ABSTRACT

The Development of an Innovative Capstone Course to Assess the Demonstrated Leadership Skills of Postgraduate Construction Management and Civil Engineering Students

Leighton Andrew Ellis

The construction industry suffers from a shortage of effective project leaders, as demonstrated by the number of projects which suffer from failures of one kind or another. In the engineering profession, licensing bodies such as the Institution of Civil Engineers (ICE) have developed techniques to evaluate the leadership attribute of their potential Chartered Engineers (CEng). These include Development Objectives, an interview and a written essay. Throughout the world, a call has been made for a change in the engineering education curriculum to address the shortage of effective project leaders.

This study proposes that innovative assessment strategies, namely a bespoke 360-Degree Feedback, Zero Tolerance, ICE Development Objectives, an interview, and a written test are suitable summative approaches to assessing the demonstrated leadership skills of postgraduate construction management and civil engineering students at the University of the West Indies, St. Augustine Campus. To determine their effectiveness, a capstone course, named *COEM 6025-Practical Team Project*, which incorporated project-based learning techniques, was developed.

Statistical analyses were conducted to determine the effectiveness of the assessment strategies used over a 4-year study period (2009-2012). The results of the Cronbach's alpha and Confirmatory Factor Analysis indicated that the 360-Degree Feedback instrument is a reliable and valid measure of the demonstrated leadership skills. The findings of the Kruskal-Wallis H-test analysis and Paired-sample t-test–suggest that the 360-Degree Feedback strategy is an effective measure of the demonstrated leadership skills of the students. A similar finding was identified based on the One-sample t-test used to analyse the Zero Tolerance measure of the demonstrated leadership skills.

Based on Spearman's Rank-order correlations conducted on all five forms of assessment, four statistically significant relationships were observed. A moderate positive correlation was observed between the 360-Degree Feedback and Zero Tolerance. This proposes that students achieving high 360-Degree Feedback marks led their teams to achieve Zero Tolerance at a faster rate and vice versa. The remaining three relationships achieved weak positive relationships. Given the weakness of the relationships, the value of their related impacts is limited.

This study suggests that using the 360-Degree Feedback and Zero Tolerance tools, within a project-based learning environment, can provide an effective measure of leadership skills. The study also highlighted that evaluation techniques used by the ICE are also effective measures of communication skills of future leaders in industry. These finding were further validated by post-evaluation surveys conducted over the study period and a report of the accrediting body, Joint Board of Moderators (JBM).

Keywords: Leighton Ellis, Leadership Skills; 360-Degree Feedback; Zero Tolerance; Institution of Civil Engineers; Construction Management; Civil Engineering; Project-based learning; University of the West Indies