

# Learning ICT–Mediated Communication through Computer–Based Simulations

**Paula Poikela**

*Lapland University of Applied Sciences, Finland*

**Hanna Vuojärvi**

*University of Lapland, Finland*

## INTRODUCTION

Working life practices in healthcare and social work have undergone significant changes in recent years. Among other things, employees are required to contribute to multi-professional teamwork, make urgent decisions under pressure, attend to their clients' safety as well as their own, and make clients aware of their rights and the conditions of the services. All these challenges require careful communication (Bradley, 2006; Fryer, 2013; Milligan, 2007), which nowadays is often supported and mediated by information and communication technologies (ICTs). In Finland, the use of State Security Networks Ltd. (called the VIRVE network in Finland) and TERrestrial Trunked RADIO (TETRA) phones is recommended in all health and social care routine communication processes and emergency-rescue situations. This is due to Finland's geographical location and sparse population.

The VIRVE network is a digital network built specifically for the use of authorities. It was established at the beginning of 2000 according to the pan-European TETRA standards and is currently used in everyday practice and in crises by the armed forces, rescue services, border guards, police, health and social services, as well as some private and government companies that operate closely with the authorities. The Ministry of Transport and Communications provides permits for the use of the VIRVE network. Similar networks are also used in other countries, for example, RAKEL (*RAdioKommunikation för Effektiv Ledning*) in Sweden, *The Airwave Network* in Britain, and Astrid (*All-round Semi-cellular Trunked Radio communication network with Integrated Dispatching*) in Belgium. Even though the TETRA network is mostly used in Europe, it is also spreading rapidly into regions of Asia, the Middle East, and South America. In Finland, the VIRVE network covers the entire Finnish global system for mobile (GSM) communication networks (Fryer, 2013; Poikela, Ruokamo, & Keskitalo, 2013) and assures flawless communication even when the distribution of electricity is interrupted.

The TETRA phone that was used in the study described in this article resembles a traditional GSM phone and actually affords common GSM functionalities, such as phone calls and SMS messages. Its appearance and technology are designed to endure water splashes and cold, and it can be accessed even with gloves on, for example, by firemen. The phone includes basic number buttons, and an additional emergency button and a tangent button that enable fast communication with several recipients simultaneously.

TETRA phones are widely used by authorities due to several benefits they have in communication processes. For example, in healthcare, they can be used for communication in emergency situations and daily working processes, where they enable the flow of patient information among professionals. Both the VIRVE network and TETRA phones have a high level of data security, which enables users to send

and receive even confidential information, such as patient information. Wide use of the TETRA technology is also useful for work involving multi-professional teams that use a shared tool for communication. In disaster situations, such as large traffic accidents or rescue situations, TETRA and VIRVE together enable effective and fast communication. The VIRVE network and TETRA phones work even in situations where GSM fails.

Despite the recent development in technologies, there are some gaps that need to be addressed to make communication more fluent and efficient and to establish the wider use of phones in areas of healthcare and social work. Often, these gaps are not so much about technological questions—that is, what types of devices would be most useful—but more about developing human processes and working practices.

The need to develop communication skills has also been acknowledged in healthcare education, which has transformed teaching and learning methods, especially over the past two decades. In particular, it has led to the development of simulation pedagogy, through which it is possible to teach not only individual skills but also multi-professional teamwork and care processes (Gaba, 2004; Milligan, 2007; Rall & Dieckmann, 2005; Rall, van Gessel, & Staender, 2011) that involve several professionals and can take place in several phases and places—for example, from a car accident site to a helicopter or an ambulance, and from an emergency room to surgery and finally to an intensive care unit. The simulation-based methods increase large-scale know-how and respond to the educational needs of the younger generation that is currently studying to be healthcare professionals (Poikela, Ruokamo, & Keskitalo, 2013).

The study presented here focuses on computer-based simulations. The research activities were a part of the MediPro research project (2012–2014) that investigated technology-supported service processes, especially the use of the TETRA telephone, in the social work and healthcare sectors. The aim of the project was to develop pedagogical models to support teaching and learning processes and technology using simulation-based learning. The objective of this study was to examine students' perceptions of how meaningful learning themes—concrete, personal, social, liable, content-based, and metacognitive (Poikela & Ruokamo, 2014)—occur in computer-based simulation that focused on learning ICT-mediated communication via TETRA phones. Quantitative data ( $N = 124$ ) were collected over 11 simulation training sessions and analyzed statistically. The results of this study will contribute to developing computer-based simulation training, both in terms of pedagogical practices and technical devices.

In the following section, the concept of simulation pedagogy is presented and discussed, with a focus on the pedagogical models developed for computer-based simulation training and how the results of quantitative analysis support the themes of meaningful learning. Later, the study and its results are presented and discussed.

## BACKGROUND

### Simulation Pedagogy

Simulations have been used as a teaching method for several decades in many fields of expertise (Rosen, 2008). Since the late 1990s, their use has also become common in healthcare education, and there is vast potential for using simulations in teaching and learning processes with or without the support of different types of ICTs. There is a wide range of simulation modalities available, and they can be categorized as:

1. Task trainers,
2. Low fidelity simulations,

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