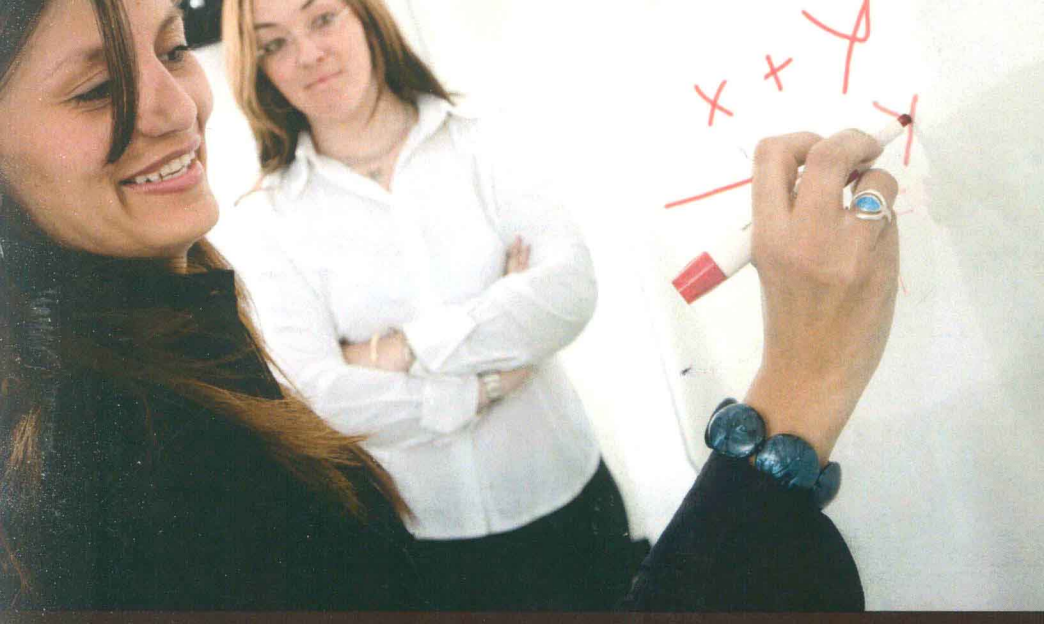

Michelle Snider

Attitudes of Limited English Proficient Students and Their Teachers

Learning Environment in Mathematics Classes

VDM
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CHAPTER 1: INTRODUCTION

Background

The deficiency in student mathematical skills has posed an ongoing problem across the United States. The basic mathematical skills demonstrated by high school students are rated as low as *fair* or *poor* by more than 60% of American employers (American Diploma Project, 2004). The 2003 assessment of United States students 15 years of age in mathematics literacy and problem solving was lower than the average performance of same-age students within most of the Organization for Economic Cooperation and Development countries (Lemke et al., 2004). The mathematics performance of students 17 years of age within this country has not measurably changed since the 1970s on the National Assessment of Educational Progress assessments with the exception of Black and Hispanic students (Livingston, 2007). Standardized mathematics test scores reported for limited English proficient (LEP) students within the United States are lower than their non-LEP peers (Perie, Grigg, & Dion, 2005).

Meeting the challenge of properly preparing all students within all academic areas for the world of work, including learners for whom English is a second language, can be daunting for the contemporary educational system throughout this country (Kornblum & Kupetz, 1997). Students born outside the United States and entering American schools with a primary language other than English are classified as either English-language learners (ELLs) or limited English proficient (LEP; *Florida Statute,* 2006; Mikow-Porto, Humphries, Egelson, O'Connell, & Teague, 2004). The unique needs of LEP students will require scrutiny as educational standards and accountability continues to increase at both state and federal levels (MacDonald, 2004). Standards-based legislation, as well as civil-rights cases, mandates that LEP students are to be included in annual assessments for purposes of equal opportunity, accountability, and representation (Abedi, Lord, Hofstetter, & Baker, 2000). The No Child Left Behind (NCLB) Act of 2001 required states to conduct annual assessments of all students within all academic areas.

To meet the requirements of the NCLB Act of 2001, LEP students within the state of Florida are required to participate in the state assessment program known as the Florida Comprehensive Assessment Test (FCAT), which assesses reading, writing, mathematics, and science (U.S. Department of Education, 2005). All high school students must pass the FCAT to

receive a standard diploma (Florida Department of Education [FDOE], 2001, 2004). While the percentage of high school LEP students passing the mathematics section of the FCAT is higher than the percentage passing the reading section, the passing scores of this student population are still lagging behind those of non-LEP students (*FCAT Student Performance,* 2006). The mathematics scores of LEP compared to non-LEP students within Florida are not unusual. The LEP students within the United States tend to score lower " . . . than Caucasian students on standardized tests of mathematics achievement at all grade levels, the Scholastic Aptitude Test (SAT), and the quantitative and analytical sections of the Graduate Record Examination (GRE)" (Abedi, Hofstetter, Baker, & Lord, 2001, p. 4).

A major goal of the state of Florida is for LEP students to develop English proficiency allowing them to reach their full academic potential (Multilingual Student Education Services, 2004). Consequently, LEP high school students are assigned to language-arts classes specifically designated for instruction delivery in English for speakers of other languages (ESOLs) and *sheltered classes* for other subject areas (e.g., mathematics, science, and social studies). While classes designed for ELLs focus on language acquisition and language-arts curriculum for the respective grade level, sheltered classes address content knowledge within other subject areas (Multilingual Student Education Services, 2004; Orange County Public Schools [OCPSs], 2006). Sheltered classes are exclusive to LEP students. The curriculum matches that of nonsheltered classes; however, instruction related to concepts and class materials are adjusted to accommodate language learning. Educators with sheltered classes are subject-area teachers trained to deliver instruction to ELLs. Lessons are delivered in English with modified instruction using strategies designed for ELLs to render content more comprehensible to LEP students while concurrently promoting English language development (Multilingual Student Education Services, 2004; OCPSs, 2006; U.S. District Court for the Southern District of Florida, 1990).

As a group, LEP students struggle in school and lag behind their language-majority peers in academic achievement (Echevarria, 2006; Echevarria, Short, & Powers, 2006). Compared to non-LEP pupils, higher dropout rates are reported for LEP students and significant achievement gaps between these two student populations are also evident with state and national assessments (Snow & Biancarosa, 2003). Closing the gap between LEP and non-LEP students in mathematics is not an easy task; however, it must be accomplished for the future of the LEP student

population (Davison, Seok-Seo, Davenport, Buterbaugh, & Davison, 2004; Ding & Davison, 2004). Career opportunities would be severely limited by a lack in mathematics achievement; such skills are not only necessary throughout daily life, but are increasingly needed throughout the workplace (National Council of Teachers of Mathematics [NCTM], 2000). While there are many reasons for LEP students lagging behind their non-LEP peers academically, one major indicator of student achievement is a positive learning environment.

Theoretical Framework

Learning-environment research investigates the classroom via application of a concept known as *psychosocial environment,* which is composed of psychological and social relationships. These relationships include those existing both among students and between students and teachers (Moos, 1979a; Rawnsley & Fisher, 1998). The concept is rooted in theory developed by Lewin (1936), which dates back to the mid-1930s, as well as the personality theory introduced by Murray during 1938. Lewin recognized that the environment and its interaction with the individual personal characteristics of individuals is a potent determinant of behavior (as cited in Fraser, 1989). He formulated his idea in the form of an equation ($B = f[P,E]$), wherein B represents behavior, f equates to function, P is person, and E represents the respective environment. Lewin noted, "Every scientific psychology must take into account whole situations, i.e., [*sic*] the state of both person and environment" (p. 12). Murray followed the Lewin approach, proposing a needs-press model. This model allows similar representation of person and environment in common terms with *personal needs* referring to the personal determinants of behavior and *environmental press* representing external determinants of behavior (Murray, 1938).

Research into psychosocial human environments evolved into the specific domain of educational environments (Moos, 1979b). The social ecological framework developed by Moos emphasizes the inclusion of social-environment (e.g., social climate) and physical-environment (e.g., ecological) variables, which must be concurrently considered. Moos posited that the " . . . social-ecological setting in which students' function can affect their attitudes and moods, their behavior and performance, and their self-concept and general sense of well-being" (p. 3). Social-environmental variables can be categorized into three broad dimensions—(a) relationship,

(b) personal growth or goal orientation, and (c) system maintenance and change. The relationship dimension assesses the extent to which students are involved in their environment by supporting peers and expressing themselves freely and openly. The personal growth or goal orientation dimension measures the basic goals of the environment such as the areas within which personal development and self-enhancement tend to manifest. The dimension of system maintenance and change measures the extent to which the environment maintains control, responding to change in an orderly manner with clear expectations.

Moos (1979b) measured the social environments of classrooms to determine the type of learning environment most beneficial to students. Current studies have replicated his research and suggested that the psychosocial climate of classrooms is related to student achievement (Dorman, Adams, & Ferguson, 2002; Fisher & Fraser, 1982; Goh & Fraser, 1996, 1998; Henderson, Fisher, & Fraser, 2000; Rawnsley & Fisher, 1998; Soerjaningshi, Fraser, & Aldridge, 2001; Trinidad, MacNish, Aldridge, Fraser, & Wood, 2001). Other researchers have demonstrated that associations exist between the perception of classroom environment and student outcomes across nations, subject matter, education levels, languages, and cultures (Dorman, 2003; Dorman, et al., 2002; Fraser, 1994, 2002; Fraser, B., 1998; Fraser, B. J., 1998). In terms of how this relates to mathematics proficiency, it raises concern regarding the type of environment needed to encourage students to gain, process, and evaluate their knowledge (English, 2002). Research has illustrated that classroom environments perceived as positive tend to lead toward increased student achievement (Chang & Fisher, 2001). Relationships among students and between students and teachers are important to the creation of such positive learning environments (Moos, 1979a; Rawnsley & Fisher, 1998). Montecel and Cortez (2002) found that a positive classroom environment for LEP pupils contributes to high academic performance by this student population.

Statement of Purpose

This current mixed-method study was conducted with two purposes. The first was to present a complete and coherent description of learning-environment attitudes exhibited by LEP students and their teachers within mathematics classrooms. The second was to identify those components within mathematics classrooms with the strongest association to a positive learning

environment for LEP students. This study measured student's perceptions of classroom environment through surveys and measured attitudes found within the mathematics-class environment through classroom observations, and student and teacher interviews. Attitudes toward the learning situation included students and teachers perceptions of the class's limitations and recommendations for a supportive, positive environment. A literature search revealed that, within the area of mathematics, study focused on learning environments is sparse, with research connecting mathematics learning environments for LEP students nonexistent. In an attempt to take a broader approach to learning attitude, this study gleaned information related to the attitudes of LEP students toward their learning environments by collecting learner perceptions in this regard.

Research Questions

This research examined student and teacher attitudes within three sheltered mathematics classrooms and three nonsheltered mathematics classrooms via a mixed-method approach. The following research questions guided the study:

1. Is there a significant difference in perceptions of the classroom between sheltered and non-sheltered mathematics students?
2. Is there a significant difference in the perceptions of the classroom between Algebra and Geometry students?
3. What are the teachers' attitudes of the mathematics classes in sheltered versus non-sheltered environments?
4. What are the students' attitudes of the mathematics classes in sheltered versus non-sheltered environments?

Population and Study Sample

This study was conducted in a Florida public high school within OCPSs. The population sample for this study was composed of high school students ranging in grade level from the 9^{th} through the 12^{th} grades. They attended either sheltered or nonsheltered mathematics classes that taught similar content. Purposive sampling was applied for the selection of student participants because only three sheltered mathematics classes were available at the school—two Algebra I

classes and one geometry class. The study sample was composed of 46 students within the nonsheltered group and 33 students within the sheltered group—a total sample size of 79.

Methodology

This study used a mixed research method combining quantitative and qualitative approaches via a survey instrument, classroom observations, and student and teacher interviews. Data from the different sources using the strategy of triangulation were examined to check the accuracy of the findings (Creswell, 2003). First, quantitative data of students' perceptions of the mathematics classroom environment were collected using a survey. Survey scores were analyzed using an independent samples *t*-test to describe any similarities and differences of the classrooms. Second, qualitative data were drawn via classroom observations and student and teacher interviews. When these data-collection procedures were completed, the survey findings were contextualized using the qualitative findings with descriptions consisting of observation notes and verbal participant accounts.

Significance of the Study

This study increases understanding of learning environments as they relate to educational research in the following ways:

1. Addresses the gap in existing literature by measuring the attitudes of high school students within sheltered mathematics classrooms.
2. Introduces the What is Happening in This Class? (WIHIC) instrument within a Florida high school.
3. Facilitates a clearer understanding for educational institutions and teachers of the manner in which attitudes are likely to influence the classroom performance and participation of LEP students.

Many studies have evaluated mathematics achievement in LEP high school students (Abella, Urrutia, & Shneyderman, 2003; Chamot, 1995; Ding & Davison, 2004; Genesee & University, 1999; Lindholm-Leary & Borsato, 2005; Wang & Goldschmidt, 1999). The attitudes of students, teachers, schools, or parents, as they relate to LEP programs, are also addressed in related literature (Hart & Allexsaht-Snider, 1996; Layzer, 2000; Lindholm-Leary & Borsato, 2005;

Torres-Velasquez & Lobo, 2005). Few studies have investigated the classroom environment or climate as it relates to LEP students (Butler & Gutiérrez, 2003; Montecel & Cortez, 2002) and, of these, language acquisition was the focus, rather than attitudes toward the environment of mathematics classrooms serving LEP students.

Mathematics learning environments serving LEP students are important to the current study for two reasons. First, understanding the impact of student attitudes on the mathematics learning environment could help teachers evaluate their classroom environments and current instructional practices. Secondly, such environments could hold general importance for the overall education of the underrepresented population of LEP students. Teachers can use the findings of this research to discover differences between their own perceptions and those of their students, allowing them to make subsequent improvements toward positive learning environments. Understanding student attitudes of the learning environment will give teachers additional information aiding in their understanding of individual differences in student performance and ways of assisting their students through difficulties with mathematics.

Limitations

The current study presented the following limitations:

1. Participation in the study was strictly voluntary.
2. The study was limited to one public high school within the OCPSs system within the state of Florida.
3. Data collection was limited to the willingness and ability of individuals to respond in a timely fashion, if at all, and to respond accurately.
4. Generalizability of the study results is limited due to the specific population and specific context.

Assumptions

The following assumptions were made while investigating the research questions:

1. The student participants responded to the survey questions honestly.
2. The survey instruments are reliable and valid.