A Virtual Reality Based Training System for Increasing Resilient Performance in Crisis Management Organizations

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Summary: This paper explores how virtual reality (VR) based training systems can be used to increase resilience in Crisis Management (CM) teams. Today’s training systems largely focus on technical and procedural skills, enforcing limitations on the freedom of interaction the trainee has compared with the real world. Although these types of skills are crucial to successful response operations, the dynamic and unpredictable nature of a crisis also requires skills that are flexible, adaptive and creative. In this paper we present and discuss a variable uncertainty framework for resilience training, developed as part of an ongoing development of a CM training system.

Crisis management operations take place in multi-organisation teams that respond to a single, or series of, event(s) that are initially outside their control. It is possible for these teams to train for their response in general terms, but in practice every event will have unique aspects that make full preparation difficult to achieve. Therefore, key aspects of crisis management training include teamwork, dealing with the situation in a flexible manner, and increasing the skill of adaptive thinking (Raybourn, 2007). These skills involve responding to what is actually taking place and adapting to the situation as is required.

Resilience is a common perspective used to understand abilities associated with unexpected events in crisis management (for a review on views of resilience in disaster management, see Manyena, 2006). Resilience is the ability to deal with changes that go outside of the designed-for system tolerances. During response operations organizations mainly strive toward maintaining established and known aspects such as policies, procedures, practices or tools. However, when some aspect of this fails or is inadequate to deal with the current situation, resilience is important for an effective response effort (Kendra & Wachtendorf, 2003). It has even been debated how strong the relationship between pre-planning and effective response is (Somers, 2009). The main argument for this debate is that pre-planning discourages organizations from recognizing and responding to the unique challenges and needs of each event. However, this does not mean that teams do not need training. Research focused on flexibility, improvisation and creativity all point in one direction: these are not emergent phenomena, they are skills that can and ought to be trained (Cunha, 1999; Mendonca & Fiedrich, 2006; Moorman, 1998; Vera & Crossan, 2004; Vera, 2005).

Training CM organizations usually consists of partial or full scale exercises. As Auf der Heide (1989) points out, is it necessary to train often as crises differ from every-day, routine emergencies. However, live exercises involving multiple agencies are costly in terms of time and funding, making digital technology an important new source for training. Also, training systems often have limitations to train adaptive behaviour as they are context-specific and anchored to the technical environment (Dekker et al., 2008). Training flexibility in unpredictable and unforeseen situations therefore poses challenges both to technology and to our imagination.

The ongoing development of a simulation-based CM training system, that utilizes game technology, is used as a basis to explore ideas on how resilience potential in CM organizations can be increased. The system uses an interactive simulation environment for multiple players and is intended to aid people involved in CM to train and practice the handling of crises in a collaborative virtual environment. Three European CM organizations in three different countries have been studied and data has been analyzed using training needs analysis and competency analysis (method is described in Van der Pal & Abma, 2009). The comprehensive data collection and analysis lay the basis for further investigation of how the current training needs can be met using digital technology.
Based on the needs of the organizations, we propose a variable uncertainty framework for resilience training. Training scenarios have the problem of being time consuming to create, and are often play out in a linear and rigid manner. In this new framework training instructors can add or alter events at different levels (e.g. when, how many and complexity), using injects. This can be done before and during the training session, creating dynamic scenarios with an increased uncertainty level. Training objectives can be set for individual and team training.

The framework will be presented using a number of examples explaining how these can be implemented and altered to fit a variety of training needs. For instance, if the training objective is role improvisation, injects into the scenario let trainees step out of their boundaries of procedural training or current role (for elaboration on procedural and status improvisation, see Webb et al., 1999). If the training objective is to be flexible, alterations of the scenario will allow opportunities for adapting to unexpected events. These alterations could be, for instance, communications disruption, a power cut, or secondary explosions. A training objective may be to improve communication skills between organizations (boundary spanning, see Mendonça, 2008; Woods, 2006). This can be done by altering or limiting resource capacities in various organizations.

Based on the studies of the three CM organisations, we have developed a framework for increasing resilience training within procedural, multi-user training activities. The next step is to then implement and evaluate this framework within the context of a CM virtual training system.

ACKNOWLEDGEMENTS

The research for this study was carried out under the CRISIS project, funded by the European Commission’s FP7 Framework Programme for Security Research, Grant Agreement Number FP7-24247.

REFERENCES