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PREVIEW

EMPOWERING TEACHERS: A CRITICAL ETHNOGRAPHY
OF A MULTICULTURAL SCIENCE REFORM

by

Susan Beth Koba

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska-Lincoln

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Interdepartmental Area of
Major: Administration, Curriculum & Instruction

Under the Supervision of Professor Elizabeth Kean

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DISSERTATION TITLE

Empowering Teachers: A Critical Ethnography of a Multicultural

Science Reform

BY

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GRADUATE COLLEGE
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Empowering Teachers: A Critical Ethnography of a Multicultural Science Reform

**Susan Beth Koba, Ph.D.
University of Nebraska, 1996**

ADVISOR: ELIZABETH KEAN

The purpose of this collaborative, critical ethnographic study was to understand teacher culture during a science reform process; to determine barriers to reform; and to serve as an advocate during attempts to reduce these barriers.

The issue leading to this study was inequitable achievement of students of color in science. The research team implemented a science program designed to resolve this inequity; however, barriers made implementation difficult. The focus of the study was to describe teacher culture as the team identified barriers and worked to overcome them and improve science learning.

Data included observations, interviews, journals, videotapes, and collaborative conversations. Thematic analyses were completed at three points during the research. These analyses provided cultural snapshots which demonstrated teacher change.

Early themes included: access to materials; beliefs aligned with Freire's (1970) banking concept of education; standards which fit students into a bell curve and viewed teachers as producers of "good" students; classroom control; and teaching ambiguities.

Mid-research themes changed to: need for change; teacher and curricular responsibility for student failure; collaboration; teacher talk and student voice; and student control of knowledge.

Final themes included: team as safety net; hierarchical power issues;

alignment of teacher and learner roles; voice and power; and stress vs. goals.

Barriers to change included personal barriers which arose from the paradoxes of teaching and from beliefs about teachers, learners, and knowledge; professional barriers which dealt with teachers' power; and institutional barriers which limited teacher change.

Conversational patterns and teacher perceptions of action research were used to determine the mechanics of change. Conversational analysis showed a shift from researcher-driven conversation and problem-solving to collaborative conversation in which co-researchers jointly solved problems.

Change was driven by praxis through cycles of reflection and action. Early reflection was individual. Slowly, teachers included co-researchers and students in the reflection/analysis process. As collaboration increased, barriers were broken. Collaborative research/conversations which centered upon theory and practice promoted teacher change.

Such information can provide direction in efforts to provide equitable science learning environments.

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Dedication

This dissertation is dedicated to my children, Kirsten Marie Koba and Jason Michael Koba. They brought me the joy that only maternal relationships can bring, the pride in their learning and development which made them fine people, and an image of what young people can be. They provide the picture I hold in mind when I work to improve education, and they *are* the fabric of a world which could be.

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Letter for School District Agreement

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Letter for Participant Agreement

PREVIEW

CHAPTER I

The Research Problem

Introduction

Some educators define cultural democracy as transmitting existing canons to all students; this existing knowledge is often falsely called a common culture of the best that is known; this assumes that democracy means giving out *widely* what has already been canonized *narrowly* as the best. In reality, existing academic canons represent the taste, usage, and knowledge of an elite, developed over centuries in the virtual absence of women, minorities, and ordinary people. This exclusive canon and discourse need multicultural, nonsexist reinventions to become democratic and representative (Shor, 1992, p. 256).

I began teaching in 1971 with two overarching desires. One was my continued desire to learn, especially about the natural world; the other was to share this love with young people in the hope that they, too, would learn to love the exploration of life. I demanded that my life be lived with intensity and quality. I lived my personal and professional lives with the concept of quality as a driving force. On a personal level, I responded to Pirsig's (1974) motorcycle journey to find quality; on a professional level, Glasser's (1992) quality world defined the world in which I strove to live. I was determined to provide *all* students with "quality" educations in "quality" schools, so they had greater chances of living in a "quality" world.

My dilemma then, and the dilemma which many urban schools face now, is that school culture does not always enhance this quality world for *all* students. Indeed, many students are marginalized and denied quality experiences in schools. The exclusive canon about which Shor (1992) speaks is sometimes blatant. However, marginalization need not be so obvious. During my years of teaching, I have seen glaring marginalization due to

segregation and to in-school tracking; I have also seen the more subtle marginalization of students based on institutional frameworks, parents' expectations and teachers' beliefs. If we expect our students to graduate both literate and capable of participating in our democracy, then cultural representation and equitable access to learning opportunities must pervade our classrooms. "Today, in classrooms, we should let our students experience democratic values in order to prepare them for their lives tomorrow in a democratic world" (Fu, 1995, p. 214).

My history with education, however, does not reflect this opportunity. During the years in which I was schooled, marginalization was very obvious since schools were functionally segregated. I student taught in a school whose population was composed primarily of students of color and/or low socioeconomic backgrounds. The school building and the teaching atmosphere were of a diminished quality compared to the suburban and newer schools which attracted middle-class, Caucasian students and capable teachers. My early teaching experiences occurred prior to court-ordered integration and were in urban schools which had high representations of students of color and/or of low socioeconomic status. After mandated integration, I continued to teach in the urban area. The percentage of students of color in schools district-wide then ranged from about 20% - 35% because of enforced integration, but most students in the schools where I taught were still of low socioeconomic status. Though my school system is now integrated, many school systems in the United States are still segregated due to discrepancies in property tax base (Kozol, 1992). Glaring inequalities still exist in many urban areas.

After the court-mandated racial integration of my school system in the

mid-seventies, marginalization did not disappear. Schools in which I taught used "tracking" to separate students by ability level, which tended to separate them by racial and socioeconomic background (Barquet, 1994; Baruth and Manning, 1992; Grant and Sleeter, 1989; Sleeter, 1992). I saw in action the "allocative function of schooling" discussed by Anderson (1987). Tracking had selectively allocated success and failure to students at the classroom level. As a science teacher, I became concerned about the growing gap of achievement between students of color and Caucasian students.

The high school in which I have most recently taught made the effort to eliminate tracking in all ninth and tenth grade science classes with the intent to provide more equitable opportunities for our African-American students. I thought we finally had opened the door of opportunity for all of our students. While "quality" in some science classroom improved, marginalization still occurred.

This time, marginalization resulted on the individual level due to varied teacher expectations and beliefs. Too many teachers' expectations of students of color were based on a deficiency model which resulted from the "uncultural assumption that the current way of functioning is the only approach to teaching and learning" (Shade and New, 1993, p. 328). Sleeter referred to this notion as "rooted in an epistemology that posits a universal 'sameness' among people based on Western norms" (Sleeter, in press, p. 3). As long as teachers refused to see their individual students for their worth, with their ability and in their culture, they continued to marginalize large numbers of students in the classroom. This situation was exacerbated in the science classroom since science teachers, especially in upper level classes, tended to narrowly define success.

At the same time, the importance of equitable access to science learning was even more critical due to the growing importance of science literacy. The increased demand for science, math and technology skills in the technological work force required a larger job pool, traditionally filled by Caucasian males. The inclusion of a more diverse group of graduates into the work force was required to meet the growing demand; but, females and students of color were denied the opportunity to gain knowledge which would help them move into higher paying jobs, make important life-decisions and enter a "quality" world (AAAS, 1989; AAUW, 1992; Barquet, 1994; Bates, 1994; Klapper, 1993; Linn, 1994). I saw that our schools not only marginalized students in their learning experience but also cast them into marginalized positions in our society.

Changing demographics have amplified the problem and will continue to do so. "In 1928, the population of students 5-17 years old was 73.3% white, 14.9% black, and 8.9% Hispanic; but by the year 2020, these numbers will have become 52.7, 19.8, and 23.9% respectively" (National Research Council, 1990, p. 77). If access for all has been a problem, the problem will only increase if the educational status quo is maintained until 2020.

In addition to demographic changes, national data have shown an achievement crisis when non-white students' and white students' achievements have been compared. While there has been essentially no difference in achievement scores upon school entry, a gap has been evident by the end of the elementary school years. This has been compounded by the fact that many students of color have dropped out of the educational system before graduation. Non-white students have begun to drop out earlier than white students (Kagan, 1992).

My community's and school district's data have reflected the same

trends. While seventy-five percent of the total adults in our community have graduated from high school, a disproportionate number of African Americans and Hispanic Americans have not graduated. Elementary African American students have not achieved at the same level in mathematics and science as their Caucasian counterparts. While enrollment of African American students in algebra and biology have been representative of their overall enrollment in the district, enrollment in upper-level science and mathematics courses has dropped dramatically (1994 District Data). Finally, achievement of African American students in math and science overall has been appalling. Less than 5% of African American students have pursued advanced mathematics or science in college after graduation (1993 District Data).

Ogbu (1994) suggested that racial barriers to success have come from two sources. First, institutional barriers have affected the "quantity and quality of black education not only directly, but also indirectly by shaping black perceptions of and responses to schooling" (Ogbu, 1994, p. 84). The second source of barriers has been the "pattern of perceptions and coping responses of blacks themselves" (Ogbu, 1994, p. 84). Ogbu recommended that, in order to improve African American school adjustment and performance, policies and programs must address both sources of barriers to equitable access. My concern has become that these inequities will be exacerbated if the status quo is maintained (the barriers not addressed) and if demographics continue to shift. Educators, schools and school systems need to consider ways in which to provide equity and excellence for *all* students in science classrooms rather than deny "quality", reinforce a social class system and maintain the canon of the elite.

Calls to Action

There have been many calls for reform during the past decade. Though the primary impetus for each of these reform efforts came from our diminishing competitiveness on a global level, equity has been a major component in each reform effort. A report by the Carnegie Commission (1991) on science, technology and government talked about serious shortcomings in U.S. science and math education. It claimed that a large number of American public schools are failing to prepare students for jobs in their future, for a diverse culture and to function in our democracy. It recognized the downward spiral in the lives of poor and disadvantaged children. The National Science Teachers Association (1992) released a position statement on multicultural science education which recognized that they must "work with other professional organizations, institutions, and agencies to seek the resources required to ensure effective science teaching for culturally diverse learners if our nation is to achieve a position of international leadership in science education." Program Standard E from the *National Science Education Standards* (NRC, 1996, p. 221) read, "All students in the K-12 science program must have equitable access to opportunities to achieve the "*National Science Education Standards*." Finally, Rutherford and Ahlgren (1989, p. 200) in *Science for All Americans* from AAAS said that, "When demographic realities, national needs, and democratic values are taken into account, it becomes clear that the nation can no longer ignore the science education of any students."

Each of these reports called for action, for reform; and each recognized that this reform must include *all* children. The dilemma has been however, that each of these efforts have been hierarchical in nature, and the calls for reform and efforts to compile information have been top-down. Teachers, used to this

type of reform effort, have seen it as one more change which will pass and therefore have not taken the reports seriously (Lortie, 1975). Hargreaves and Fullan (1992) suggested that top-down reform efforts have not valued teachers' practical knowledge and often encouraged teacher resistance. Though the rhetoric of change in these calls for action began a decade ago, the average classroom teacher has only recent and surface exposure to the information, an inadequate technical culture with which to address suggested changes (Fullan and Stiegelbauer, 1991; Lortie, 1975; and Rosenholz, 1991) and, certainly, little perceived power with which to institute necessary changes to reach these goals.

Our Early Attempts to Address Reform Issues

A rather unique set of circumstances allowed some of the staff at my school to view our situation through a slightly different lens. In 1989, four of us in the science department had the opportunity to participate in a summer workshop, the Summer Minority Science Workshop. This three and one-half week workshop encouraged teachers to reflect on personal core values, to learn new teaching strategies and to develop multicultural curriculum (Johnson and Kean, 1992; Johnson, Mitchell and Kean, 1994). This workshop used a more humanistic approach to teacher development (Hargreaves & Fullan, 1992) which, instead of being hierarchical, took into account teachers as persons and the contexts of their settings.

As Fullan and Stiegelbauer (1991) recognized, teachers' beliefs are central to their choice of materials and approaches. The emphasized reflection on personal core values in this workshop gave us the philosophical underpinnings necessary for change in our classrooms (Johnson and Kean, 1992; Johnson, Mitchell and Kean, 1994). For me it focused a dramatic,