

Combat Medical Care Conference / Journal of Special Operations Medicine French serious games for Medics

Title

3D-SC1, a serious game for forward combat casualty care training of French soldiers: development, deployment and assessment.

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Background: The French Military Medical Service has standardized its military prehospital care policy in a “*Sauvetage au Combat*” (SC) program (Forward Combat Casualty Care). A major part of the SC training program relies on simulations, which are challenging and costly when dealing with more than 80,000 soldiers. In 2014, the French Military Medical Service decided to develop and deploy 3D-SC1[®], a serious game intended to train and assess soldiers managing the early steps of SC.

Objective: The purpose of this paper is to describe the creation and production of 3D-SC1[®] as well its deployment and assessment, based on a study aiming to evaluate the impact on performance of additional training with 3D-SC1[®].

Methods: A 10 experts group, and the Paris Descartes University Medical Simulation Department spin-off, Medusims, coproduced 3D-SC1[®]. Medusims are virtual medical experiences using 3D real-time videogame technology designed for educational purposes (training and assessment) to simulate medical situations. These virtual situations have been created based on real cases and tested on mannequins by experts. Trainees are asked to manage specific situations according to best practices recommended by SC, and receive a score and a personalized feedback regarding their performance. Furthermore, a recent study assessed the performance of soldiers randomly assigned to one of two groups, before (measure 1) and after (measure 2) receiving additional training. This training involved either 3D-SC1[®] (Intervention group), or a DVD (Control group). The principal measure was the individual performance (on a 16-point scale), assessed by two investigators during a hands-on

simulation. First, the mean performance score was compared between the two measures for Intervention and Control groups using a two-tailed paired t-test. Second, a multivariable linear regression was used to determine the difference in the impacts of 3D-SC1[®] and DVD training, and the order of presentation of the two scenarios, on the mean change from baseline in performance scores.

Results: The scenario simulated in 3D-SC1[®] is an attack on a patrol of 3 soldiers with an improvised explosive device explosion as a result of which one soldier dies, one soldier is slightly stunned, and the third soldier experiences a leg amputation and other injuries. This scenario was first tested with mannequins in military simulation centers, before being transformed into a virtual 3D real-time scenario using a multi-support, multi-operating system platform, Unity. Processes of gamification and scoring were applied, with 2 levels of difficulty. A personalized debriefing was integrated at the end of the simulations. The design and production of 3D-SC1[®] took 9 months. The deployment, performed in 3 months, has reached 84 of 96 (88%) French Army units, with a total of 818 hours of connection in the first 3 months.

In the assessment study, a total of 96 subjects were evaluated: seven could not be followed-up, while 50 were randomly allocated to the Intervention group, and 39 to the Control group. Between measure 1 and measure 2, the mean (SD) performance score increased from 9.9 (3.13) to 14.1 (1.23), and from 9.4 (2.97) to 12.5 (1.83), for the Intervention group and Control group, respectively ($p < 0.0001$). The adjusted mean difference in performance scores between 3D-SC1[®] and DVD training was 1.1 (95% confidence interval 0.3, 2.5) ($p = 0.14$). Overall, the study found that supplementing SC1 training with either 3D-SC1[®] or DVD improved performance, assessed by a hands-on simulation.

Conclusion: The development of 3D-SC1[®] involved a collaborative platform with interdisciplinary actors from the French Military Medical Service, medical university, and videogame industry. Training each French soldier with simulation exercises and mannequins is challenging and costly. Implementation of 3D-SC1[®] into the training program offers a unique and efficient opportunity at a lower cost to improve training and subsequently the real-time performance of soldiers when managing combat casualties; ideally, these should be combined with physical simulations.

References

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