

Project Yuva: The Design of a Case-Based Multimedia Environment for Pre-service Teachers

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Introduction

This paper describes the integration of a case-based digital learning environment (*Project Yuva*) into a teacher education course, and the impact that environment had on preservice teacher thinking around teaching science in urban settings with respect to issues of diversity and social justice.

The three cases in this environment are drawn from extensive data gathered from two urban middle schools in New York City as part of a larger project. The cases, presented in multiple formats (video, text) illuminate the issues central to the teaching and learning of transformative science in urban settings. These issues include: (1) students' funds of knowledge and how funds of knowledge relate to science (Bouillion & Gomez, 2001; N. Gonzalez & Moll, 2002), (2) strategies (teacher and student) for leveraging funds of knowledge in science learning (Swidler, 1986), and how students' funds of knowledge contribute to the composite culture of the classroom (Hogan & Corey, 2001). In this environment we refer to the combination of "students' funds of knowledge and the strategies they employ to activate those funds" as their "science toolkits" (see Swidler, 1986; Seiler, 2001). We also refer to how teachers understand students' funds of knowledge, their own funds of knowledge, and the strategies *they* use to draw upon them as their "pedagogical toolkits."

Project Yuva provides preservice teachers opportunities to: (1) Explore urban students' "science toolkits" from multiple perspectives and (2) Generate a set of defensible claims (and to provide concrete evidence for those claims) about teaching science for diversity and social justice in urban settings. It was created with the belief that the addition of this case based digital learning environment in a teacher education course (on urban science education) would provide teachers with a shared context to explore issues related to teaching science for diversity and social justice, in a safe but challenging environment.

Research Questions

Two research questions frame this study for the purposes of this presentation:

1. How do preservice teacher's ideas about teaching science in high poverty urban schools develop over their participation in *Project Yuva*?
2. How do teachers' understandings of what it means to teach for social justice and diversity develop?

Conceptual Framework:

Preservice teachers typically see themselves as "committed individuals, having good parents, good values, a good education, and a good sense of what is expected from them as teachers (McIntyre, 1997). In contrast, they see students of color as not having- as somehow deficient" (p. 135). Many teachers hold on to such beliefs even after undergoing educational experiences that specifically focuses on an anti-deficit approach (Williams, Newcombe, Woods, & Buttram, 1994). Goodlad's (1990) study on teacher education in the US showed that many teachers "were less than convinced that all students can learn. They voiced the view that they should be kind and considerate to all, but they accepted as fact the theory that some simply can't learn." Schultz *et al.* (1996) also found that preservice teachers have stereotypic beliefs about urban children e.g. they believe that urban youth have attitudes that interfere with education.

Over the past decade or so, several educators have revitalized the field of urban science education research with their agenda for social justice and action research (Calabrese Barton, 2002; N. Gonzalez et al., 1993; Hogan & Corey, 2001; Moje, 2001; Moll, Amanti, Neff, & Gonzalez, 1992; Rodriguez, 1998; Swidler, 1986; Varelas, 2002). We believe that these anti-deficit perspectives are an important part of an urban teacher's pedagogical toolkit, and *Project Yuva* presents such perspectives to teachers in a tangible manner through authentic cases from urban classrooms.

Project Yuva is grounded in theories of development research (Brown, 1992; Van den Berg & Visscher-Voerman, 2000) and constructivist case-based environments (Jonassen, Peck, & Wilson, 1999). We opted for a constructivist case-based environment because of its advantages in teacher education: learner controlled environments, opportunities to revisit classroom events,

multiple perspectives, and procedural support for instructional design and classroom teaching (Horvath & Lehrer, 2000; Koehler & Lehrer, 1998; Lampert & Ball, 1998; Lehrer, Petrosino, & Koehler, 1999; Merseth, 1996; Van den Berg & Visscher-Voerman, 2000). Also, the non-linearity of multimedia learning environments such as those developed by Lampert and Ball (1998) enhances the effective use of cases by allowing the user to revisit various sources of information and to build and store flexible and multiple links among various pieces of information (Putnam & Borko, 2000).

Methodology

The embedded case study design (Yin, 2003) has been employed in this project, where the course Urban Science Education is the context of the study and 6-8 preservice teachers in the course are the subunits of analysis. Data were collected through participant observations as well as collections of weekly and semester-long assignments, teaching philosophy statements, reflections, and fast-writes. Further, the 6-8 case study participants were interviewed in depth throughout the course of the semester and will be observed and interviewed during their field placements as well.

Findings

In presenting the stories of two preservice teachers enrolled in the course, two key tensions have been traced through the data:

1. A major methodological tension we anticipated (in the design of Project Yuva) is the tension between making a justifiable case for the claims presented in *Project Yuva* around science learning in high poverty urban schools, and the transferability of those claims to preservice teachers' own classroom experiences (in their student teaching and observation experiences). Using the teachers' own stories, we present in this paper, how our preservice teachers were able to negotiate this particular tension to incorporate the claims into their own pedagogical toolkits.
2. Also of interest is the tension between theory and practice omnipresent in preservice teacher education. A critical finding hidden in the preservice teacher stories is the impact that using a case-based environment has on developing preservice teachers' pedagogical toolkits by offering a more tangible understanding of abstract theoretical concepts in authentic classroom settings. Part of the story we tell in this paper is how those understandings were incorporated into the preservice teachers' pedagogical toolkits and further, how they were then drawn upon in the student teaching experience.

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