A Measurement Model for Collaborative Online Learning in Postgraduate Engineering Management Studies

Leonidas Efthymiou
https://orcid.org/0000-0001-8099-5885
University of Nicosia, Cyprus

Alex Zarifis
https://orcid.org/0000-0003-3103-4601
Loughborough University, UK

Yianna Orphanidou
https://orcid.org/0000-0003-1933-4409
University of Nicosia, Cyprus

EXECUTIVE SUMMARY

Although the approach of social constructivism is not new (its origins are dated back to the pre-World War II era), it can be used along with novel learning strategies to facilitate quality online learning. The progress of technology, learning platforms and digital resources, together with certain social constructivism techniques, enable engineering practitioners to study in postgraduate management programs that replicate face-to-face environments. In this chapter, the authors introduce certain metrics (objectives, critical success factors, key performance indicators, and targets) along with a handful of constructivism techniques, namely, 'peer interaction', 'forum activities', 'learning by doing', and 'systematic feedback'. Linking the constructs of social constructivism with quantification enables us to develop a rational model of performance measurement, serving as a navigation instrument for instructors, instructional designers, and learners.

INTRODUCTION

This conceptual chapter brings together Social Constructivism and Performance Measurement (PM) to offer a measurement model for postgraduate online students in Engineering Management. Departing from the pedagogy of social constructivism, (Dewey, 1938), the chapter reviews a number of learning techniques, namely, 'social interactions', 'online communities', 'learning by doing', 'systematic feedback', 'continuous assessment', and the role of 'instructor as facilitator' – all of them intended to enhance fully interactive and engaging online learning experiences.

The social constructivist approach in online learning involves interaction with instructors and peers in forum activities. High levels of interaction among learners result to a positive attitude, greater satisfaction and therefore, successful distance education (Desai et al., 2009; Mooney, 2008). In addition, the environment is instructor-led where learners are guided through the content and learning activities at specified times (Rhode, 2009). Often, the instructor is a facilitator rather than a surrogate teacher or conveyor of information (Briggs, 2013, Smolin and Lawless, 2003). Instructors as well as peers systematically receive and offer feedback, which is an essential component of effective teaching and learning (Boling et al, 2011; Chan & Repman, 1999).

The use of social constructivism techniques along with a number of metrics and tools enable us to develop a student performance measurement model with Objectives, Critical Success Factors (CSFs), Key Performance Indicators (KPIs) and Targets. Linking the constructs of social constructivism with quantification is deemed important as it progresses both fields and offers a rational model to instructors and students. Hence, the questions this study seeks to address concern an attempt to quantify the online learning experience, namely: what metrics can we combine to measure the online learning experience? What do we want to measure and how can we best serve students' needs proactively? This conceptual chapter, then, is not a literature review. It is rather a navigation instrument; a scholar's guide of how to systematically prepare by quantifying online learning performance. This type of conceptual study is called a 'model' (Jaakkola, 2020) inasmuch as it seeks to build a theoretical framework that predicts relationships between concepts; identifies connections between constructs and proposes particular outcomes (Cornelissen 2017).

To our knowledge, this is the first time a full performance measurement model is designed for online post-graduate learners in engineering management whereas it is likely to be useful to instructors and instructional designers. The proposed model is intended specifically for formal, instructor-led, engaging, online learning experiences, aligned completely with the requirements of National Standards in Higher Education and Quality Assurance agencies.

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