

Chapter 13

Developing Cultural Competency in Engineering through Transnational Distance Learning

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ABSTRACT

While cultural competency is a stated priority for engineering education in the United States, as emphasized by Outcome H in the ABET standards, it is often difficult to engage students in immersive international experiences that develop intercultural awareness. Undergraduate engineering students face packed curricula with little or no room for languages and an often unforgiving structure that puts them a year out of course sequences if they do travel for study abroad. In this case study, the authors examine how online education can be a transformational factor in this challenge. When designed to create interactive, engaging learning across nations, online education can support joint international experiences that develop cultural competency without requiring the time and expenses that are often a barrier for students. This online model could easily be scaled up to offer more students an international collaboration opportunity without institutional reliance on study abroad. This online transnational distance learning approach saves students and universities time and money, while accomplishing the intended professional competencies.

INTRODUCTION

With a growing awareness among many disciplines of the global, systemic nature of their professions, the spotlight has increasingly turned to transnational educational experiences that afford students the opportunities to experience other cultures or collaborate across borders as a means of preparing them for the work worlds that await them. Companies around the world expect future graduates to be able to work in an international environment and within international teams (Hiller & Vogler-Lipp, 2010). The past 10 years have seen greater attention to offering such transnational experiences for students in order to attract students from around the world as institutions are now largely seeking to establish connections with those from other countries in efforts to afford students new experiences for learning (Helguero-Balcells, 2009). Designing and facilitating these experiences, however, introduces challenges that many instructors and their institutions do not fully anticipate, which could threaten individual and institutional commitment to these sorts of investments. Here we examine one such example created using the systematic process of instructional systems design as a way of providing the needed structure for the design of complex learning environments (Gustafson & Branch, 2002). This case study highlights how a transnational collaborative instructional design process enabled cultural differences that appeared to be significant instructional constraints to be turned into instructional affordances.

In the discipline of engineering, recent modifications to expected outcomes for engineering students have included an emphasis on students' abilities to understand the impact of engineering solutions in global and societal contexts (ABET, 2008), thus providing broad impetus for developments in this area. Although articulated together, *global* and *societal* are two very different constructs that, while they intersect along some

points, are largely two different types of awareness among engineering graduates. Understanding solutions in a global context often implies increased awareness of cultural differences, and therefore cultural considerations and implications that should be addressed during design, development, and implementation (Chen & Messner, 2010; Dewey, et al., 2006). In contrast, understanding the impact of solutions on a societal context often connotes more of an emphasis on social responsibility and attending concepts such as environmental impact, sustainability, safety, and other measures of societal impact. Through the collaborative design illustrated here, we seek to add the understanding of what it means to teach with a global perspective in addition to content and strategies in this particular course that already emphasizes the societal impact of engineering.

In examining the relationship between intercultural sensitivity and moral reasoning, Endicott, Bock, and Navarez (2003) looked at intercultural development as a cognitive construct. They hypothesized the development of this construct is largely facilitated by multicultural experiences such as study-abroad and work-abroad experiences. While their research supported the relationship between these two types of reasoning and such experiences, we offer that providing such deep *multicultural experiences* for every student is prohibitively costly for any institution. Nevertheless the need to offer an engineering education that gives every student the fundamental knowledge and skills to function in the global workplace, where cultural appreciation and international collaboration have become basic skills, remains. We posit that distributed, transnational learning experiences, when based on a sound instructional design process, can facilitate the development of *cultural competence* in the absence of extensive study abroad opportunities, and serve as a stepping-stone experience when more immersive experiences are possible. The design of these environments requires two critical components:

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