Chapter 12

Addressing Diverse College Students and Interdisciplinary Learning Experiences Through Online Virtual Laboratory Instruction:
A Theoretical Approach to Error-Based Learning in Biopsychology

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ABSTRACT

Habits in note-taking and media usage of the current generation of undergraduate college students are very different from prior generations. Current students are attracted to multi-dimensional teaching approaches which utilize visual learning aids and increased social interactions beyond the traditional lecture. Moreover, the diversity with respect to first generation college student/immigrant and returning learners is growing. This learning situation becomes further complicated in teaching interdisciplinary biopsychology courses, where students may not possess a complete set of foundational concepts. Thus,

students require increased learning opportunities, sustained practice, as well as positive and corrective feedback to meet curricular proficiency expectations. At the same time, many students also have difficulty receiving, accepting, and implementing necessary feedback in order to succeed in their academic endeavors. To address this "feedback" issue, we have proposed a theoretical approach using "error-based" learning, for a biopsychology curriculum, to remedy this student learning problem through virtual laboratory instruction. Notably, this approach can be used in other integrative fields of learning.

INTRODUCTION

The new wave of undergraduate college students is different from the traditional college students of the 1970s and they possess particular educational characteristics, whether in formal classes or online instruction (Asarta & Schmidt, 2017; Wladis, Hachey & Conway, 2015). Today's undergraduate college student population is extraordinarily diverse, not just demographically, but also in their approach to learning. This diversity has been shaped by the rapid changes in instructional media and technology and the increasing utilization of social media, outside of the academic context. Therefore, traditional teaching approaches must adapt to current student background and needs to best facilitate and foster a meaningful educational experience, while maintaining the necessary rigor of the curriculum. The demographic diversity is one of the educational challenges for both faculty and students, and is often referred to as the "*academic achievement gap*." Disaggregating student data by ethnicity, first generation college (FGC) student, foreign-born first generation immigrant college (FGI) student, to name a few, is required in order to truly hone in on student-specific factors associated with their achievement and implement interventional strategies to address their needs, thereby better serving today's undergraduate college student (*For review see* Mukherji, Neuwirth & Limonic, 2017).

Because of these emerging academic risk factors, it remains in the hands of the educators to develop, (re)design, and reform the curriculum to prevent further widening of this academic achievement gap for current and future generations.

BACKGROUND

Maseleno, Hardaker, Sabani & Suhaili (2016) offered a unique perspective to address the academic achievement gap. They posited a multi-cultural education model, characterizing students culture, learning styles (*i.e.,* preferences and cognitive framework), and creativity in order to develop a software diagnostic tool to target their needs for intervention (*i.e.,* learner analytics and predictive modeling). Their study employed a questionnaire that analyzed student's learning patterns: *culture* through race, ethnicity, language; *learning preferences* through physiological and perceptual domains; *cognitive learning styles* through physical, mental, and emotional approaches; and *creativity* through problem solving skills, motivation, and subject specific knowledge (Maseleno et al, 2016). The study concluded, based on their dataset that creativity was at the core of their predictive analytic model for multi-cultural student education. However, the study failed to elaborate on specific instructional and curricular interventions that could be utilized by educators to address the academic achievement gap. Moreover, research in this area is both timely and necessary to understand and address student-specific needs and further to facilitate faculty efforts to intervene effectively.

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