Design Satisfaction Measurement: A Case Study of Taiwan’s Primary School Construction

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Abstract

This study presents a novel model for evaluating design satisfaction (DS) for primary school construction projects. The proposed model consists of three aspects including Teaching space design, Campus planning and design, and Eco-awareness oriented and 19 DS evaluation items (DSEIs). Eco-awareness oriented was the most important aspect and must be exerted during the design phase of school construction based on the DS evaluation results of 10 schools. Additionally, special attention should be paid to design of natural lighting in classroom (DSEI_5), utilization of color in classroom (DSEI_7) and construction scheduling and planning (DSEI_11) as they are important DSEIs that received low satisfaction scores. The results of this study contribute to the efforts to improve DS and the quality of primary school construction. The framework, methodology, and analytical tools used in the study can be applied to build similar models for other aspects of construction and service performance for school construction projects.

Keywords: Construction Projects, Design Satisfaction (DS), Evaluation, Factor Analysis, Primary School, Simple Additive Weighting Method

Introduction

Satisfaction is a client’s cumulative result of positive experiences; however, these positive experiences can be adversely affected by just one bad experience (Austin & Peters, 1985). In increasingly competitive environments, satisfaction evaluation (SE) has become crucial to business success. Consequently, satisfaction evaluation research has garnered considerable attention recently. The SE revolution has spread across many industries, including the construction industry. Different phases of a construction project, including planning/design, contracts delivery, construction, operation and maintenance phases, impact overall project quality and performance differently. Generally, planning/design phase is the most important component in delivering a success project, and thereby deserves the most attention.

For a construction project, architects are responsible for transforming needs and expectations into drawings and specifications. Contractors then transform these drawings into...
a construction entity. Since primary schools lack professional construction personnel, the design and supervision of a primary school construction is usually awarded to the same architectural firm or engineering consulting. Various design faults may be covered up due to the game-rule of players acting as referees at the same time. Improper designs are therefore often generated, leading to problems associated with project cost, duration, quality, and safety (Lin & Chen, 2005). Additionally, the performance of Architect/Engineer (A/E), including their professional knowledge and service performance, significantly impact the success of a project and influence satisfaction derived from a particular project (Bukohin & Rozenes, 2011; Remington & Soderholm, 2010; Tan, et al., 2008).

To provide client satisfaction, it is necessary to take the client’s prime concerns of design performance into consideration in the design (Bredin, 2010). If designers fully understand a school construction project client’s points of view regarding design performance, eliminating possible design mistakes and defects and enhancing the project client’s satisfaction is easy. However, the aspects that the school construction owners are concerned about and how well the designers perform in terms of school construction design remain unclear. From the viewpoints of school facility users/managers, this study aims to build a model for measuring the DS associated with primary school construction. In this study, school construction covers the construction of buildings, playgrounds, and all secondary facilities. Satisfaction is defined as “customer subjective appreciation after consuming products or services.”

**PREVIOUS STUDIES**

Many points of view on satisfaction evaluation are available (Oliver, 1981; Bolton & Drew, 1991; Kujala & Ahola, 2005; Sweis, et al., 2011). Some researchers assert that satisfaction is an integrated and general concept and, thus, use overall satisfaction to represent satisfaction (Day, 1977). Other researchers believe that adding multiple items together is the best way for measuring satisfaction (Rozenes, 2011). Satisfaction evaluation is not new to the construction industry. Construction SE has attracted the interest of many researchers and practitioners. Some studies focus on customers, homebuyers, and homeowners when building SE models for private construction projects. Other SE-related studies focus on planning, design, contract awarding, construction, inspection, acceptance, and cost and duration (Sanchez & Robert, 2010).

Construction projects are typically viewed as a production process, the product of which is the completed facility. Construction is frequently examined in terms of the service product, service delivery, and service environment. Three important phases, i.e. the design, construction and operational phases, influence construction project quality (Arditi & Lee, 2003). Ahmed and Kangari (1995) surveyed 101 client companies and used ANOVA to develop a client satisfaction model. They conclude that all factors in the client satisfaction model do not have the same significance when satisfying clients. However, the perception of factors leading to satisfaction in different industrial sectors does not differ significantly. Additionally, in their study, no interaction existed between model factors and client groups. Kujala and Ahola (2005) built a framework for assessing the role and value of customer satisfaction surveys using institutional theory and a cognitive model of organizational culture. The use of customer satisfaction surveys, based on two case studies, suggests that these surveys may provide some symbolic value. Leung et al. (2004) investigated the behavioral management mechanisms of construction project participants. A total of 11 behavioral management mechanisms were identified and 15 hypotheses were tested in this study. Leung found that management mechanisms, rather than particular projects, directly affect participant satisfaction. Additionally, high commitment attenuates the negative effects of a difficult situation (high task and team conflict) on participant satisfaction. Maloney (2002)
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