International Journal of Innovative Teaching and Learning in Higher Education
Volume 2 • Issue 1 • January-March 2021

Using Experiential Learning to Improve Student Attitude and Learning Quality in Software Engineering Education

Ferdinand Ndifor Che, American University of Nigeria, Yola, Nigeria
https://orcid.org/0000-0003-4823-2858

Kenneth David Strang, Walden University, USA
https://orcid.org/0000-0002-4333-4399

Narasimha Rao Vajjhala, University of New York Tirana, Albania
https://orcid.org/0000-0002-8260-2392

ABSTRACT

Experiential learning (EL) has great potential to transform students' learning experiences. Few studies, however, have focused on the use of EL in computer science education. The purpose of this study was to examine students' experiences with EL in computer science. Data were collected to examine the influence of EL on students' attitudes and quality of learning. The antecedent variables included student involvement, learning expectancy, instructor impact, course structure, and prior experience. PLS-SEM with PLSc was used to test generated hypotheses. The findings indicated that student involvement positively correlated with attitudes and learning expectancy. Instructor impact is positively associated with student involvement, quality of learning, and attitudes. Prior experience positively correlated with learning expectancy. Finally, course structure positively moderated the relationship between student involvement and learning expectancy. It is concluded that EL is a promising pedagogy to improve student attitude and quality of learning in software engineering education.

KEYWORDS

Experiential Learning, Instructor Impact, Learning Expectancy, PLS-SEM, Quality of Learning, Software Engineering, Student Attitudes, Student Involvement, Student Perceptions

INTRODUCTION

Academic leaders in tertiary institutions have wrestled for over two decades with the persistent gap between software engineering education and industry needs. The conventional way of teaching students technical concepts in the classroom does not arm them with the skills that they need to succeed as professionals (Exter, 2014; Garousi, Giray, & Tuzun, 2019; Garousi, Giray, Tuzun, Catal, & Felderer, 2020; Hanna, Jaber, Almasalmeh, & Jaber, 2014; Kövesi & Csizmadia, 2016; Radermacher & Walia,

DOI: 10.4018/IJITLHE.20210101.oa2

2013; SREB.org, 2016; Tuzun, Erdogmus, & Ozbilgin, 2018). Simultaneously, there is a growing demand for software engineers (Garousi et al., 2020; Tuzun et al., 2018).

Most established universities that offer software engineering as part of their computer science programs offer courses designed to address the problem. Adopting experiential learning (EL) strategies could transform traditional pedagogy into a more learner-centered learning, thereby narrowing the skills gap in software engineering industry (Garousi et al., 2020; Holmes, Allen, & Craig, 2018; Ng & Huang, 2013). The EL pedagogy promises significant benefits for students, both academically and professionally, as it facilitates more profound learning, acquiring practical competencies, more engagement, appreciation of diversity, and exposure to professional networking opportunities (Coker & Porter, 2015; Holmes et al., 2018). Students who have taken an EL course find the overall experience positive - they appreciate the valuable mentorship gained from working on real projects with practical impact (Holmes et al., 2018).

Even though the EL pedagogy is transformative compared to the traditional pedagogy, students can often resist it (Chavan, 2011; Cornell, Johnson, & Jr, 2013; Hains & Smith, 2012; Lovelace & Brickman, 2013). Students are often reluctant to change from a traditional teacher-centered pedagogy that they know and trust (Bedawy, 2017; Hains & Smith, 2012). In other cases, students perceived the tasks involved as too complicated, or did not feel confident in their ability to complete the tasks, or were merely uncertain about how they would be assessed (Bedawy, 2017; Hains & Smith, 2012; Leveritt, Ball, & Desbrow, 2013; Lovelace & Brickman, 2013; Unda & Ramos, 2016). In some cases where EL was optional, some students preferred the traditional methods, which were perceived as more predictable (Brennan, 2014). Understanding the factors that lead students to resist EL could provide potential strategies to mitigate such resistance. Whether students have prior experience with a learner-centered course, or whether students perceive the instructor as knowledgeable, competent, and a good mentor could mitigate students' resistance (Hains & Smith, 2012; Kahu, 2013; Redpath, 2012).

The EL pedagogy inherently incorporates students' involvement as an essential ingredient for achieving learning outcomes (Kahu, 2013). In transitioning to EL, it makes sense to monitor students' perceptions to confirm that attitudes are positive and that such a transformative pedagogy delivers a better quality of learning experience. In addition, quality of learning is a construct that reflects the degree of learning in terms of knowledge and skills gained and the extent to which students are satisfied with the learning process and experience (Thindwa, 2015).

The purpose of this study, therefore, was to examine the factors that would impact students' attitude towards and learning quality of EL activities in a third-year software engineering course. Insights gleaned from the study could help identify promising instructional strategies to improve software engineering students' preparation for future industry careers. The results could also be helpful to other software engineering programs considering introducing EL methods into their curriculum.

LITERATURE REVIEW

With the traditional teaching approach, often described as the teacher-centered, lecture-based approach, the instructor is actively involved in teaching while the learners are passive, receptive, and mainly listening. The EL approach is learner-centered and deliberately supports the compelling weaving together of educational learning, work, and personal development outcomes (Bavota, Lucia, Fasano, Oliveto, & Zottoli, 2012; Dragoumanos et al., 2017; Ellis et al., 2015; Holmes et al., 2018; Krutz et al., 2014; Stroulia et al., 2011). The preponderance of evidence in social science research indicates that EL not only improves student's engagement and student's overall performance but narrows the gap between the theoretical concepts taught in the classroom and the skills needed for graduates to succeed once they join the professional workforce (Accenture, 2018; Garousi et al., 2020; Hanna et al., 2014; Ng & Huang, 2013; Radermacher & Walia, 2013; Tuzun et al., 2018). Therefore, program designers in many tertiary institutions have explored various strategies to incorporate EL into their programs.