Responding to Administrative Priorities

The Role of Cultural Capital in Decisions to Enroll and Persist in STEM Studies

Capsule: Female students who would be expected to persist in engineering studies given their academic and social backgrounds still "leak" from the pipeline during their undergraduate careers. This result suggests that other factors, such as institutional climate, may be as predictive of persistence decisions as personal characteristics.

Summary: One of Pierre Bourdieu's (1930 – 2002) many contributions is the extension of the concept of "capital" from its traditional economic definition to encompass notions of a person's social and cultural knowledge, experiences, values, and beliefs. The type and amount of social and cultural capital are determined, in large measure, by family and class, and provides a structure for comprehending, navigating, and negotiating life events. People socialized in a society's non-dominant cultures may not have the capital to participate successfully in the dominant culture. According to Wacquant (1998, p. 216), one of Bourdieu's students, "'cultural capital' – educational credentials and familiarity with bourgeois culture – was becoming (in the prosperous post-World War II societies) a major determinant of life chances and that, under the cloak of individual talent and academic meritocracy, its unequal distribution was helping to conserve social hierarchies." A representative article is Bourdieu (1973).

Adamuti-Trache and Andres (2008) report the results of a 10 year longitudinal study (n = 1055) of student decisions to enroll and persist in the STEM pipeline. The research's goal is to determine the extent to which cultural and academic capital have an impact on a person's earning a baccalaureate degree in science, mathematics, or engineering (STEM; technology studies are assumed). Decisions are checked in high school, one year after high school graduation, and ten years after high school graduation. The data are analyzed using correspondence analysis techniques. Cultural capital, defined as the level of parental educational achievement, is highly associated with post secondary completion status and choice of degree program, along with the independent variables gender and concentration[s] of studies in high school. The assumption is that university educated parents are more likely to value the credentials of a university degree and a professional career than non-university educated parents, since the acquisition of credentials is one way parents transmit cultural capital to their children. However, females with backgrounds that would predict completion of a baccalaureate degree in STEM, such as concentrations of study in math and physical sciences in high school and parents with a university degree, still "leaked" from the pipeline, suggesting that other factors have an effect on their decisions to leave. Females with the described background who did earn a science-oriented degree tended to major in "soft" fields such as agricultural and biological sciences, health, and behavioral and social sciences. The proportion of variation in career choices 10 years after graduation explained by the model of subjects concentration in high school and parental level of education is low, indicating that other factors are influencing the decision of females to opt out of STEM studies and careers for which they seem well prepared. Adamuti-Trache and Andres indicate that an important third agent is the nature of the postsecondary educational system: "(a)lthough individual agency is one determinant of participation in and completion of studies in science and mathematics, the structure of the system – and related policies, practices, and processes – is another determinant" since "(u)niversities play a key role in creating and maintaining the image of various fields in society" (p. 1578).

Implications for Engineering Education: Two implications for administrators can be drawn from a consideration of the influence that postsecondary institutional culture may have on student decisions. First, administrators should actively participate, if they do not already, in the establishment and maintenance of the "tone" and "temperature" of the culture for which they're responsible – institutional, program, or department – to ensure an appropriately inclusive one. Recognition should be made in this process of the various cultural factors affecting students from different gender, economic, social, and ethnic identifications. Too often, the demand is that the student adapts him/herself to the prevailing culture, not vice versa – especially in institutions with large STEM programs, and alienation may be a result. Second, administrators should be aware of the stress students from backgrounds different from the dominant student culture may experience, and provide programs to help ease their adjustment. Both initiatives will help with recruitment as well as retention.

References: Maria Adamuti-Trache and Lesley Andres (2008). "Embarking on and Persisting in Scientific Fields of Study: Cultural Capital, Gender, and Curriculum Along the Science Pipeline." In the *International Journal of Science Education* 30(12), October 2008, pp. 1557 – 1584.

Pierre Bourdieu (1973). "Cultural Reproduction and Social Reproduction." In Jerome Karabel and A.H. Halsey (eds.), *Power and Ideology in Education*, pp. 487 – 511. New York: Oxford University Press.

Loïc J.D. Wacquant (1998). "Pierre Bourdieu." In Rob Stones (ed.), *Key Sociological Thinkers* (1st edition), pp. 215 - 229. New York: Macmillan.

Prepared by: Susan K. Donohue, Ph.D., EEES Postdoctoral Engineering Education Researcher, Center for the Advancement of Scholarship on Engineering Education, January 2009.