

Chapter 5

Testing the DeLone–McLean Model of Information System Success in an E–Learning Context

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ABSTRACT

This chapter has two important objectives (a) introduction of structural equation modeling for a beginner; and (b) empirical testing of the validity of the information system (IS) success model of DeLone and McLean (the DM model) in an e-learning environment, using LISREL based structural equation modeling. The following section briefly describes the prior literature on course delivery technologies and e-learning success. The next section presents the research model tested and discussion of the survey instrument. The structural equation modeling process is fully discussed including specification, identification, estimation, testing, and modification of the model. The final section summarizes the test results. To build e-learning theories, those untested conceptual frameworks must be tested and refined. Nevertheless, there has been very little testing of these frameworks. This chapter is concerned with the testing of one such framework. There is abundant prior research that examines the relationships among information quality, system quality, system use, user satisfaction, and system outcomes. This is the first study that focuses on the testing of the DM model in an e-learning context.

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INTRODUCTION

During the past decades, we have seen an increase in empirical research to identify the success factors of e-learning systems. The majority of e-learning research has focused on the two research streams (a) outcome comparison studies with classroom-based learning; and (b) studies examining potential predictors of e-learning success or e-learning outcomes (Arbaugh et al., 2009). The quality of e-learning empirical research has also improved substantially during the past two decades. Many frameworks for e-learning education in business have been developed or adopted from other disciplines. To build e-learning theories, those untested conceptual frameworks must be tested and refined. Nevertheless, there has been very little testing of these frameworks. This chapter is concerned with the testing of one such framework: the information system (IS) success model of DeLone and McLean (the DM model).

This chapter has two important objectives (a) introduction of structural equation modeling for a beginner; and (b) empirically testing the validity of the DM model in an e-learning environment. The primary focus of this book is placed on providing an introduction to e-learning empirical research. To that end, several chapters in the book include tutorials on structural equation modeling techniques such as path analysis and structural equation modeling using partial least squares. This chapter complements those chapters to provide a basic introduction to structural equation modeling. The second objective of this chapter is to empirically test the validity of the DM model in an e-learning environment. The DM model is one of the widely recognized IS models based on a systematic review of 180 studies with over 100 measures. The DM model has been empirically tested using structural equation modeling in a quasi-voluntary IS use context (Rai, Lang, & Welker, 2002) and in a mandatory information system context (Livari, 2005). The study of Rai et al. concluded that the DM model

has explanatory power, and therefore, the model has merit for explaining IS success. The study of Livari concluded that perceived system quality and information quality are significant predictors of user satisfaction. However, his study failed to support the positive association between system use and user satisfaction. Our study is the first empirical testing of the DM model in e-learning context. E-learning systems and information systems share some common dependent variables. Nevertheless, the two systems differ in terms of the output of the systems (independent variables).

The rest of this chapter is organized into several sections. The following section briefly describes the prior literature on course delivery technologies and e-learning success. The course delivery technologies are part of a comprehensive array of dependent variables that affect the success of e-learning systems. The next section presents the research model to be tested. The survey instrument is discussed in the next section. Structural equation modeling (SEM) methodology is fully discussed in the following sections, including model specification, model identification, model estimation, and model testing and modification. The final section summarizes the test results.

COURSE DELIVERY TECHNOLOGIES AND E-LEARNING SUCCESS

The review of the past two decades of e-learning systems research identified three dimensions: human (students, instructors, and interaction among them), design (course contents, course structures, etc.), and e-learning systems including technologies. In each dimension, researchers identified many indicator variables. For example, students can be further sub-classified into sub-dimensions such as learning styles, intelligence, self-efficacy, motivation, self-regulated learning behaviors, etc. For the review of the impact of human dimensions and design dimensions on e-learning success,

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