staff-members.

Author Keywords
Serious games, mobile learning, field-trips, security simulation

INTRODUCTION
To better protect and meet the needs of forcibly displaced persons, humanitarian agencies like UNHCR must be able to make use of new technologies to train its staff on a number of key subject areas such as refugee law, international human rights law, international humanitarian law, operations planning and programmes and security risk management. Some of these subjects can be delivered through more "traditional" eLearning delivery methodologies such as self-study eLearning and webinar-based coaching. Training humanitarian staff on complex subject areas, such as managing hostage taking situations, however rely more on immersive and participatory simulation exercises and role-plays. These methodologies are typically used for security and emergency training exercises at UNHCR where creating a realistic environment during the training is key in delivering the learning objectives thus ensuring that the participants respond effectively in similar real-life scenarios.

Simulations are used by the security training team at UNHCR's Global Learning Centre to evaluate the effectiveness of plans and procedures designed to respond to security threats by testing them in a series of simulated threat scenarios.

Organizing real-life security simulations can be resource heavy, and often involves the use of weapons, explosives, large crowds and vehicles. As the purpose of these exercises is to identify any significant deficiencies in the protective strategy that need correcting, the use of mobile devices can replace some of these resources without losing the realistic effect, thereby making it more flexible and easy to implement. In addition, in many environments in which UNHCR operates, a real-life simulation is impractical or impossible to carry out due to the high risk it presents to staff. In some cases, it is simply not safe to conduct large-scale simulations. In other environments, host governments would not be favourable to such an exercise taking place. In these situations, mobile devices allow UNHCR to practice security plans and procedures in an effective manner, without risking the reputation and relationship between UNHCR and host governments and as well as minimizing personal safety risks to staff. As such, using simulations with mobile devices saves time and money, and ultimately helps to save lives.

Towards this objective, the OUNL and UNHCR have decided to collaboratively develop and train UNHCR staff with the ARLearn application (ARLearn, 2012). ARLearn is an open source mixed reality application framework (Milgram, 1994) (Liestøl, 2011), which supports mobile applications for Android smartphones. With this toolset, learners are presented audio-visual information based on triggers like their location and responses to questions. Furthermore, it enables learners to take notes (with audio or pictures) and by doing so build an online portfolio. The application has been deployed in different educational scenarios in which learners are to explore their environment and collect data, commonly addressed by the concept of fieldwork (Ternier et al., 2012).

EDUCATIONAL SETTING AND THE DESIGN OF A MOBILE GAME
UNHCR operates in over 120 countries, its staff often work in hazardous locations. To better equip staff, UNHCR conducts a number of security management trainings worldwide. These trainings are organized by the Global Learning Centre (GLC) of the UNHCR based in Budapest. The typical approach is a workshop organized over a 3-5 day period in which different aspects of security risk management are addressed. These workshops cover policy based information, such as standard operating procedures, delivered through self-study pre-Elearning modules follow by instructor-led workshops. The workshop also includes immersive simulation exercises, for example hostage taking, bomb threat and other security-related scenarios.

For many years a role-playing game has been part of these workshops. In this game learners are split into groups representing the different roles that are present in an actual security situation. The groups have to implement and carry out the procedures that have been introduced during the pre-Elearning modules and the workshop. In the case of the hostage-taking scenario, a role-playing game is a highly immersive experience for the learners, in which they have to deal with stress, act quickly, collaborate and negotiate in order to 'save the hostage'. Running the game turns out to be an intensive exercise, not only for the participants, but also for the organizers and facilitators. It requires a lot of concentration and effort by a facilitator to encourage the whole team to engage in the chaotic development of a hostage situation, with the limitation that there is a maximum number of participants that can effectively join a game. As the game is carried out at a rapid pace it can be difficult to have an all-inclusive debriefing in which all roles of all teams receive appropriate feedback. The debriefing and reflection phase of the activity is a major learning point. Debriefing allows learners to reflect on what they learned, the challenges and risks associated with hostage taking situations and their personal capabilities. Facilitators recognize that this is one of the most important learning moments, however it is difficult to capture all the important points from the simulation due to the speed at which events occur. This aspect has led to the development of this project, in an effort to address this shortcoming.

As an alternative for the original game, a version was developed applying concepts of mobile serious games and blended instructional design principles (Gruber, 2010). Using the ARLearn toolkit made it possible to address the following training issues:

- Enabling the creation of different reusable variations of a game-design for emergency security response, covering initially the hostage taking situation and potentially other cases.

- Enabling 'on the fly' messaging to participants and real-time assessments of activities.

- Semi-automatic management of the game thus enabling more participants to experience the role-playing exercise.

- Creating a log through the game of responses and interactions, which can be used by the trainer to provide feedback during the debriefing session.

In the following paragraph the functionalities and technical capabilities of ARLearn will be described after which the actual game designed is to be discussed and evaluated.

ARLEARN

ARLearn, originally a tool for audio augmented reality, has grown over the past few years from a standalone smartphone app to a fully-fledged mixed reality application platform taking into account field-trips, serious gaming, augmented virtuality and a notification system (Ternier, 2012). ARLearn features two important concept that enable the design of reusable mobile serious games.

1. A game is a blueprint for a simulation or a field-trip. Within a game media items, progress rules, scoring rules and dependencies between items are bundled. A game defines a configuration and captures whether scoring is enabled, whether a map view is enabled, etc.

2. A run is a materialization of a game. A game can be played multiple times through the creation of new runs. A run defines teams, users and assigns roles to the users.

At design time, the various artefacts such as open questions, audio messages, movies and multiple-choice questions are defined. Depending on the actions a user takes, the ARLearn system can be configured to hide or display new messages.

UNHCR CASE STUDY – GAME DESIGN

The first ARLearn pilot was implemented in UNHCR at the Security Management Learning Programme (SMLP) workshop in December 2011 in Entebbe, Uganda. The 17 participants were senior staff members, including heads of offices, who are responsible for managing operations and the security of the staff members in their country offices.

A pre-game survey was conducted to examine how comfortable the participants are with smartphones. The majority use their mobile phone frequently, either constantly (9/17) or daily (6/17). Eleven participants use their phone to access the internet/email. Six of them constantly access the Internet with their smartphone. This survey shows that most of the participants were comfortable with a smartphone, although most of them had not used a touch-screen based device prior to the simulation.

The workshop was organized in the conference room of a hotel in Entebbe. Internet connectivity was limited and sporadic, and electricity cuts were quite frequent. In Entebbe, the game was played using 9 smartphones simultaneously. Three runs were created for the game, with 3 roles participating in each run. Each role was assigned 2-3 players.

The game is designed to prepare the participants on the response procedures to be initiated immediately when a staff member is taken hostage. A Hostage Incident Management (HIM) team is deployed eventually in such situations but it can take time till this team arrives and offices need to know how to respond prior to their arrival.

The players participated in this game taking one of the following three roles: head of office, security officer and staff welfare member. The hostage-taking simulation was designed such that players in all roles play the same game but have to react differently based on their roles. The game is organized in 5 phases:

Phase 1: Notification of the incident
The game starts with a plea for help by Jerry Khan, a fictitious UNHCR employee that was taken hostage. This video message features a blindfolded actor and creates an authentic context. This message is broadcasted to all the roles. Next, players take a decision on what to do next, depending on their specific role. The head of office (role A) for instance can decide to "notify the Designated Officer (DO)" while a staff welfare member (role C) should select the option to "contact senior management". Depending on the decision taken, they receive feedback on whether this is a good choice.

Phase 2: Assembling the team
In the next phase, the head of office is informed by the DO that a hostage incident management team will be dispatched. In the mean time, they need to contact the security advisor (role B) and staff welfare officer (role C) and ask them to assemble in headquarters for a planning session.

Phase 3: Planning
When the facilitator observes that the team has assembled, an audio recording of the DO requesting the team to work out a reception plan is sent out. The team is next tasked to work out this plan on a flip-board and to capture a photo of the plan with their device and submit this as soon as they are ready. Next, the participants are asked to split up and go to their individual rooms.

Phase 4: Responding
In this phase, role A and role C participants are to respond to calls from a journalist and a distressed family member respectively. The security officer (role B) in the meantime receives a message from the DO with the task to prepare a Proof of Life (POL) question.

Phase 5: Negotiating
In this last phase, all roles gather together again. This is triggered by a message from the hostage takers. In this phase, a negotiation with the hostage takers is simulated. The game ends with the message that the Hostage Incident Management (HIM) team has arrived and is ready to take over the negotiations.

UNHCR CASE STUDY – RESULTS & CHALLENGES
Overall, the game was well received and the participants were able to successfully complete the runs. During the run, there were three electricity cuts that caused the wireless router to reset. However, the participants were able to continue the exercise despite these challenges as ARLearn caches both game content and logic on the mobile devices.

The participants found the ARLearn simulation very useful, and once they got over the initial technical obstacles were able to respond to the Notification, Assembling, Planning, Responding and Negotiating exercises. From the 17 participants, 14 answered positively on the question regarding the usefulness of mobile phones in a simulation exercise (1 was negative, 2 had a mixed response). As both the exercise and the use of smartphones was new to the participants, the expressed learning outcomes varied from 14 persons learning from the game itself to 2 people expressing that they mainly learned about using the smartphone and 1 reported no learning.

From a content perspective, the participants were able to understand the criticality of the exercise and the tasks associated with the immediate response of a hostage taking scenario. They learned the importance of coordination that was enabled and assessed through the game. The game added more realism through the "Jerry Khan" hostage video, calls from distressed family members, and pressure that was applied by the demands of the hostage takers. In addition, the facilitators played a role in moderating and pacing the flow of the game through the use of the manual triggers. It created good role inter-dependencies and showed that the leadership of the head of office (role A) plays a key role in ensuring that the team delivers.

There were also some surprising outcomes, with participants realising the importance of efficient and rapid information sharing in a crisis that is enabled through well connected and ICT-enabled offices. Participants also found the exercise highly stimulating, as they played the game within the device, moved around, interacted with each other and responded to the various assessments. The learning from the ARLearn exercise was later referred to in the workshop, for example on the formation of the proof of life (POL) questions.

There were a number of technical challenges with the exercise, especially related to the problems of dependence on the wireless internet. The live internet enables :

- *Role inter-dependencies*. When a player takes an action this can cause messages to appear on an other player's device.

- Manual triggers. The game facilitator can use the console to make a message appear on all devices.

These functions require the devices to be constantly connected to the network. The participants were also uneasy initially with the devices, and the initial challenges were more related to the usability of the device than the game itself. As the participants got more comfortable with the device they were able to focus on the real objectives of the exercise.

CONCLUSION

Hostage taking was selected as a pilot due to the complexity of managing such an event. Albeit relatively low in frequency, the impact of an abduction is extremely high. Although the rate of kidnapping per year varies significantly, the average numbers of kidnappings of humanitarian workers from 2006-2008 represents a 250% increase over the previous 8 years' average. In Somalia alone, 50 humanitarian staff were taken hostage from July 2008 to December 2009. Based on this trend, hostage taking and abduction is clearly a topic the organization should be well prepared to respond to and manage.

The ARLearn tool has proved to be useful in aiding the "realism" of UNHCR's hostage taking simulation exercises. UNHCR's security training team plans to implement further security scenarios in 2012-13 with the tool including but not limited to:

- Death of a staff member

- Car accident involving injuries

- Kidnapping of a staff member (terrorist, politically or financially motivated)

- Refugee threatening suicide

- Staff member injured in mine strike that occurs with a team on mission in a remote location

- Angry demonstration that turns into a riot outside the office

- Staff member(s) detained in a refugee camp by a group of angry refugees

- Arrest of a staff member

- Bomb blast on the street outside the office – gate destroyed and casualties among guards but no major damage to the office itself

- Loss of the office

Beyond security training, UNHCR also plans to use the ARLearn tool to train on scenarios in the field of emergency response, refugee protection and programme management.

REFERENCES

ARLearn project page. (2011) See also website:
http://portal.ou.nl/web/topic-mobile-learning/home/-/wiki/Main/ARLearn

Gruber, M., Glahn, C., Specht, M., Koper, R. (2010) Orchestrating learning using adaptive educational designs in IMS learning design. Sustaining TEL: From Innovation to Learning and Practice, 123-138

Liestøl, G. (2011). Situated Simulations between Virtual Reality and Mobile Augmented Reality: Designing a Narrative Space. In Furht, B. (Ed.) Handbook of Augmented Reality, (pp. 309-319), Springer.

Milgram, P. and Kishino, A. F. (1994) Taxonomy of Mixed Reality Visual Displays IEICE Transactions on Information and Systems, E77-D(12), pp. 1321-1329.

Ternier, S. Klemke, R., Kalz, M., van Ulzen, P., Specht, M. (2012). ARLearn: augmented reality meets augmented virtuality. Accepted for Journal of Universal Computer Science, Special Issue on Technology for learning across physical and virtual spaces. (to appear 2012)