Massive study of video games for learning offers good news about the future of safety education

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Video games are often advocated as educational tools that can increase students' knowledge through entertainment. However, published studies

about the effectiveness of video games in education and training are limited in both the number and diversity of participants, lacking the robust evidence that needs a very large, varied, worldwide sample.

Such evidence is now offered by the first massive study of games for learning, according to a research paper published in the *IEEE Transactions on Visualization and Computer Graphics*. The study involved more than 400,000 players worldwide speaking more than 40 different languages. It focused on a notoriously difficult educational goal, that is teaching the general public about the safety procedures that must be followed during aircraft emergencies. A major unresolved issue in aviation safety is indeed lack of passengers' attention to as well as understanding of the pre-flight briefings and safety cards given by airlines.

"To explore a novel way of teaching safety, we created a mobile game that provides players with an experiential, first-person learning experience in vivid, realistic simulations of accidents," explains professor Luca Chittaro, director of the Human-Computer Interaction Lab (HCI Lab) of the University of Udine, Italy. The different levels of the game, called "Prepare for Impact," challenge players to go through and survive major types of emergencies, such as in-flight decompression, ground collision, runway overrun, water landing, crash landing, and fire.

The research team made the app freely available for Android and iOS in Google Play and Apple App Store. Then, they began studying the growing number of international players as they progressed through the different levels of the game. In addition to analyzing the gameplay of 425,021 participants, the study examined additional data from 45,164 participants who agreed to take a thorough safety knowledge test before playing the game and after completing four game levels.

Results of the study showed significant improvement in players' knowledge, using different metrics. Analysis of improvement in participants who took the knowledge test highlighted a statistically large effect size. Moreover, analysis of gameplay data from all participants showed significant improvement over time in their capability of assessing the threats posed by the different accidents and taking the right decisions for survival.

The study also focused on the possible role of making errors in the game, linking them to improvement in safety knowledge. "Turning failure into an expected and even desirable event," says Chittaro, "is a very interesting feature of using games for learning. While making errors in a traditional classroom environment is an unpleasant experience, a well-designed game environment encourages learner's exploration of what-if scenarios that makes instead players curious about what is going to happen when they make mistakes."

More information: Chittaro L., Buttussi F. Learning Safety through Public Serious Games: A Study of "Prepare for Impact" on a Very Large, International Sample of Players, IEEE Transactions on Visualization and Computer Graphics, September 2020, pubmed.ncbi.nlm.nih.gov/32894716/

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