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ABSTRACT

This study presents the case of a preservice science student teacher with a desire to make science education more accessible to all students. The paper highlights her cross-cultural student teaching experience in an urban middle school with a predominantly Hispanic-American population. Data were gathered from interviews conducted throughout her student teaching experience, a journal in which she recorded her daily experiences and reflections, and classroom observations. Results found that she encountered three cultural borders during her student teaching experience: the culture of the students, the culture of instruction, and the culture of the school. As a science student teacher, she clarified her own beliefs about relevant, meaningful, and student-centered science instruction within her own interpretation of the cultural border. In order to cross the student culture border, she spent time learning about her students and their lives. She learned to understand their culture through the stories in their journals and their personal tales. Her instructional philosophy was often different from that of other teachers at the school. She tried to assimilate her culture of instruction into the predominant one, but by the end of the student teaching experience, she had returned to her own beliefs. She did not move comfortably into the culture of the school. However, encountering borders was beneficial because she knowingly learned more about working within a diverse environment and unknowingly clarified hew own beliefs. (Contains 16 references.) (Author/SM)

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Border Crossings: The student teaching experience of a multicultural science education enthusiast

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Paper presented at the Arizona K-16 Teaching Reforms Conference, Arizona State University West, Phoenix, Arizona, October 10-11, 1997.

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Abstract

This study examines the student teaching experience of Jill; a student who wanted to make science more accessible to all students. Jill's student teaching experience was documented through interviews, observations, and a journal. The process of inductive analysis revealed that Jill encountered three cultural borders during her student teaching experience: the culture of the students, the culture of instruction, and the culture of the school. As a science student teacher, Jill clarified her own beliefs about relevant, meaningful, and student-centered science instruction within her own interpretation of the cultural border. This study suggests that preservice students will encounter cultural borders, and that preservice programs should provide multiple field experiences with diverse students, time for crossings to happen, and ample information about effective instruction for diverse students.

Border Crossings: The student teaching experience of a multicultural science education enthusiast

> *The kids arrived at 8 A.M. and swarmed into the class, each of them pausing to murmur a dutiful good-morning. One small fry climbed into a seat only to be accosted by a larger girl who said that he was seating in her seat. He said something unintelligible (to me). She cuffed his head, he swung a fist, then she drifted into another seat while I watched the whole scene. I think that I said something profound like "now, now." After this everyone sat erect in his seat appraising me with indirect glances, looking around at one another, then giggling and looking back at me. I felt ludicrously white.* (Conroy, 1972, p.22)

Pat Conroy (1972), in his memoir The water is wide, describes the first few minutes of his first day as a teacher in the school on Yamacraw Island, in South Carolina. His statement shares with the reader his feelings of being different from his students; an experience that is becoming more common among the new teachers of 1990's. As teachers of today work with students of different cultural backgrounds they encounter a variety of cultural differences; specifically, the differences between themselves and their students, other teachers, the school, and the community. When encountering different cultures, new teachers, like Conroy, knowingly and unknowingly make decisions that allow them to either cross into the culture or reside outside of the culture. This study specifically examines the cultural borders that one student experienced as she completed her student teaching in a culture different than her own.

Each culture has a border and these borders are unknowingly and knowingly crossed by the person who encounters the culture. A border crossing, as described by Aikenhead (1996), is the journey a person makes from one culture or subculture to another. Culture being defined as the norms, values, beliefs, expectations, or actions of a group (Phelan, Davidson, & Cao, 1991), and subcultures being defined as identifiable groups that share qualities of a culture. Pat Conroy, for example, experienced several borders, some of which he crossed and some of which he did not

cross. One border he did not cross involved the treatment of students. Mrs. Brown, the principal of his school, constantly reminded Conroy that the students were use to and needed a strict learning environment that included "the whip." Conroy would listen, but disagreed with the need for this type of management. He never crossed the border of the school's culture that valued a stringent learning environment.

Aikenhead (1996) further adds that border crossings can be effortless or problematic. Effortless border crossing are those experiences which we frequently engage in and are consistent with our belief systems. An example of an effortless border crossing would be a constructivist science teacher learning to utilize a new student-centered methodology in his class. The nature of the methodology would be consistent with the teacher's belief about teaching and would ultimately be subsumed into his repertoire of instructional strategies. Problematic border crossing are those that cause us difficulty in learning and are inconsistent with our belief systems. For example, a science student who believes in creationism would experience a problematic border crossing as she learned about evolution. She would find herself at odds with the espoused thought and may accept the presented information for the test or she may choose not to listen at all.

This study is about the borders that are inherent during the science student teaching process. This study is specifically about Jill[1], a preservice science student who completed her student teaching in a culture different than her own. It is about the cultural borders of the students, instruction, and school that Jill did and did not cross during her student teaching. This study contributes to the field of research that focuses on learning to teach science in diverse cultures[2].

Relevant Literature

As student populations in schools become more diverse, teachers will need to be better prepared to meet the needs of their students. In preservice education, this translates into creating programs that increase the awareness of different cultures among future teachers, and providing preservice teachers with opportunities to experience, explore, and understand cultures other than there own. Unfortunately this task is much easier to espouse than enact.

Studies of preservice teachers demonstrate that their ideas about culture are complex and individually constructed. In Atwater and Crockett's (1996) study of preservice students, culture was depicted by students as dynamic and complex and influenced by their previous experiences. In this study, preservice students spoke about their views of culture and revealed the cultural conflicts that they were currently engaged in. Similarly, Ross and Smith (1992) found that preservice students held complex views about diversity that were individually constructed. Over time, their students held on to different global views about teaching diverse students, but expanded upon their understanding of diversity.

Studies on preservice programs that prepare students to work in diverse setting have revealed a mixed bag of findings. Ross and Smith (1992) found some change in attitudes among preservice students who worked with diverse students, yet there was still the potential for unintentional discrimination in the classroom. Barry and Lechner (1995) found that preservice teachers were aware of issues about cultural diversity, yet they felt uncertain how well they were prepared to work with students from cultural backgrounds different than their own. Grant and Tate (1995) found that preservice student teaching experiences, within a multicultural community, can contribute positively to a preservice teacher's ability to work in diverse settings. McDiarmid

and Price (1993), in a study of five preservice education programs, found that educational course work had little impact on the beliefs of students about issues of diversity. These studies suggest that in order to prepare students to work in diverse settings, students will need experiences with issues of diversity over periods of time and ample opportunities to work with diverse students.

Methodology

Jill

Jill was originally from the East and moved to the Southwest to pursue a degree in anthropology. She shifted the emphasis of her degree from anthropology to biology in the middle of her undergraduate program. Prior to completing her degree in biology, she applied to the initial teacher certification program in the College of Education. Throughout her teacher certification program, Jill constantly refined her ideology about working with diverse populations. During Science Methods (her final year of course work) she became known as a multicultural science education enthusiast; a preservice teacher excited to make science accessible and relevant to all students.

Jill's School

This study was conducted while Jill completed her student teaching at Center City Middle School; a school whose student population is predominately Hispanic-American. Center City Middle School is located in the central part of a large Southwestern city, adjacent to the local university. The close proximity of the university makes Center City Middle School a frequent site for practicum and student teachers.

Researcher

Prior to this study, I was Jill's Secondary Science Methods instructor. I was interested in multicultural science education, but I was not the informed enthusiast that Jill was. Following Secondary Science Methods, I was assigned to supervise Jill' student teaching experience. Her interest in multicultural education and my interest in creating science education programs that prepare teachers to work in diverse settings led me to propose this study to her. Jill was willing and excited to participate.

Data Collection

This project utilized the following data sources: a) in-depth interviews that were conducted with Jill every other week throughout her student teaching experience at Center City Middle School, b) weekly participant observations and discussions about the Jill's science student teaching, and c) a journal in which Jill recorded her experiences and reflections about her teaching. Data were collected throughout Jill's 18-week student teaching experience to reveal the borders that Jill crossed as a multicultural science education enthusiast. While multiple data sources in this study provided a rich pool of information about Jill's experiences, they also achieved triangulation (Marshall & Rossman, 1989; Mathison, 1988).

It is not clear how being both a researcher and a supervisor may have affected the study. My thoughts and ideas about working with students may have influenced Jill's discussion of her experiences. Yet our close working relationship may have also provided access that would not have existed for an unknown researcher. It is also important to acknowledge that Jill was a multicultural science education enthusiast; a science teacher wanted to make science more accessible to all students. While Jill is not representative of the entire population of student

teachers, she does represent a new group of student teachers those who are excited and committed to working with cultural populations different from their own.

Analysis

The principles of constructivist analysis guided the interpretation of the collected data (Denzin, 1994; Guba & Lincoln, 1989). A interim analysis began as the data were first being gathered. The initial constructions were tentative and emerged through the periodic interactions between Jill and I. These constructions helped to define how clearly the research topic was being captured and indicated if necessary adjustments needed to be made within the design protocol (Huberman & Miles, 1994). During the summer, the transcripts from Jill's interviews, Jill's journal, and transcribed participant observations were inductively analyzed (Bogdan & Biklen, 1992; Huberman & Miles, 1994) by two researchers. Although Jill's summer responsibilities prevented her from continually participating in the analysis, she was frequently contacted to evaluate, discuss, clarify, and verify the emergent themes. The iterative process utilized the constant comparative method (Glasser & Strauss, 1967; Bogdan & Biklen, 1992) to compare and apply incidents to categories, to integrate categories and their properties, and to delimit and write the theory (Denzin, 1994, p. 508).

Results and Discussion

Cultural Border of the Students

During her first week of student teaching, Jill described herself as white middle class and having limited experiences with minorities. She, in fact, could count all of the minorities she knew in high school on one hand (Interview 1a, 5-13). Jill was not overly concerned at this time about the differences between herself and her students, although she was conscious of them. Instead, she

often expressed concern for management and lesson planning, and she frequently sought advice from her cooperating teacher in these areas (Journal entry, page 1).

By the third week of her student teaching, Jill was aware of the differences between herself and her Hispanic-American students. Specifically, she stated:

> I guess I have no...I have no way to understand why these kids are doing this, and I can only theorize about their home life or their motivation. I have no claim of understanding how they can be this way (Interview 1a, 379-383).

At this time, Jill had arrived at the cultural border of her students.

Jill wanted to cross into the culture of her students; specifically, she wanted to understand her students and their lives. Jill felt by knowing more about her students, she could cross the cultural border of the students and hopefully become a successful teacher with students who historically did not participate in science. By knowing her students, Jill reasoned, she would be able to create meaningful experiences in science that were relevant to them (Interview 1a, 34-59).

In order to cross this border, Jill spent time learning about her students and their lives. At first, she was receptive to crossing, but she was often confounded by her own experiences and values. For example, Jill stayed after class one day to help a student who typically did not do well in class with a science project. She initially hoped that she would get the know the student a little better as they completed the student's science project. After they had started the project and began collecting data, the student became disinterested and expressed displeasure when Jill asked her a question about the experiment. Jill was shocked that the student would treat a teacher in this way, especially a teacher who was trying to be helpful (Journal entry, p. 6). In this case, Jill's own expectations of how a student should be behave interfered with understanding the student's own experience. The student may have been unable to answer the question, embarrassed to be a

"school girl[3]", anxious to get home, or uncomfortable with the attention. Although Jill wanted to understand the students, she was unable to look beyond the action of the student.

Over time, Jill began to understand the culture of her students through the stories in their journals and their personal tales (Journal entry, p.13). Students shared with her their stories of being in gangs (Interview 2a, 1532-1551), the importance of friendships (Interview 2b, 2073-2098), their after school activities (Interview 3b, 2663-2679), and the traditional celebrations for girls who turn fifteen (Interview 3a 3260-3269). Each story allowed Jill to better understand her students and the culture in which they existed.

By the end of her student teaching, Jill felt that she had an understanding of her students and she could identify with their lives, yet she still considered herself an outsider (Interview 5a, 563-572). During one of her last interviews, Jill discussed her feelings:

> Jill: I think that I can build rapport, but I don't think that I'll ever be someone that they can relate to. I want to be someone that they can relate to and I to be someone who can relate to them, but I don't know if it will ever happen. Although I may feel better now than I did at the beginning of the semester. I feel like I am relating to them and I do know more about their culture than when I started.
>
> Inter: Can you tell me what you know more about?
>
> Jill. Well, their traditions, their quincernieras[4], the three dots on their hands, and why they choose to be in a gang. (Interview 4a, 4382-4397)

For Jill, understanding the cultural traditions and the lives of her students allowed her to cross the cultural border of her students. By understanding the most basic aspects of the culture of her students, Jill felt closer to her students.

By the conclusion of her student teaching, Jill had experienced a managed (Phelan, Davidson, & Cao, 1991) border crossing. She did not easily cross from her culture into the culture of her students. She wanted to understand the world of her students, yet it took time and

numerous encounters with students in order to do so. In the end, Jill still felt different than her students, yet she felt that she knew more about her students than when she had started her student teaching.

Cultural Border of Instruction

Jill wanted to teach science within a constructivist framework. She wanted to provide students with rich experiences in science that were inquiry-based. Specifically, as a future science teacher she wanted her students to design their own experiments, collect and analyze their own data, and she wanted her students to share their own understandings with one another. She wanted students to participate in science, instead of completing worksheets and mandated school projects that were prevalent at Center City Middle School (Interview 1a, 29-44). Unfortunately, Jill's instructional philosophy was often inconsistent with the other teachers at Center City Middle School (Interview 1a, 810-836; Interview 2b, 1487-1504; Interview 4b, 3878-3887; Journal entry, p. 6).

The teachers at Center City Middle school wanted students to have instruction that emphasized life skills and provided ample direction, not open-ended activities (Interview 1a, 810-836; Interview 2b, 1487-1504; Journal entry, p. 6). This group of students, she was often told by fellow teachers, needed structure and direction (Interview 1a, 167-168). Of the teachers that Jill observed, the classes were structured and often had students opening their books and answering the assigned questions (Interview 4b, 3878-3887).

Jill often felt like she was from one culture (the culture of inquiry instruction), while her colleagues were from another (the culture of traditional instruction). For Jill, crossing instructional borders would require the assimilation of her culture of instruction into the predominant culture of instruction. In order to do this, Jill realized that she would have to

understand her colleagues' instructional strategies and find opportunities to include her own instructional methods. This crossing was more difficult than Jill had expected.

Early in her student teaching experience, when Jill arrived at the border of her colleagues instructional philosophy, she often comprised her own beliefs. In one instance, Jill wanted to begin a unit on plants by having students explore the similarities and differences of several plants. Her cooperating teacher suggested that the unit begin with a lecture on plants and their importance in society. This way, the cooperating teacher reasoned, the students would have a background and an interest in the topic before they participated in an investigation. Jill ultimately followed her cooperating teacher's suggestions and regretted her instructional choice afterwards (Journal entry, p. 19-20).

Jill often felt uncomfortable enacting instruction that she knew was inconsistent with constructivist thought. As time went on, she could no longer leave her instructional culture for the instructional culture of the school. By the end of her student teaching experience, when Jill again arrived at the border of her colleagues' instructional philosophy she enacted the lesson that was consistent with her beliefs. Her final lesson on ecosystems, for example, required that students build and observe their own plastic bottle biomes. Students had to decide which plants they would put in their bottle and they would have to discuss their rationale for selecting the plants that they did. In addition, students would have to record their daily observations of their bottles (Observation 4/18). The cooperating teacher was skeptical of the lesson because it lacked structure and direction, but she admitted when the lesson was over she was impressed at level of participation and interest of the students (Observation 4/18).

Jill did not cross into the instructional culture of her colleagues at Center City Middle School. Initially she thought that she could assimilate her culture of inquiry instruction into the

school's culture of traditional instruction. Yet Jill was unable to relinquish her own beliefs about instruction, and ultimately planned and enacted the instruction that she espoused. As Jill's student teaching experience progressed, it became clear that Jill's culture and the instructional culture of the school were so dissimilar that the crossing would be hazardous and ultimately impossible (Phelan, Davidson, & Cao, 1991). Ironically, while Jill never crossed in the culture of instruction within the school, Jill's cooperating teacher, for a brief moment, did examine Jill's culture of inquiry instruction.

Cultural Border of the School

Jill was excited to teach at the middle level and she looked forward to working with a population of students who had a different background than herself (Interview 1a, 69-102). She wanted to learn from experienced teachers, participate in the school programs, and discuss her science instruction with other science teachers. As a student teacher, Jill wanted to be part of the school.

Early during her student teaching experience, Jill assisted students with science fair projects. The science fair program was an important event at Center City Middle School because of a school district mandate that required students to complete such a project. In order to support the science fair program, Jill carefully planned her instruction so that students could learn skills they would need while they completed their projects (e.g., graphing, word processing, and displays) (Interview 1a, 892-906). Jill also assisted students after school with their science fair investigations. Slowly, Jill's excitement for the event became tempered as she experienced various aspects of the science fair program: parents completing students' projects, students rarely working on science fair during allocated times, and students waiting until the last minute to start their project (Journal entry, p. 3; Journal entry, p. 6; Interview, 1a 235-238). At the conclusion of

the science fair, Jill clearly felt at odds with the school mandated program. Regarding the students, Jill wrote:

> Science fair is over!. I had very mixed feelings this evening as parents and students mulled around admiring the projects. One student asked me "Miss, I got an A, how come I didn't win??" This student has very poor reading and writing skills, but put forth maximum effort and earned an A. All I could think was you DID win, Mike. Unfortunately, he did not see it the way I did. Other students were equally disappointed. "Why did Susan win and I didn't?" "Hers was better, huh?" A time for reveling in accomplishment became a time for competitive comparison and at times, disappointment. (Journal entry, p.10)

While she had tried to support science fair, Jill ultimately felt it neglected the students as well as interfered with her scheduled lessons (Interview 1a, 892-906; Journal entry, p. 10).

Throughout her student teaching, Jill participated in team meetings that were designed specifically to assist teachers in coordinating their instructional efforts. At first Team Meetings were informative for Jill. Team members discussed individual students and they shared the lessons they had planned (Seminar notes 2/4). Over time, team meetings became a source of frustration. Team members would not show up to meetings, or team members would focus on the lack of skills of the students during meetings (Journal entry, p.7; Interview 253-256). Ultimately, Jill became a skeptic of team meetings and questioned rather team meetings really assisted the teachers in meetings the needs of the students (Interview 5a, 456-462).

As a temporary member in the school, Jill also familiarized herself with several of the school programs. She learned about Saturday School, in-school suspension, and the cultural celebrations that were advocated by the school (Interview 3a, 2682-2703; Interview 3b, 3285-3303; Interview 4b, 3717-3744). In each instance, she was initially enthused about each program and how each program could meet the needs of the students. Yet as she began to understand each program, she became frustrated with the assistance or support that the program offered to students in the school. For example, Jill wondered why the only cultural celebration in the school

was African-American history month. In a school that was predominately Hispanic-American, she felt there needed to be a similar celebration. Furthermore, she felt that science classes should contain displays that discussed the scientific accomplishments of a variety of scientists, not just Caucasian scientists (Interview 3b, 3285-3303). Jill wanted her students to succeed, but she often wondered if the programs within the school hampered her students' success (Interview 5, 129-138).

As a student teacher, Jill knew she wanted to contribute and participate in the culture of the school. As she engaged in programs initiated by the school, Jill often found herself at odds with program philosophies because they did not seem to meet the needs of the students. Jill was able to cross into the culture of the school, yet she was aware of the significant differences between herself and the school. She managed to fit into the school, but it was often with an awareness of the constraints that students experienced. Ultimately, Jill's crossing into the school culture was managed (Phelan, Davidson, & Cao, 1991).

Conclusion

As a multicultural science education enthusiast, Jill was committed to working with diverse students and providing them with equitable science instruction. Ultimately, it was her instructional philosophy that brought her to the cultural borders that she encountered. By understanding how Jill negotiated the borders that she encountered, future teachers can be assisted in navigating the cultural borders they experience.

Jill was did not easily pass from one cultural border to another. Instead, when Jill encountered cultural borders she became engaged in a highly personalized event in which she negotiated the border at her level of understanding, and she knowingly and unknowingly

examined her own beliefs about multicultural science education. Specifically, Jill clarified her own beliefs about relevant, meaningful, and student-centered science instruction within her own interpretation of the cultural border.

As Jill encountered cultural borders, she reduced the parameters of the border to her own level of understanding. This resulted in Jill interpreting the border within a frame of reference that was familiar to her. For example, Jill negotiated the cultural border of fellow teachers through an examination of their instruction. As an advocate of inquiry instruction, Jill reduced the cultural border of instruction to a pedagogical dilemma. Jill viewed this cultural border as a struggle between traditional and inquiry instruction; a struggle that was frequently discussed in her science methods classes. Another example is when Jill crossed the cultural border of her students. Jill came to know her students through the salient and well-known events within their culture. Her previous work in anthropology and the frequent discussion of these events in the media may have contributed to the awareness she held in this area. Throughout the course of semester, Jill did not extend beyond her initial framing of the cultural borders even though she knew about the philosophy of science, different ways in which knowledge is stored within cultures, and instruction for multiple intelligences.

When Jill encountered a border, she embarked upon the crossing and soon began an examination of her own beliefs within the new culture. In each case, Jill drew upon her beliefs, examined them, then either continued or withdrew from the crossing. For example, when Jill embarked upon the cultural border of her students, she felt that she had to know her students in order to create a meaningful science environment that was relevant to her students. Although difficult at times, Jill's beliefs about making instruction meaningful and relevant guided her towards learning more about her students. For Jill, encountering borders was beneficial in that she

knowingly learned more about working within a diverse environment and unknowingly clarified her own beliefs. Jill, like the teachers in Grant and Tate's (1995) study, clearly benefited from working a diverse culture. She also, like the teachers in Ross and Smith's (1992) study, continued to refine her understanding of teaching diverse students.

The highly personalized experience of crossing borders while learning to teach in a diverse setting (negotiating the parameters of the border and the active reflection while in the border) suggests that the above mentioned border crossings will take time. In this study, an enthusiast about teaching science needed time to encounter and negotiate her borders thoughtfully. Students without a multicultural agenda may need even more time to develop their own practice within a diverse setting. Given the complexity of learning to teach diverse students, ample time will be important as student cross cultural borders while they learn to teach.

Implications

By examining Jill's experience at Center City Middle School, science educators can better prepare and assist the increasing number of preservice students who will be student teaching in cultural environments different than their own. The study of Jill suggests that science student teachers do encounter cultural borders, and that crossing these borders can be eased by providing multiple field experiences with diverse students, time for crossings to happen, and ample information about effective instruction for diverse students.

Science education programs should provide multiple field experiences in diverse cultures. Furthermore, student should have ample time and resources to make sense of their experience. Ideally, long term course work and field experiences would focus on the sharing of information about students' cultures and developing one's own understanding of different cultural

perspectives. Furthermore, preservice students should also be encouraged to understand their own cultural identity and the oppression of others (Bollin & Finkel, 1995).

Preservice science students need a strong understanding of effective science instruction, this includes: pedagogy, content, and the history and philosophy of science. Preservice science teachers should learn science in a manner that represents the field of science, and they should know and understand the tenets of effective science instruction. An understanding of science that is complemented with the history and philosophy of science would provide a preservice science student teacher with an additional arsenal of tools that could increase the relevancy of science to their students.

Notes

1. Pseudonyms are used throughout this paper.

2. This paper focuses on the diversity between the student teacher and her students. It is acknowledged that a diversity could also exist between the students and the student teacher, or the student teacher and her cooperating teacher.

3. "School girl" and "school boy" are names given to students, by students, that indicate a student is successful in school. Jill's students did not like being called "school girl" or "school boy."

4. Quincernieras are celebrations for fifteen year old Hispanic girls.

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