Chapter 2

Common Denominators to Learner-Centered Success: Undergraduate STEM, Graduate Teacher Education, and an Educational Technology Doctoral Program

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ABSTRACT

New Jersey City University (NJCU) ranks in the top hundred most diverse institutions of higher education in the country. NJCU’s mission is “to provide a diverse population with an excellent university education.” Its undergraduate population is 25% White, 21% Black, 35% Hispanic, and 9% Asian; many NJCU students do not speak English as their first language. This chapter will highlight learner-centered pedagogical practices in three distinct disciplines and at three levels in higher education: undergraduate STEM education (science, technology, engineering, and mathematics); graduate ESL, bilingual, and world language teacher education; and educational technology leadership in a new doctoral program. The pedagogical practices described all share a common goal: to allow multilingual, multicultural, and nontraditional students to fully engage and demonstrate their growing knowledge of content as well as their ability to think critically—to ensure their success in future academic work and careers.

DOI: 10.4018/978-1-5225-0892-2.ch002
INTRODUCTION

New Jersey City University (NJCU) ranks in the top hundred most diverse institutions of higher education in the country. NJCU’s mission is “to provide a diverse population with an excellent university education.” Its undergraduate population is 25% White, 21% Black, 35% Hispanic, and 9% Asian; many of its students do not speak English as their first language. The average NJCU undergraduate student is a female and 24 years old, from a low-income family (23% have mean household incomes of less than $30,000). NJCU’s strength as an institution lies in the diversity of its student body: our students have the opportunity to join a learning community with a huge spectrum of talents, skills, cultures, and backgrounds. At the same time, this diversity that makes the learning environment so rich and stimulating also presents challenges. At all levels (undergraduate, graduate, doctoral) the students’ degree of preparation for college work, their learning habits and learning styles vary significantly. In addition, many students are returning to education after significant time away. The rapid changes that have taken place in education since the last time these students sat in the classroom (whether in high school, or at the undergraduate or Master’s level) may take them by surprise and require adjustments, including new skills acquisition even as they are learning new and difficult content. The professor who wishes to engage successfully with nontraditional students needs to address all of these factors and adjust course preparation and instructional techniques accordingly. It is essential that the modern instructor be willing to evolve away from traditional methods of instruction if she/he is serious about retention, graduation, and about ensuring that all students are prepared for success in the constantly changing work world. Instructors at other institutions with a similar demographic to NJCU, who are striving to reconfigure their own learning environments may benefit from the following examples of practices that have worked for us.

This chapter will highlight learner-centered pedagogical practices in three distinct disciplines and at three levels in higher education: undergraduate STEM education (science, technology, engineering, and mathematics); graduate ESL, bilingual, and world language teacher education; and educational technology leadership in a new doctoral program. The pedagogical practices to be described all share a common goal: to allow multilingual, multicultural, and nontraditional students who may be challenged by traditional university tasks and assignments to fully engage and to demonstrate their growing knowledge of content as well as their ability to think critically. The practices described here allow students to scaffold toward improved abilities for success in future academic work and careers.

This chapter will begin by presenting a definition of active learning. Then we will address project-based learning as an active learning pedagogical approach beneficial to the above-mentioned targeted student populations, as well as the significance of digital tools to active learning. Finally, the chapter will include three applications of active learning in real and quite different contexts. First, we know that the learning outcomes of diverse undergraduates in STEM education who are exposed to pedagogical approaches incorporating active learning exceed the outcomes of similar students taught by traditional methods. A concentrated STEM faculty collaboration effort at NJCU has been effective in improving multiple aspects of the learning experience for undergraduate students across all the STEM disciplines. Second, graduate students (pre- and in-service teachers) in various branches of language education, many of whom have limited English themselves and/or limited experience in U.S. educational settings, are able to think critically about crucial course concepts through a rigorous and challenging group writing assignment in the Cloud. This assignment, firmly in sync with an active learning philosophy, helps students comprehend and retain essential educational and linguistic concepts better; what is more, their ability to apply theoretical educational concepts in Pre-K–12 classroom settings is improved. As our
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