ICT as a Catalyst in Problem-Based Learning Processes?  
A Comparison of Online and Campus-Based PBL in Swedish Fire-Fighter Training

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ABSTRACT

This article focuses on the impact on learning processes when digital technologies are integrated into PBL (problem-based learning) oriented distance training. Based on socio-cultural perspectives on learning and a comparative distance-campus as well as a time-perspective, instructor and student roles, and learning activities were explored. Interviews with instructors and students were collected from the two study modes at the beginning and at the end of the training period. The results showed that online PBL, compared to campus-based PBL, evolved towards a more individual, real-life and literacy-oriented problem-solving process with supervising instructors and self-directed learning among students. The follow-up study in the latter part of the training showed that the extended technology integration resulted in both phases of dissemination and normalization. The development in online PBL affected both the course design and educational talks throughout the training. However, the prevailing teaching culture and educational deficiencies of new instructors contributed to a gradual normalization of the online PBL.

Keywords: Digital Technologies, Distance Learning, Fire-Fighter Training, Instructor Role, Learning Activities, Learning Processes, Online PBL, Problem-Based Learning, Student Role

INTRODUCTION

This article is about the impact on learning processes that occur when digital technologies are introduced and integrated in PBL-focused educational context in Swedish fire-fighter training. Problem Based Learning (PBL) has been an established teaching method in this education for many years, and when the distance mode started in 2008 it was also introduced and integrated there. Within this mode, the face-to-face based PBL structure is replaced with an online environment, in which mediating technologies are used to distribute content and as tools for communication and collaboration. Given the traditionally situated nature of fire-fighter training, where teaching preferably has occurred on training grounds and in customized training rooms with teaching instructors, this study examines the consequences that arise as a result of this change. In order to deepen the understanding of the learning processes that take place, this study has a qualitative actor- and time-oriented comparative approach, in which
particular attention is drawn to the instructor and student roles, and the learning activities that develop within each study mode, campus and distance.

Drawing on socio-cultural perspectives on learning, in which social learning, mediating and situated aspects are emphasized (Lave & Wenger, 1991; Vygotsky, 1978; Wertsch et al., 1995) the focus is directed towards how instructors and students in interaction with the tools PBL and ICT and teaching contexts develop learning activities and allocate roles in teaching. In socio-cultural terms, this relationship can be described as a mutual influence process in which actors, tools and environment together contribute to actions and activities being able to take place. In line with this, Wertsch (1998) formulates the socio-cultural focus of research as “the relationships between human action, on the one hand, and the cultural, institutional, historical contexts in which this action occurs, on the other” (p.24). In this relationship the mediating tools “provide the link or bridge between the concrete actions carried out by individuals and groups, on the one hand, and cultural, institutional, and historical settings, on the other” (Wertsch et al., 1995, p. 21).

This study incorporates several relevant aspects for the research area PBL and online PBL. Firstly, a comparative perspective is included, where learning processes developed within each study mode are studied. It complements previous research, where PBL to a great extent has been studied in relation to traditional classroom teaching with focus on learning effects or instructor and student satisfaction (see for example, Albanese & Mitchell, 1993; Dochy et al., 2003; Strobel & Barneveld, 2009). Secondly, a time perspective is included, which shows the changes over time of the learning processes developed during the training period. This aspect is an important complement to previous research, showing among other things the retention effects of PBL after graduation (Strobel & Barneveld, 2009).

Last but not least, the study was conducted in an educational context, which only to a sparse extent has been the subject of previous research within this research area. Previous studies on PBL are preferably carried out in higher education and in other vocational training such as medicine, nursing, economics and teacher training (Savery, 2006). Previous research on PBL in firefighter training shows that different views prevail about this teaching method. For example, Göransson (2004) shows that the lack of knowledge among both instructors and students about the purpose and goals of PBL together with a strong knowledge transmission tradition, contributes to PBL not getting any major impact. However, Streichert et al. (2005), who studied PBL in courses with participants from various rescue organizations, shows that PBL was favoured in comparison with other teaching methods, as traditional exercises and other case methodologies (Harvard Business School). In their study, PBL was considered to create more realism and greater interactions between different professional groups.

The overall purpose of this study is, on the basis of a comparative distance and campus perspective, to describe and analyse the impact on the learning process that occurs when PBL is integrated with ICT. More specifically, this article aims to answer the following questions:

- What impact does the integration of ICT and PBL have on instructor and student roles, and learning activities that develop within the online PBL in comparison to the development taking place in traditional campus-based PBL?
- What changes can be identified over time, with respect to the above-mentioned aspects?

The article is structured in the following order. First, descriptions of the educational context and the research field are given, followed by a description of methodological aspects. The results and analyses are then presented and finally a discussion section follows, which includes conclusions and implications.
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