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## Game-Based Learning: An Innovative and Scalable Approach to Mine Risk Education

Ta Thi Hai Yen  
*Catholic Relief Services*

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# Game-Based Learning:



Figure 1. Screenshot of start page of MRE app.  
All images courtesy of CRS.

## AN INNOVATIVE AND SCALABLE APPROACH TO MINE RISK EDUCATION

by Ta Thi Hai Yen [ Catholic Relief Services Vietnam ]

More than forty years after the war, Vietnam remains highly contaminated with 800,000 tons<sup>1</sup> of landmines and unexploded ordnance (UXO) such as artillery shells, bombs, missiles, and mortars contaminating 6.1 million hectares of land. According to the *Landmine & Cluster Munition Monitor*, landmines and UXO were the cause of 129 deaths and 241 injuries between 2008 and 2017.<sup>2</sup> Survey findings show that children are one of the most high-risk groups in many provinces in Vietnam, including in heavily-affected provinces such as Quảng Trị, Quảng Bình, Bình Định, and Quảng Nam.<sup>3</sup> Since the end of the war, children have been disproportionately affected by mine and UXO-related accidents, of which 38 percent resulted from children playing with mines and UXO—mainly small bombs and M-79 munitions<sup>3</sup> that they did not realize were dangerous. In 2015, a Catholic Relief Services (CRS) survey of 1,836 post-war landmine survivors found that 16 percent experienced accidents between the ages of six and ten (primary-school age) and 18 percent experienced accidents when they were aged eleven to fourteen (secondary-school age).<sup>4</sup> Though the Vietnam government and international organizations have made efforts to reduce the amount

of contaminated land, it is likely that several decades-worth of work<sup>5</sup> are necessary to completely clear the land and water during which time children and youth will still be at risk. Although mine risk education (MRE) has been taught in primary schools for years, lessons are not standardized and are often only included as part of other lessons or extracurricular activities. Without frequent and in-depth lessons and discussions on MRE, many students' knowledge of the risks of mines remains dangerously insufficient.

### DESIGN STRATEGY

To address these inconsistencies, CRS Vietnam, with funding from the Office of Weapons Removal and Abatement in the U.S. State Department's Bureau for Political-Military Affairs (PM/WRA), developed a digital game-based learning application for children ages eight-to-twelve years old. The application includes thirty minutes of narrated, media-rich gaming that can run on Android, iOS, Windows, and Mac operating systems. The app has features in both Vietnamese and English and can be downloaded for free from Google Play and Apple. It is also designed to be easily shared, and

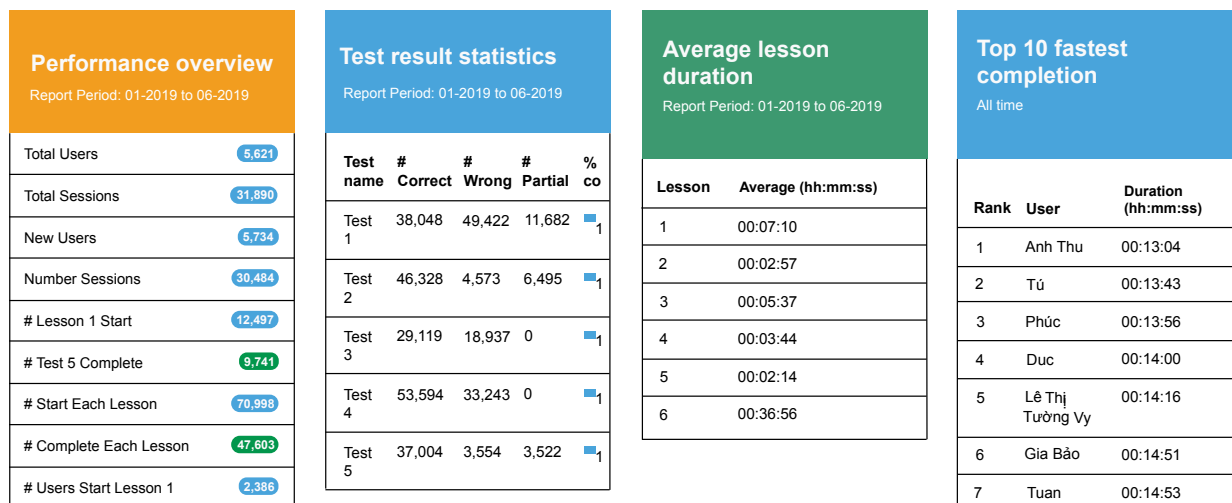


Figure 2. Information created from data collected through the back-end system.

users are encouraged to share this app via emails and messages by either clicking the sharing icon in the app’s main lesson or simply responding to the sharing reminder that pops up while playing. The app has both online and offline functionality and is designed to be user-friendly and age-appropriate for both boys and girls in the Vietnam cultural context.

The five stages of the app are equivalent to lessons. These lessons cover important MRE topics: the characteristics of landmines and UXO, risky behaviors that lead to accidents, ways to prevent accidents, consequences of accidents, and clues to identify contaminated areas. Key messages for each lesson are supported by eye-catching illustrations and lively sounds to keep players excited and interested. Each stage ends with a *challenge*, which is a test to measure players’ knowledge when they complete each stage. After completing all five stages, players are given one last challenge to test their overall knowledge.

This app provides a platform to provide children with standardized quality MRE that they can access frequently. By playing this game, children can practice behaviors and thought processes in a simulated environment that have real-life applications. In addition to dynamically engaging young learners, it also facilitates learning for educators and adults as well.

Another key feature of this app is a back-end system to track basic demographic details about users as well as their performance and progress through the five stages. Basic information on users’ character name, sex, age, and province is collected at the users’ discretion, ensuring that users’ full identities are protected. Information

gathered about users’ countries through their internet protocol (IP) address revealed that this game is used outside of Vietnam as well, indicating that the app is not only of interest to children in Vietnam but is also of interest to people in other countries. Figure 2 features a screenshot of visualized information created from data collected through the back-end system. This system plays a critical role in determining areas where children struggle with specific questions, which allows educators to better tailor in-class MRE lessons.

## LAUNCHING THE MRE APP

The MRE app was officially launched in early December 2018 in the coastal province of Quảng Trị in central Vietnam. To an audience of hundreds of students, parents, teachers, government officials, and various mine action groups, CRS and its local government partners announced that the MRE app would be integrated into the informatics lessons of primary schools in the province.<sup>6</sup>

In January 2019, the app was piloted in twenty-six primary schools across three central provinces of Vietnam: Quảng Trị, Quảng Nam, and Da Nang. Forty-seven school managers and information technology teachers were trained on installing and managing the app and given detailed instructions on its contents and structure. Following the training, the app was integrated into each school’s informatics lessons so students could play whenever they went to the school computer lab. Provincial-level Department of Education and Training officials (DOETs) aimed for at least one-hundred students per school to play the game during informatics classes.

To encourage students to use the app on their parents’ mobile devices, parents were introduced to the app at the end-of-the-year school meetings in May 2019 with the idea that students could continue to play the game throughout the summer break. This provided an opportunity to reinforce students’ MRE knowledge and encourage safe behaviors throughout the year.

In its first six months of operation, from January to June 2019, the app had a total of 5,610 downloads, and users played the game 31,717 times. CRS expects that the number of people exposed to the

Report Period: 01-2019 to 06-2019	
Total users	5,610
Total sessions	31,717
Average time to complete 5 lessons	00:12:56
Average time to obtain certificate	00:22:19
Completion ratio	78%
Number of certificates issued	2,176

Table 1. Test result statistics.



Students are eager to try the app at the launch.

app's content is much higher than the number of downloads (total users) because students typically play together under one user profile at school, and usually play with their parents or siblings at home.

While the app provides comprehensive MRE information, it was also designed to accommodate a wide range of student abilities and ages. On average, most users complete all five lessons in thirteen minutes and need another ten minutes to conquer the final challenge covering content from all the individual lessons and receive an MRE certificate. As of June 2019, 78 percent of the users were able to complete the whole game.

Already, feedback and results have been extremely positive with students indicating that they really enjoy the game and Vietnamese provincial-level government partners expressing serious commitment to ensuring schools in their jurisdiction use this app. The MRE app, by nature of the platforms on which it is available, is accessible to students throughout Vietnam. Downloads and use have expanded to provinces where CRS is not directly implementing MRE programs. Through the Landmine Working Group of Vietnam, CRS has been able to share key analytics on the usage of the app with other partners and create a platform to discuss critical gaps in MRE knowledge and establish key MRE messages to disseminate across the country.

## IMPACT AND SCALABILITY

Delivering key MRE messages in the format of a game helps to keep children interested and to remember the messages longer. Since the deployment of the app, CRS' work exposed 296,230 primary school children to MRE, and in the CRS-supported provinces—Quảng Bình, Quảng Trị, Quảng Nam, and Da Nang—there have been zero casualties.

In the pilot phase, CRS has taken to heart the feedback provided by the government and other key stakeholders. To date, most of it has been positive. A back-end system captures users' performances (lessons they fail, lessons they pass, etc.), indicating gaps in children's knowledge and allowing CRS a means of adjusting the focus/program.

A government partner, Md Nguyen Thi Thuy Thuy, Vice Director of DOET in Quang Tri asserted that "It's critical to provide mine risk education for students to prevent accidents. We appreciate this MRE Play app developed by CRS, as it's a new education tool, which is suitable and appealing to students. It will help them remember information."

Mr. Dinh Bat Chuyen, DOET Representative in Da Nang stated that "This is a good initiative to support MRE at schools. Our teachers and students are very eager with learning new things, especially technologies. This kind of educational game should be introduced to parents as a communication channel to remind students and their family members o[f] MRE messages and prevent UXO accidents in communities."

A fifth-grade student at Cam Lo primary school, Quang Tri Province shared "I like the app very much. It's very interesting to learn MRE through a game."

A teacher who has taught MRE for fifth-grade students for six years at Cam Lộ primary school, Quảng Trị province said that "The app is very useful and highly scalable. I believe that it will be widely used by both students and their parents." All thirty-six students in her class have used the app in the school computer lab.

Globally, CRS is highlighting development of the app and raising visibility around using information communication



Visitors try the MRE app at the CRS booth at the Information and Communication Technology for Development (ICT4D) conference in Uganda.

technology for knowledge sharing. The Vietnam team hosted an internal webinar on 13 December 2018 to educate other CRS stakeholders on the process, cost, intended uses of the app, and the data generated from its use. Furthermore, the app was widely shared through a forty-minute session and at the CRS booth at the Information and Communication Technology for Development (ICT4D) conference<sup>7</sup> in Uganda on 1 May 2019.

The app will strongly complement CRS's class-based MRE but cannot completely replace it in the near future. However, if unable to do class-based MRE when expanding to new project provinces, CRS will use the app as an alternative. As the app is in the form of a game, project staff do not expect major challenges while being played by children in non-project areas. However, CRS will need the acceptance of the local governments of new provinces in order to integrate the app into lessons. Furthermore, as CRS cannot pay to advertise the game in app stores, many people do not know that the app exists. For the future, project staff may consider developing

a second version of the game by increasing its complexity to appeal to an expanded range of user ages. ©

*See endnotes page 59*

**Ta Thi Hai Yen**  
Program Manager  
CRS Vietnam



Ta Thi Hai Yen has been an experienced program manager and specialist in mine and UXO risk education and survivor assistance for CRS Vietnam since 2007. She is experienced in participatory assessment, project design, preparation and management of budgets, results-based reporting, and leading teams. For the past ten years, she has successfully managed projects funded by PM/WRA, the Department for International Development for the United Kingdom, and Korea International Cooperation Agency. Ta Thi Hai Yen is also a graduate of CISR's 2012 Senior Managers' Course in ERW and Mine Action.