

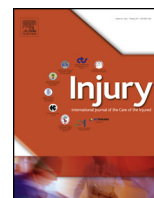


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The potential of blended learning in education and training for advanced civilian and military trauma care

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ABSTRACT

Introduction: In the field of advanced care of the complex trauma patient, there is an emerging need for focused education and training. However, several hospitals do not support further education and training in this field, and the challenge of releasing time for physicians and nurses is well-known. Educational strategies using blended learning, which combines traditional classroom methods with modern computer-assisted methods and media, have not yet been widely used. This study analysed the educational challenges and areas for improvement, according to senior physicians and nurses, and investigated the potential use of blended learning.

Method: The setting was an international course, *Definitive Surgical Trauma Care (DSTC) – Military Version*, part of a programme which prepares health professionals for work during extreme conditions. The sample consisted of senior physicians and nurses, participating in the course in September 2015. A survey was completed, interviews were performed and a post-course survey was conducted 18 months later in March 2017.

Results: The most difficult aspect of learning how to manage the complex trauma patient, was the lack of real practice. Even though the respondents were knowledgeable in advanced trauma, they lacked personal experience in managing complex trauma cases. Cases presented during the course represented significantly greater complexity of injury compared to those usually seen in hospitals and during military deployment. The following educational challenges were identified from the study: (1) Lack of experience and knowledge of advanced trauma care. (2) Lack of the use of blended learning as support for education and training. (3) Limited time available for preparation and reflection in the education and training process. (4) Lack of support for such education and training from home hospitals. (5) The unfulfilled requirement for multidisciplinary team-training in the military medical environment.

Conclusion: Educational strategies and methods, such as blended learning can support education and training, and the learning process by unlimited practice in reasoning and decision making in virtual patients. It can also provide flexibility and mobility for senior health professionals and their home hospitals, and contribute to an improved military pre-deployment training with less time strain on the civilian home hospitals.

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Introduction

In the Nordic countries where expertise, trauma volume and the experience in the management of major trauma are limited, there is an increasing need for training and education in advanced civilian and military trauma care, to meet the new demand on society [1,2]. In several European countries, the number of military

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health care providers is limited, and their armed forces make extensive use of civilian physicians and nurses, who are deployed as needed. As a result, increased civilian and military interchange has also been called for [3]. Hospitals do not always support education and training in this field and the challenge of releasing time for physicians and nurses is well-known [4,5]. It is critical to provide adequate education and training to prepare civilian health professionals for the extreme environment they will face when deployed with the armed forces. The military medical environment is characterized by multiple casualties, need to work under hostile fire, in darkness, extreme cold or heat, and with shortcomings in available medical resources such as equipment, and delays in transport to hospital [6]. Collaboration with other professionals such as military officers or medical personnel from other nations is also frequently challenging. Earlier studies have identified a lack of common understanding between civilian health care personnel active within military medicine, and professional military personnel [5]. It is therefore essential that health professionals be supported in education and training, to understand, and be prepared for the extreme environment in which they will be working.

New strategies of how to provide a more flexible education and training for health professionals in the multidisciplinary field are needed [4,7]. Blended learning (BL) mixes various learning styles and environments during the learning process. BL is a flexible type of learning that combines traditional classroom methods with modern computer-assisted methods and media [8]. BL is therefore able to provide improved support, collaboration, flexibility and mobility [8,9]. The armed forces in the Nordic countries have been proactive in the development of technology, and its application in several fields of military interests, both within education and training itself. However, despite the rapid development of digital technologies, traditional didactic education has only taken advantage of it to a very modest extent, nor has it taken place to the same extent in the field of military medicine [4,7,10,11,12,13]. This study analysed the educational challenges, as expressed by senior physicians and nurses, and investigates the potential use of blended learning in advanced civilian and military trauma care.

Method

Study setting and sample

The setting was a military version of a high-end international course, the *Definitive Surgical Trauma Care Course (DSTC)* [14]. The DSTC is internationally well-established, and the course aims at teaching techniques particularly applicable to the patient who requires surgery and intensive care for major trauma. It contains a mixture of didactic lectures, group discussions, and practical wet tissue training. DSTC is one of several courses in a military medical programme preparing physicians and nurses for work during extreme conditions in the military medical context. Physicians and nurses from different hospitals participate annually in the course, which until now has been running without any use of blended learning.

The sample consisted of 51 senior physicians and nurses participating in the course during September 2015.

Full surveys and interview questions are available from the main author upon request.

Course survey, interviews and post-course survey

The course survey collected data of outcomes from the course and the participants were surveyed about the content, at the end of the course.

The interviews aimed to collect data focusing on a deeper understanding of the educational challenges, needs for improvement and earlier experiences of blended learning in education and training. The concept of blended learning was introduced during the interviews to initiate a constructive discussion of its possible use. Blended learning as a concept was defined as the combination of traditional classroom methods with modern computer-assisted methods and media (i.e. physical and online presence of both instructors and learners) [8,9,15,16]. Eleven health professionals who participated in the course volunteered for individual semi-structured interviews. The interviewees were six surgeons, two anaesthesiologists and three specialized nurses. The interviewees were working with trauma but lacked the experience of patient management in advanced trauma or military medicine, such as injuries from high-energy projectiles and blast wounds from explosives. All interviews were performed by the first author (LS) and recorded for subsequent analysis. An online *post-course survey* was distributed 18 months later (March 2017) with the same individuals, focusing on earlier experiences of advanced trauma care, the use of knowledge derived from education and training and the perceived need for further improvement. The online post-course survey was conducted through e-mail to 42 participants. The discrepancy between the original 51 participants, and subsequently 42 resulted from an inability to follow the remaining nine, due to incomplete contact details.

Data analysis

Thematic analysis was used to identify and analyse patterns from the collected data, into specific educational challenges, and perceived need for improvement in education and training [17]. The collected data from the DSTC course survey, interviews during the course and the online post-course survey was analysed by mapping the answers in relation to the questions and the data was arranged into themes.

Ethics approval and consent to participate

Participation in surveys and interviews was optional for course participants, and did not affect their participation or outcomes within the course. Information about the study was given by the course director at the beginning of the course. The first author (LS) participated as an observer during the course and was available to answer questions about the study. An ethical application for the study was submitted to the Regional Ethical Review Board in Stockholm, Sweden, who waived the need for specific approval (reference number: 2016/1701-31/5)

Results

Outcomes from the thematic analysis are presented as identified educational challenges, indicating areas for improvement, and the potential for blended learning.

Experiences and knowledge of advanced civilian and military trauma care

According to the respondents, the most difficult aspect of learning how to manage advanced trauma cases, was the lack of real practice. Even though the respondents were experienced and educated in advanced trauma, the nature of cases in the military situation, differed significantly compared to trauma cases in civilian hospitals. However, the education and training in advanced military trauma was considered as being of particular value in their daily civilian work, mostly in the decision making required in major surgical trauma cases, and according to one respondent, it

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