Chapter 12

VideoPaper as a Bridging Tool in Teacher Professional Development

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ABSTRACT

This study demonstrates the possibilities of new media and affordable technological tools that support teacher professional development in a workplace setting. A team of 5 mathematics teachers in a secondary school is followed over a period of six months as they work jointly to improve their teaching and team practice using a multimedia Web developer system (VideoPaper). VideoPaper is an easy-to-use tool for developing and sharing of Web documents that integrates video resources, images, and texts reflecting local practices. The framework of Developmental Work Research methods aligned to historical-cultural activity theory (Engeström, 2001, 2008) was adapted to the local needs and workplace conditions. The findings point to changes in teachers' conceptual approaches to learning and teaching, and to the significance of technology-enhanced support for professional development. The study contributes to an understanding of the complexities in bridging practices between social and technological design for teacher development and the development of learning communities.

INTRODUCTION

In modern knowledge organizations, practices for facilitating collaboration, creation, advancement, and sharing of knowledge are considered some of the most important challenges for professional and institutional development (Gherardi, 2006; Hakarainen, Palonen, Paavola, & Lehtinen, 2004; Nonaka

& Takeuchi, 1995). However, the school development and teacher professional learning literature does not reveal a straightforward solution to the complexity of these challenges (Darling-Hammond & Bransford, 2005; Fullan, Hill, & Crévola, 2006; Hubbard, Mehan, & Stein 2006; Leithwood & Louis, 1998; MacBeath & Mortimore, 2001).

A growing body of studies concerns the use of new technologies in schools to facilitate collaborative learning, knowledge building and knowledge

advancement among students (Scardamalia & Bereiter, 1994, 2006; Stahl, 2006; Wasson, Ludvigsen, & Hoppe, 2003). However, there is a lack of knowledge related to how technology may support advanced workplace learning and professional development among teachers (Paavola & Hakarainnen, 2005). A promising field of research that moves beyond some of these limits is the development of online and inquiry-based learning environments where teachers create and share lessons plans, learning resources, and descriptions of classroom practices through case stories and videos. The Inquiry Learning Forum (IFL) (Barab, MaKinster, & Scheckler, 2003), the LeMill learning toolbox (Calibrate, 2005), and the multimedia authoring tool VideoPaper (Beardsley, Cogan-Dew, & Olivero, 2007) are examples of inquiry-oriented technologies that focus on the community aspect of teachers' learning. However, there is a need for further research on the integration of such technologies in real workplace settings that support teacher professional development, for example, in nested improvement design of classroom practices. Research on online design reveals the complexities of bridging practices between net-based and social levels for teacher professional development (cf., Barab, Kling, & Gray, 2004; Kling & Courtright, 2003).

In this chapter, we present and examine a small-scale intervention study in a workplace setting for mathematics teachers in an upper secondary school that explores the systematic development of classroom practices supported by a multimedia web-developer system (*VideoPaper*), i.e., an easy-to-use tool for the joint development and sharing of web-documents that integrate video resources, images, and texts reflecting local practices. The tool was accessible online through a restricted domain open to the participants. The VideoPaper technology was originally designed to support student teachers/teachers in reflecting upon their practices (Beardsley, Cogan-Drew, & Olivero, 2007; Olivero, Sutherland, & John, 2004); however, the actual study extends this

user scenario by including experienced teachers in a workplace and communal setting for professional development. The study focuses on how the teachers become aware of the salient features of their instruction when participating in different spaces for design, assessment, and reflection. We seek to understand how the actual technology may support professional practices in a real workplace setting. This integral design perspective seems to be a necessary extension of existing approaches to online learning (cf., Barnett, 2006; Schlager & Fusco, 2003).

TOOLS AND RESEARCH DESIGN

VideoPaper Technology

The Java-based VideoPaper Builder software, developed by the U.S. Concord Consortium and TERC (2000) (http://vpb.concord.org/), enables the user to insert and in various ways interlink texts, images, and video resources, and to publish the combined resources as a user-friendly multimedia web document. The possibility of publishing text and video side-by-side makes *VideoPaper* a powerful tool to annotate digital video, cf. Figure 1.

Figure 1 depicts a screenshot of VideoPaper divided into three sectors: A, B, and C. Sector A is where the video and slides are imported and displayed, sector B is where the navigation buttons and menus are generated, and sector C is where textual annotation and descriptions are described and presented by the writers of the VideoPaper. Content is added with easy-to-use text formatting tools and is connected to multimedia content by simple control buttons. Control buttons are easily inserted in the text as triggers for 1) video playback, 2) overlays adjustable to the video, and 3) slides or pictures to appear below the video playback window. The activity of interconnecting video, images, and text with the help of the VideoPaper builder allows the production of the textual sto-

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