Chapter 13
Emergency Management Training and Social Network Analysis: Providing Experiential Data for Virtual Responders

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ABSTRACT
The chapter first presents a background review of the application of computer technology in simulations of natural hazard situations. The chapter then presents the efforts of researchers at Mid Sweden University and Nord-Trøndelag University College to build a comprehensive emergency training tool with funding from the Interreg/EU ERDF (European Regional Development Fund). The main part of the chapter reports empirical data from this project GSS (Gaining Security Symbiosis). The project developed the tool for training emergency personnel (police, fire, ambulance, and local officials) in handling crises in the border region between Norway and Sweden. The Web-based software incorporated complex scenarios that the emergency personnel had to contend with during 3-hour training sessions. The participants included employees at the operator, tactical, and strategic level of the organizations. The training tool recorded all communications among participants which primarily was text based. The rich data source was analyzed “on-the-fly” with the software from the R Project for statistical computing and the SNA package (Social Network Analysis package). The statistical software provided detailed graphs of the social networking of communications among the participants on both sides of the national border in central Scandinavia. The chapter concludes with a presentation of ideas towards using the social networking data as input into simulation models based on system dynamics. The empirical data from the project will naturally provide data for future training sessions. A planned future model of the comprehensive training tool—netAgora—will use experiential data in a Virtual Responder component in the training sessions of emergency personnel.

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INTRODUCTION

This chapter describes an EU-funded research project (Interreg) which during the years 2010 – 2013 worked with emergency personnel developing software for training in handling emergencies in the mountainous border region of mid-Norway and mid-Sweden. The ideas for this project was developed with the help of colleagues in Slovenia and Greece during the autumn of 2008 and resulted in a project proposal to the 7th Framework Programme of the EU in December 2008. This proposal did not receive any funding for the four-country collaboration project, but a smaller project received funding from the Interreg Sweden-Norway programme of the EU. The chapter presents background information on research on simulations of natural hazards and the work in the project on developing software for emergency training exercises as a computerized role playing package. The empirical part of the chapter presents data from three years of simulations / role playing exercises with participants within the police, fire and ambulance emergency response personnel in both countries. The chapter concludes with presenting the plan for a comprehensive training tool – netAgora – that will be the focus of a new project by the participants of the completed research project. Nord-Trøndelag University College and Mid-Sweden University will be the principal investigators of the project planned for 2015-2018.

BACKGROUND

Over the last 40 years, the application of computer technology in order to train individuals and organizations in the handling of emergencies has been in focus as a means of making the training process more effective and realistic. During the late 1970’s the Federal Emergency Management Agency in the US (FEMA) initiated a study utilizing networked computers (Terak) in studying variations in response-pattern among participants receiving a simulated tornado threat (Leik et al., 1981). In 1980, the laboratory research expanded the computerized simulations to handle human response to the threat of volcano eruptions following the eruption of Mt. St. Helens in May 1980 (Ekker, Gifford, Leik & Leik, 1988). Post and Fox (1982) has documented the programming of experiments on a Terak computer. The author participated in the programming of a set of Terak computers using UCSD Pascal from the University of California San Diego (Threedee.com, 2015). The operating system used around 1978 on these computers was a version of RT-11 (Cryptosmith.com, 2015), and it had no networking capabilities, and the FEMA funded project hired a computer scientist to implement a networking component of the RT-11. This pioneering work on the operating system RT-11 resulted in providing the project with three networked Terak computers running experiments/simulations from 1978 until 1981. The simulations were run in mobile homes in Minneapolis and in Washington State (following the Mt. St. Helens eruption in 1980), wired with a primitive implementation of a LAN (local area network). Currently there is collaborative work on a UCSD Pascal implementation as a SourceForge project (SourceForge.net, 2015). Recently, the University of California San Diego released parts of the source code and a non-profit license.

Research on computerized training for personnel handling emergencies has focused on the challenges of inter-organizational as well as international issues. The work of Stolk, Alexandrian, Gros and Paggio (2001) focuses on training for environmental crisis based in the experiences of the GAMMA-EC Project. The project trained the staff of environmental agencies in handling...