

Digital EORE Bite-Sized Contents



© 2021 DRC

Topic: Mobile EORE Augmented Reality Application

- # Digital Application
- Augmented Reality
- Child-Friendly EORE
- Colouring Book

November 2022

EORE AG
Explosive Ordnance Risk Education
Advisory Group

Background Summary



DRC implemented an EORE programme in Non-Government and Government Controlled Areas (N/GCA) of Ukraine in 2021. Before the Russian Federation's military offensive in 2022, Explosive Ordnance (EO) accidents had the following patterns:

- For both Government Controlled Areas and Non-Government Controlled Areas, males between 35 and 59 years of age were the most at-risk groups for EO accidents
- On NGCA side twice as many children were affected as on the GCA side;
- For civilians, traveling, picking up, tampering, or handling EO most often resulted in incidents, followed by household work, construction, and foraging
- Landmines represented almost half of all incidents, followed by IEDs/Booby Traps, Abandoned Explosive Ordnance, and Unexploded Explosive Ordnance


Following extensive casualty data profiling and research, DRC developed an innovative project to deliver school-based interventions coupling conventional EORE with digital EORE to improve interactivity and ensure retention of knowledge for children. The project consisted of a colouring book with an Augmented Reality (AR) mobile application extension

Target groups:

- Primary: children (6-11 years old) of eastern Ukraine
- Secondary: teachers, parents, etc. using it as a pedagogical tool to teach/learn about EO awareness and safe behaviour



Background Timeline and Budget



Timeline: February to December 2021 (development and testing); January 2022 onwards for usage

Budget: USD 24,000 for an external AR developer. Very high and continuous involvement from DRC Staff.

Methodology



- DRC co-developed this EORE initiative with **involvement of local pedagogical and psychological experts** to account for the context-specific age and psycho-emotional features of its target groups and ensure “do no harm”, the use of non-traumatic images, and target-specific messages and materials:
 - Colouring has developmental and educational functions for children: developing motor skills, spatial and figurative thinking; opportunity to spend time with peers and/or parents; providing positive emotions, vivid impression, sense of accomplishment
 - Due to a generally high technological literacy in Ukraine, the ubiquity of Web 2.0 technologies among children and youth, and reliable internet provision, DRC decided to pursue digital EORE (DEORE)
 - Bilingual direct interpersonal school-based EORE session remained the backbone of the methodology and the **colouring book with the AR extension was developed to reinforce the knowledge acquired** through the EORE sessions for children
- DRC contracted an external vendor to design the ‘Dangerous Quest’ AR mobile application, using EASY AR software, developing 2D and 3D models and interactive games. The app works on mobile phones and tablet computers



Recommendations



- **Ensure you get technical support and encouragement from HQ and in-country senior management** (at DRC, digitalisation/innovation is a key organisational principle; DRC has in-house capacities of IT/e-learning/digital communication department)
- **Go beyond EORE to trigger innovation:** preliminary research scope was broadened to Science, Technology, Engineering, and Mathematics (STEM), including multimedia, gamification, educational games, etc, since literature on DEORE was scarce at the time
- **Ensure you dedicate time and resources to train and quality control your service provider to humanitarian principles and EORE:** DRC developed relationships with the private sector for the technical development of the AR application and colouring books, which was necessary but not always a positive experience (mainly due to low understanding of Mine Action, generally, and EORE, specifically)



Recommendations



Ensure sustainability and broad availability of the application and associated EORE materials

- DRC mobile application and colouring book are freely available on a moodle platform (stopmina.dk)
- Colouring book easily downloaded and printed on any home printer
- Application freely available on Google Play and Apple Store
- Application can be used on any private mobile phone and/or tablet computer
- **Validated and endorsed by the Ministry of Education and Science in Ukraine**



Monitoring and Evaluation



- **Tailor the Monitoring and Evaluation (M&E) system to the target group**, including field-testing.
- Focus Group Discussions with 11 children (eight boys, three girls) without a personal experience with the conflict (to act as a control group without prior EORE exposure)
- The children tested the application but also played with other games – creating a relaxed and friendly atmosphere. Children needed 14-20 minutes on average to complete the story on the mobile app. took longer and depended on each child. The “novelty effect” of the colouring book decreased after 2-3 pages.
- **M&E focused on:**
 - Memorisation of key safety messages
 - How many pictures were coloured by children
 - When the children’s interest started to fade
 - What was more interesting to colour
 - How easy was it for children to use the application
 - How user-friendly was the interface
 - Were they able to change the language
 - How engaging were the games, sound effects, etc.




Monitoring and Evaluation Findings



- All 11 children understood the essence of the application, learnt the three golden safety rules, and were able to clearly articulate what they saw during the application usage
- Children remembered how warning signs look like and memorised the safe behaviour rules
- All children enjoyed the storyline, the colouring, and the application, as well as the narration, sound, music, visuals, etc.
- The first picture was painted much longer than others ('novelty effect'), after the third pictures attention started to fade, but the children wanted to see how the plot of the story developed
- Children did not experience any difficulties interacting with the technical aspects of the mobile application




Scientific findings from STEM suggest that digital initiatives work best when complementing the traditional, two-way communication channels




Partnerships with Extended Reality (XR) companies is unavoidable, but require extensive support for the appropriate development of the end product

Key Takeaways



Although AR has a relatively high cost at the project's start, it does not require expensive equipment to run afterwards. AR can function on any devices already equipped with a digital camera. AR maintenance costs after deployment is lower.



Partner with local educational providers and experts to ensure the adequacy, context-specificity, adaptability, and sustainability of DEORE initiatives

This bite-sized content was based on...

DRC Mobile EORE Augmented Reality Application

...and written by:

Nick Vovk: nick.vovk@drc.ngo

...with the participation of:

Audrey Torrecilla: audrey.torrecilla@gmail.com



- DRC online EORE courses: <https://stopmina.dk/>
- Gambari, Amosa I., Akawo A. Yaki, Eli S. Gana, and Quenn E. Ughovwa 2014 'Improving Secondary School Student's Achievement and Retention in Biology Through Video-based Multimedia Instruction.' *Insight: A Journal of Scholarly Teaching* 9: 78-91
- Griffiths, Mark 2002 'The Educational Benefits of Videogames.' *Education and Health* 20(3): 47- 51.
- Hamari, Juho, Jonna Koivisto, and Harri Sarsa 2014 'Does Gamification Work? A Literature Review of Empirical Studies on Gamification.' Paper from 2014 47th Hawaii International Conference on System sciences (p. 3025-3034).
- Kennewell, Steve and Alex Morgan 2006 'Factors Influencing Learning Through Play in ICT Setting.' *Computers & Education* 46: 265-279.
- Rodrigues, Marcelo José and Paulo Simeão Carvalho 2013 'Teaching Physics with Angry Birds: Exploring the Kinematics and Dynamics of the Game.' *Physics Education* 48(4): 431-437.
- Truong, Huong May 2016 'Integrating Learning Styles and Adaptive E-learning Systems: Current Developments, Problems and Opportunities.' *Computers in Human Behavior* 55: 1185-1193

© 2021 DRC

EORE AG
Explosive Ordnance Risk Education
Advisory Group