

Affordances of an electronic forum in support for pre-service teachers' collaborative reflective practice and knowledge building

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Abstract

The main objective of this design experiment (Brown, 1992; Collins, 1992; 1999) was to evaluate the characteristics of a hybrid learning environment (onsite/online interactions) for collaborative reflective practice (Schön, 1983) and knowledge building (Scardamalia & Bereiter, 1994); two key elements for pre-service teachers' development. The concept of affordance (Gibson, 1979) was helpful to understand how participants interacted with the characteristics of the environment before, during and after their field experience. We concentrate here on affordances that were available during the field experience, i.e. those from an electronic forum. Research results are coming from qualitative and quantitative descriptive analysis. They illustrate how online interactions can combine with onsite experience to engage pre-service teachers in rich discourse about innovative teaching practices.

Introduction

The learning sciences (Bransford, Brown & Cocking, 1999; Sawyer, 2005) emphasize both cognitive and social processes in learning thus calling for changes in the way we approach teaching and learning. In the Province of Québec, Canada, an educational reform is underway, one that promotes a socio-constructivist perspective as an epistemological foundation. Reflective practice and professional development are recognized as a key part of any innovation strategy (Guskey, 1995, Fullan, 1993; Lieberman, 1996; Little, 1993).

Information and communication technologies (ICTs) offer promising possibilities to this end (Kollias & Kikis, 2005; Putnam & Borko, 2000; Voogt & Knezek, 2008) because ICTs can be used to tighten the university-school relationship, an important characteristic for bringing coherence into an educational innovation process (Holmes, 1990). These elements can contribute to transform the learning environment into a hybrid mode, one characterized by onsite and online interactions. In such a context, new practices are likely to emerge and unforeseen challenges to arise, especially for pre-service teachers. At the dawn of the knowledge age, it seems crucial to learn from each other and to reinvest what has been learnt for collective professional gains to be made (Bereiter, 2002).

For preparing students to deal with the realities of the knowledge age, teacher communities are called to update their collective repertoire of practices. With such considerations in

mind, we designed a hybrid learning environment to support pre-service teachers before, during and after their field experiences and student teaching in the networked classrooms of a secondary public school (technology-oriented program). Our design aimed at fostering collaborative reflective practice (Schön, 1983), considering such an unfamiliar and challenging classroom context for them, and knowledge building (Scardamalia and Bereiter, 1994) considering the novelty of such a working context for teachers. These are key processes for knowledge improvement, individual and collective. Our research objective was to evaluate in what way our design supported reflexive and knowledge building discourses all along the pathway of a field experience. In the context of this proposal, we focus on characteristics that were available during the field experience, in particular those supporting online interactions. Thus, the following questions were investigated:

- Which are the characteristics of the hybrid learning environment that were perceived by pre-services teachers while they were interacting online?
- What types of reflexive online discourse did occur?
- How did the knowledge building online discourse unfold?

Framework

To understand how pre-service teachers perceived the characteristics of the hybrid learning environment, we adapted Gaver's (1991) distinction of different types of affordances (perceptible affordances, hidden affordances, and emergent affordances). They describe the interactions taking place between a designer's intention and a user's perception. In our context, affordances were to support collaborative reflective practice and knowledge building.

Collaborative reflective practice was inspired by Schön's (1983) concept of reflective practice when the professional activity is complex. It refers to the process of distancing oneself from one's action with the intent to improve one's effectiveness. We added a collaborative dimension so peers could contribute to the improvement of individual knowledge. To this end, ICTs are recognized to afford collaborative reflective practice (Naidu, 1997; Osterman & Kottman, 2004). As knowledge also grows out of a collective dynamic, we've also considered the knowledge building concept (Scardamalia & Bereiter, 1994) in our design. This process refers to deliberate idea improvement for one's local professional community's collective knowledge and beyond.

Methods

The design research methodology (Brown, 1992; Collins, 1992, 1999; Kelley, Lesh, & Baek, 2008) is recognized as well suited for educational innovation. This research methodology was used to improve reflective practice and knowledge building processes about teaching and learning in a networked classroom. More specifically, the design effort aimed at supporting pre-service teachers' field experiences and student teaching in innovative classrooms, school-based networked classrooms, that is, classrooms in which each school learner used a personal laptop and was connected to online resources, and university-based networked classrooms, that is, classrooms in which each pre-service teacher interacted onsite and online with others (Laferrière, Bracewell, Breuleux, Erickson, Lamon, & Owston, 2001). One part of the design was the introduction of an electronic forum, Knowledge Forum, to support pre-service teachers' collaborative reflection and knowledge building. Two types of affordances were designed: social and digital. Social affordances refer to human-human interactions mediated by technology (Kreijns, Kirschner & Jochems, 2002; Bradner, 2001; Bielaczyc, 2001; Little, 2003; Kozma, 2003) whereas digital affordances refer to human-machine interactions that support reflective and knowledge building processes, such as hard scaffolding (Brush & Saye, 2002). Our design evolved all along the experiment in light of what was learned from one pre-service teachers cohort to another.

All participants were registered in a four-year integrated B. Ed. in secondary education. They all did their field experiences in the same secondary school. From the fall session of 2002 to the end of the 2005 winter session, forty-five pre-service teachers (nine cohorts) did their field experiences (10 dispersed days or 5 weeks in a row or four-month duration) in a networked classroom.

We inquired into pre-service teachers' recognition of the affordances of the hybrid environment by conducting two interviews: one at the very beginning and another during the last part of participant's field experience. Our objective here was to determine when and in what way pre-service teachers did perceive the characteristics of the environment. Next, we investigated the types of reflective online discourse generated by the participants. To do so, we performed a

content analysis based on Van Manen's (1977) three levels of reflexivity on the practical (technical, deliberative, and critical). Notes written in the database were coded using a propositional unit of analysis. Finally, for deeper understanding of the discourse, and especially progressive discourse (Bereiter & Scardamalia, 1993), we also analyzed in an inductive manner specific discourse sequences, i.e. notes linked to one another by participants themselves.

Results

As regards the perceptible affordances present in the electronic forum of the designed hybrid learning environment, social affordances were acknowledged more quickly than digital ones, i.e. at the very beginning of the field experience. Moreover, pre-service teachers' experience (students who did more than one field experience) in the hybrid environment was a factor in the perception and use by other pre-service teachers who were part of the same experience during the same semester.

The set of scaffolds most visually apparent, the one based on an adaptation of the knowledge building principles (Scardamalia & Bereiter, 2003), was more frequently used (85 %) than the reflective analysis set of scaffolds (5 %). Pre-service teachers generated discourse in accordance with our adaptation of the knowledge building principles, 72 % of the time. In addition, we noticed differences in the nature of the reflective discourse in relation to the use of the different sets of scaffolds: The knowledge building set of scaffolds was more often associated with deliberative and critical levels of discourse (Van Manen, 1977) than was the reflective analysis set of scaffolds.

On some occasions, when pre-service teachers went beyond their own individual reflection and moved to communal advancement, collaborative reflective discourse transformed into knowledge building discourse. At a more fine-grained level of analysis, we noticed that although each discourse thread had its own organizational logic, common patterns could be identified. Discourse threads began with an authentic question growing out of the field experience. Through the exchange, the initial shared object (question or problem submitted) was reformulated as new details offered more precision and as practice-based evidence was added. Approval-type discourse not only supported but helped link participants' ideas. Authoritative sources were used

in a limited manner; but in each, they added depth to idea formulation. When comparing each cohort's longest discourse thread over the four-month long student teaching experience, we noticed a higher level of problem reformulation over time, proportionally to the number of notes in the sequence. We stress that a vertical approach was taken by more experienced pre-service teachers as they not only set the problem but progressively updated its formulation as their discourse lead, not only to new solutions, but to a more complex understanding of the problem raised.

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