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Pre-service teachers' use of the objective knowledge framework for reflection during practicum

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ABSTRACT

This empirical study, conducted in a Canadian university, argues that the objective knowledge growth framework (OKGF), a self-directed reflective approach, can contribute to the professional development of pre-service teachers in dealing with the complexities of teaching. The paper seeks to answer the following research question: How do pre-service teachers use the OKGF as a self-directed professional development tool to solve teaching practice issues that arise during their practicum? It offers a critical analysis of 24 pre-service teachers' use of the OKGF, as well as the trends in their application and interpretation of the OKGF in solving issues of teaching practice during practicum.

1. Introduction

Teaching is complex and problematic despite being perceived as "a well ordered, technically proficient and purposefully directed routine" (Loughran, 2006, p. 30). In spite of teachers' thoughtful planning, the very act of teaching creates situations that can be anticipated but that are not always fully addressed until they arise in practice. The image of an "indeterminate swampy zone" (Schön, 1983) comes to mind when describing the world of practice because teaching is a complex endeavour. It is messy in the sense that it is difficult to understand and master (Berry, 2004, p. 1312).

Myers and Simpson (1998) suggest that teachers learn about teaching "by teaching and from teaching" (p. 58), because the range of teaching experiences are "logged intellectually into a teacher's conceptual framework and built into his or her personalized professional set of knowledge, skills and values" (p. 58). If such a view of teaching is to prevail, educators need to understand their teaching as investigation, experimentation, reflection and analysis of what goes on in their classroom practice, and how they use their own personal professional theories to guide them in their future practice (Myers & Simpson, 1998, p. 58).

This empirical study, conducted at a Canadian university, argues that the objective knowledge growth framework (OKGF), a self-directed reflective approach, can contribute to the professional development of pre-service teachers in dealing with the complexities of teaching (Chitpin & Simon, 2006; Evers & Chitpin, 2003). The OKGF enables teachers to develop the habit of reflection, thereby continuously accessing new lenses to view student learning, and alter their perceptions and perspectives that bring previous decisions up for re-evaluation. Moreover, the paper seeks to answer the following research question: How do pre-service teachers use the OKGF as a self-directed professional development tool to solve teaching practice issues that arise during their practicum? It offers a critical analysis of 24 pre-service teachers' use of the OKGF during their field placement. First a brief literature review on the OKGF and its application in the teaching context is presented, followed by a description of the methodology and the results. Next, the paper moves on to discuss the trends noted in the pre-service teachers' application of the

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framework. These trends not only revealed pre-service teachers' patterns of action, they also produced the unexpected finding that the OKGF serves as a valuable tool for gaining insight into the main critical issues considered by pre-service teachers and their interpretation of the OKGF to solve teaching practice issues that arise during their practicum. Finally, the paper concludes with a discussion of the limits of the study, and implications for future studies.

2. Objective knowledge growth framework

Hoban (2002) conceptualizes the complexity in teaching through a systems approach and demonstrates that teaching can and should be viewed as a complex system. His view about differentiating control from management is important in understanding the complexity of teaching because it is in the managing of the many inter-relationships in a pedagogical setting that the skill, knowledge, ability and professional autonomy of teachers comes to the fore. The OKGF can play a role in helping pre-service teachers acquire skill, knowledge, ability and professional autonomy because it provides them with a self-directed and structured reflective process that takes into account the complexities and challenges associated with teaching. The framework promotes reflection, which has been touted as one of the most promising paths to developing effective teaching strategies that, according to Stoiber (1991), result in higher pedagogical reasoning, a greater sense of responsibility towards students, and improved self-perception as a problem-solver. It also has the potential to help pre-service teachers examine their practice in a systematic and thoughtful way in order to hone their practice or extend it in new ways. In addition, the framework can enable pre-service teachers to articulate and test their beliefs and biased assumptions, as well as challenge their expectations of students. Finally, the framework prompts pre-service teachers to face their own attitudes, particularly those that may impede their potential for tolerance and acceptance in meeting the needs of a culturally diverse society (Larrivée, 2006).

The OKGF, which is based on the work of Karl Popper, a post-positivist philosopher, is a reflective deduction model of professional development. It goes a step further than Dewey's (1957) and Vygotsky's (1978) with respect to knowledge growth theories. Dewey and Vygotsky both emphasized the intuitive and non-conscious nature of situated expertise where skills become gradually automated and routine by training (Noble & Watkins, 2003). However Popper's approach is more goal oriented in that it assumes that there is a problem to be solved. It also emphasizes the symbolic and logical resolution of the cognitive problem rather than the practical adaptation, which involves changes in the subject and the object (Crossley, 2001; Emirbayer & Mische, 1998; Knorr-Cetina, 2001; Miettinen & Virkkunen, 2005). Finally, it views knowledge as discussable, criticisable and evolved through the self-critical elimination of theories when solving problems of practice.

The framework can be represented by the following schema:

$$P1 \rightarrow TT1 \rightarrow EE1 \rightarrow P2.$$

P1 is the problem to be solved, TT1 is a tentative theory (TT) that the learners offer in order to solve the problem, EE1 is the process of error elimination (EE), and P2 is a new or reformulated problem. The first column of Appendix A provides an example of an application of the schema. Pre-service teacher Joan identified her initial problem as (P1) "how to get students to be attentive during circle time?" She proposed using the strategy of "stopping and waiting quietly until everyone notices, and is ready to continue" as her tentative theory (TT1). In examining her (TT1), she found out that "there was a sufficient amount of time wasted" (EE1). She then refined her tentative theory (TT2) to the strategy of "clapping hands in a rhythm and having them repeat the clapped rhythm". Her (TT2) in the second column was more progressive and sharper in empirical content than her (TT1). That is, each of her tentative theories became more epistemically progressive in content as depicted in the final columns of Appendix A. However, from the perspective of Popper's critical rationalism, all theories remain essentially tentative or hypothetical, even when one feels that she is unable to doubt them any longer. Until a theory has been refuted, one can never know in what way it may have to be modified.

Despite its critics (Lakatos, 1978; Maxwell, 2002; Mayo, 2006; Ulrich, 2006), critical rationalism is well accepted in the scientific community. In fact it was used by Sir John Eccles in his Nobel Prize winning research in 1963 (Bohm & Hiley, 1993; Pratt, 1995). Recently, Mikser (2005) suggested it would be a useful framework for critically evaluating the scientific content of two basic traditions in education and their utility in improving the educational curricula. Critical rationalism has also captured the attention of medical researchers as having the potential to ease tension between traditional medicine and complementary alternative methods (Parusnikova, 2002). It has likewise been adopted in considering the role of emerging technology in military operations and in considering the phenomenon of force transformation (Reid & Giffin, 2003). Further, Popper's theory was used in a study involving systematics. The study concluded with a recommendation for adopting Popper's scientific method in future courses to fully understand systematics (Helfenbein & DeSalle, 2005).

Empirical studies have been conducted on the use of this reflective framework as the basis for professional development for teachers (Chitpin, 2003, 2006; Chitpin & Evers, 2005; Chitpin & Simon, 2006; Evers & Chitpin, 2003). In a series of case studies, the authors attempted to demonstrate that teachers' professional learning, from their documentation of experience, could be fitted to the OKGF. Conversely, the participants in Chitpin (2006) and Chitpin and Simon (2006) studies were systematically introduced to the OKGF and applied it to their practice. Findings from all of these studies suggest that regardless of the teachers' professional training (pre-service or in-service teachers), of their background, or of their prior