Chapter 25

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

Lorenz S. Neuwirth
SUNY Old Westbury, USA

B. Runi Mukherji
SUNY Old Westbury, USA

Alireza Ebrahimi
SUNY Old Westbury, USA

Lillian Park
SUNY Old Westbury, USA

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 diffi-culty 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.

It is important to note that culture in the Maseleno et al. (2016) study referred to students' own background(s), *i.e.,* the context in which their learning history was established, which often was their Country of Origin's Educational Context, as well as the background(s) of others, *i.e.,* the new context in which their learning history is now being challenged (the American Educational Context). In our approach we agree to some extent with the learner analytics and predictive modeling of Maseleno et al. (2016) that was adapted from Amabile (1997). However, we caution the assumption that creativity is the core factor, or necessarily the most appropriate attribute for characterizing the learner (*for more*

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/addressing-diverse-college-students-and-interdisciplinary-learning-experiences-through-online-virtual-laboratory-instruction/224716

Related Content

An Immersive Tractor Application for Sustainability: A South African Land Reform and Learners' Perspective
Ofentse Mabiletsa, Sarel J. Viljoen, Jason Arthur Farrell, Lwando Ngqwemlaand Omowunmi Elizabeth Isafiade (2020). *International Journal of Virtual and Augmented Reality (pp. 35-54).*
www.irma-international.org/article/an-immersive-tractor-application-for-sustainability/262623

Advanced Visual SLAM and Image Segmentation Techniques for Augmented Reality
Yirui Jiang, Trung Hieu Tranand Leon Williams (2022). *International Journal of Virtual and Augmented Reality (pp. 1-28).*
www.irma-international.org/article/advanced-visual-slam-and-image-segmentation-techniques-for-augmented-reality/307063

On Being Lost: Evaluating Spatial Recognition in a Virtual Environment
Tomohiro Sasakiand Michael Vallance (2018). *International Journal of Virtual and Augmented Reality (pp. 38-58).*
www.irma-international.org/article/on-being-lost/214988

Vision, Trends, Gaps and a Broad Roadmap for Future Engineering
Jan Goossenaerts, Frank Possel-Dölkenand Keith Popplewell (2009). *Virtual Team Leadership and Collaborative Engineering Advancements: Contemporary Issues and Implications (pp. 226-240).*
www.irma-international.org/chapter/vision-trends-gaps-broad-roadmap/30886

Thinking in Virtual Spaces: Impacts of Virtual Reality on the Undergraduate Interior Design Process
Elizabeth Poberand Matt Cook (2019). *International Journal of Virtual and Augmented Reality (pp. 23-40).*
www.irma-international.org/article/thinking-in-virtual-spaces/239896