From the individual to the group: tracing preservice teachers' conceptions of transformational technologies

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Abstract: This study describes the conceptions of technology held by two preservice teachers and how they may have influenced group talk and work within a collaborative technology infusion project. Analyses establish that preservice teachers saw technology as a utilitarian tool rather than a transformational one. These conceptions were influenced by their personal experiences and were not altered greatly by peer contributions. They could also be seen to influence group talk and the ultimate creation of the infusion project.

Introduction

Due to the variety of "text forms" that are being created as a result of improving information and multimedia technologies, understandings of literacy must be broadened to include a variety of discourses and meaning-making modes in order to include and emphasize different social, cultural, and material contexts. Technology has great potential for helping learners become constructive producers of knowledge rather than just reactive consumers of information because its affordances encourage the integration and reformulation of both old and new knowledge (Cope & Kalantzis, 2000; Luke, 2003; Kress; 2003; The New London Group, 2000). Although the catchphrase "technological integration" pervades the educational realm, not all preservice teachers see the value of incorporating technology in their teaching aims. If teacher educators are to foster effective, progressive uses of technology, they must first identify the conceptions that affect preservice teachers' understandings and implementations of technology. When conceptions of technology interface directly with teachers' pedagogical knowledge and practices, then technologies can move from existing as mere artifacts, to being used as significant tools, to becoming potential transformers of education (Zhao, 2003). Preservice teachers can make connections between what they already know and what they are learning and thus engage with the material in ways that precipitate meaningful and authentic learning. For example, a webquest that hosts copies of primary sources makes available to the preservice teacher the experience of engaging firsthand with those sources as a historian (in addition to engaging with them as a traditional preservice teacher). In this way, the preservice teacher may construct a learning experience that is both socially relevant and personally meaningful, and subsequently more likely to be applied in other experiences. Such affordances often aid the transformation of educational experiences from experiences where information is merely received and processed to experiences where information is authentically applied and retained.

This study explores the ways in which two preservice teacher's conceptions were received and understood by the other members of their group and how these understandings may have influenced the creation and organization of their subsequent technology infusion project. Sociocultural theories of learning place a strong emphasis on the social construction of knowledge (Cole, 1996; Greeno, Collins, & Resnick, 1996; Pea, 1993). From this perspective, the members of a group construct knowledge as they interact with each other and share information (Cole, 1996; Greeno, Collins, & Resnick, 1996). Likewise, in a joint problem space group members interact with each other in order to arrive at joint solutions to some task or problem (Hmelo, Nagarajan, & Day, 2000). Collaborative learning research also demonstrates the importance of introspective, high quality discourse because such discourse provides opportunities for constructive processing (Greeno, 1998). In this study, the technology infusion project was designed to serve as an innovative and authentic technology learning practice that would encourage preservice teachers to safely model educational technology integrations before testing them in "real" classroom environments. The project asked preservice teachers to look at the processes behind the technological media in order to determine what purposes those processes could serve in an educational context. Preservice teachers needed to work collaboratively in order to not only ask quality questions about the underlying principles of their project, but also to complete the assignment.

Methodology

Qualitative methodology was used in order to construct a detailed, intrinsic case study that allowed for intense descriptions and close analyses of these preservice teachers' conceptions within the larger culture of the educational technology course (Stake, 2000; Johnson & Onwuegbuzie, 2004). Data collection included a variety of sources: field notes, class observations, participant responses to four online, open-ended prompts, pre- and post-project interviews, and digital video of group work during the technology infusion project. The preservice teachers were enrolled in a required educational technology course designed to encourage the appropriation and integration of transformative uses of technology. Their conceptions of technology were examined in order to 1) explore the preservice teachers' understandings of technology and 2) describe and trace how these particular conceptions may have contributed to group talk and the group collaboration that shaped the creation of the final group project. The group examined consisted of 2 English education and 2 Social Studies education preservice teachers. This study focused on the conceptions of the 2 English preservice teachers in comparison to the rest of their group in order to look at conceptions of technology that may be formed within disciplines that concentrate on literacy aims. The technology infusion project encouraged each content area group to create a sample lesson plan that integrated technology for a fictional class of high school history preservice teachers. Viewing the video corpus several times allowed for the identification of potentially significant clips, were then transcribed verbatim and coded by themes. Occurrences of group talk that indicated themes that significantly alluded to conceptions of technology were selected as significant clips. . The analyses of the pre- and post-project interviews were situated against a hermeneutic analysis of the themes revealed in the other data sources in order to develop an intrinsic case study for each participant. The data was analyzed using constructivist grounded theory methodology in order to facilitate the building of dominant categories by coding turns within all of the individual participant data and group data (Charmaz, 2000).

Discussion

The participants described technology as an academic tool that could support learning practices. They described technology in general as: powerful, frightening, fascinating, facilitating, and extraneous. As a whole, the participants' conceptions of technology did not include those of a potential transformative medium that encouraged the emergence of new or changing educational goals and practices. Conceptions of technology as a facilitating tool in support of traditional literacy practices prevailed in both their individual conceptions and during group discussion of the group technology infusion project. Cross-case analyses established that the conceptions the English preservice teachers held, which saw technology as a primarily utilitarian tool rather than a transformational one, were greatly influenced by their personal experiences with technology and were not altered greatly by the content and/or theories presented by their instructor or their peers in the educational technology course. Technology was referred to as a tool that could support learning, but it was not referenced as a transformational agent that could potentially change learning experiences. Elements of their conceptions could clearly be seen in different aspects of the final group infusion project. Although the two Social Studies education group members did not exactly share all of the same conceptions about technology as the English education participants, all group members did have several conceptions in common. The most-referenced common conception was that technology best served education as a supportive tool. However, the final project created by all group members clearly exhibited elements that could be directly attributed to statements made about the utilitarian function of technology by the English education preservice teachers. Based on the analyses of both individual and group talk in the joint problem space, it did not appear that the Social Studies education preservice teachers were persuaded or intimidated by the English education preservice teachers to define and structure technological application in their project in the utilitarian way that they did. Rather, it seemed that their own, perhaps somewhat less keenly expressed (or explored) ideas about technology, were not only reaffirmed by the English education preservice teachers' voiced sentiments, but were subsequently and easily adopted as part of the group's joint solution. Despite a well-intended course curriculum, all of the preservice teachers seemed to see technology as an "add-on," rather than an integrative component. Finally, these conceptions could also be identified in the English education preservice teachers' own predications of the types of technological integration they foresaw themselves employing in their future classes.

Understanding preservice teachers' conceptions with regards to technological tools is important to future technology and education integration, especially in light of constructivist and poststructuralist calls for the reconceptualization of traditional concepts of technology, learning, and teaching (Luke, 2003). As a result of this research, I suggest that two key practices be incorporated into educational technology courses. If these two practices have already been built into an educational technology course, it is critical that they are re-examined in terms of

actual instructional objectives, sequencing of both independent and dependant enabling skills, and genuine opportunities for student engagement. In the educational technology course observed in this study, it appeared that these practices were vaguely alluded to as information that the preservice teachers were assumed to have read and comprehended (e.g., transformational technology practices were discussed in one chapter of the text for this course). It was not observed that these practices were concretely and deliberately implemented or (rather importantly) modeled for the students. First, preservice teachers need to articulate and explore their conceptions of technology within a larger societal context where collaborative activity may encourage community discussion. By having preservice teachers identify and communicate their understandings of technology to others, they engage both their critical and reflexive thinking skills. Also, it may compel them to think affectively about the roles and spaces where technology intersects their lives and to think about disengaging technology from societal and cultural biases in order to understand what personal relevance technology has for each of them. Second, preservice teachers need to be deliberately engaged in collaborative, potentially transformative educational technological activities in order to expand intellectual resources available to individuals and subsequently the knowledge base from which they draw their conceptions of technology from. Activities that engage preservice teachers in inquiry projects using web-based resources, computer simulated discovery, and exploration or digitally aided measurement and analysis could be some ways of integrating technology into an educational curriculum. Applying such practices may create a potentially different and transformative technology experience to compare to other experiences that already exist in their personal histories.

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