multicultural perspectives. Some promising attempts have been made to develop multicultural materials for mathematics and science teachers (Moses & Cobb, 2001; Powell & Frankenstein, 1997). However, more work must be done in this area before most mathematics and science teachers can develop and implement a curriculum-content approach to multicultural education.

Multicultural education is a way of viewing reality and a way of thinking, and not just content about various ethnic, racial, and cultural groups. Much more important work needs to be done in order to provide teachers with the examples and specifics they need. In the meantime, we can help all teachers, including mathematics and science teachers, to conceptualize and develop an equity pedagogy (Banks, 2003), a way of teaching that is not discipline-specific but that has implications for all subject areas and for teaching in general.

THE DIMENSIONS OF MULTICULTURAL EDUCATION

Teachers can examine five dimensions of the school when trying to implement multicultural education. These dimensions, identified above, are summarized in Figure 1. They are defined and illustrated below.

Content Integration

Content integration deals with the extent to which teachers use examples and content from a variety of cultures and groups to illustrate key concepts, principles, generalizations, and theories in their subject area or discipline. The infusion of ethnic and cultural content into the subject area should be logical, not contrived. The widespread belief that content integration constitutes the whole of multicultural education might be an important factor that causes many teachers of subjects such as mathematics and science to view multicultural education as an endeavor primarily for social studies and language arts teachers.

More opportunities exist for the integration of ethnic and cultural content in some subject areas than in others. In the social studies, the language arts, music, and family and consumer sciences, there are frequent and ample opportunities for teachers to use ethnic and cultural content to illustrate concepts, themes, and principles. There are also opportunities to integrate the math and science curriculum with ethnic and cultural content (Addison-Wesley, 1992). However, these opportunities are not as apparent or as easy to identify as they are in subject areas such as the social studies and the language arts.

In the language arts, for example, students can examine the ways in which Ebonics (Black English) is both similar to and different from mainstream U.S. English (Delpit & Dowdy, 2002). The students can also study how African American oratory is used to engage the audience with the speaker. They can read and listen to speeches by such African Americans as Martin Luther King, Jr., [former] Congresswoman Maxine Waters of California, Marian Wright Edelman, Al Sharpton, and [former] Senator Barack Obama from Illinois when studying Ebonics and African American oratory (Foner & Branham, 1998). The importance of oral traditions in Native American cultures can also be examined. Personal accounts by Native Americans can be studied and read aloud (Hirschfelder, 1995).

The scientific explanation of skin color differences, the biological kinship of the human species, and the frequency of certain diseases among specific human groups are also content issues that can be investigated in science. The contributions to science made by cultures such as the Aztecs, the Egyptians, and the Native Americans are other possibilities for content integration in science (Bernal, 1987, 1991; Weatherford, 1988).

The Knowledge Construction Process

The knowledge construction process consists of the methods, activities, and questions teachers use to help students to understand, investigate, and determine how implicit cultural assump-