Chapter 15
Partnership of Learning Construction Through Model Making:
Case Study or Designing?

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ABSTRACT

Project-based learning offers an engaging instructional method to make learners active constructors of knowledge. This study aims to investigate the effectiveness of learning in two project-based learning of construction through model making in architecture using a case study and by designing. Model making is an innovative and time-consuming approach in teaching construction as this approach rely heavily on student-teacher partnership mimicking the studio learning. Learning construction through model making needs students to take an active role and to be 'in-charge' of their learning and learning process. The study employs a survey to 78 participants of undergraduate architecture students. The results of this study demonstrated architecture students learn construction effectively using the model making method. This project-based learning allows students to have construction knowledge to consider buildability in their architecture design studio. The result can be used to improve teaching and learning of construction in architectural education.

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INTRODUCTION

Project-based learning suggests an engaging instructional method to make learners active constructors of knowledge. Project-based learning allows an in-depth investigation of a topic worth deep learning (Harris & Katz, 2001). In addition, learners typically have more autonomy over what to learn while maintaining interest and motivating students to take more responsibility for their learning (Worthy, 2000). Buildability of the construction application in Architecture Design Studio has been a persistent problem in Architecture Education. This study aims to investigate the effectiveness of learning in two project-based learning of construction through model making in architecture and further answer the research question, "Did the students learn better by recreating a construction model using a case study or by designing?", and, "Which project will help them in considering buildability in design?". This teaching of construction through model making is an innovative and time-consuming approach in teaching construction as this approach relies heavily on student-teacher partnership mimicking the studio learning. Learning construction through model making needs students to take an active role and to be 'in-charge' of their learning and learning process. The two projects emphasize on process of learning as well as developing students' knowledge and skills. Learning construction by model making method will enhance the cognitive thinking, enables students to visualize spatial as well as the relationship between structures, joints, and details. The constructivist-learning environment (Holmes & Mullen, 2013) by making a model enables students to construct their own meaning of developing structural knowledge than just memorizing information from drawings or lecture notes. According to Biggs and Tang (2011), "surface and deep learning reflect the different ways students learn and lecturers aim to teach". Surface learning relates to learning by memory, memorizing facts and having very little personal engagement, while deep learning is more involved with understanding the idea, the reasoning behind it and appreciating how it relates to existing knowledge. Deep learning is important for architecture students to demonstrate application of construction knowledge in design. Constructionism theorizes that individuals learn best when they are constructing an artifact that can be shared with others and reflected upon. Another important element to constructionism is that the artifacts must be personally meaningful, where individuals are most likely to become engaged in learning. To investigate learning construction through model making in architecture and further explore the preference of students in applying model-making technique in architecture design studio, a quantitative study was employed. Creswell (2014) stated that survey research describes "trends, attitudes, or opinions of a population by studying a sample of that population" (p. 155). The construct of the survey has three (3) sections; Section A is the background information of the students. Section B questioned the cooperative / collaborative learning and project-based learning method of learning construction. Section C questioned students learning construction from making model of their design, a case study and application in architecture design studio. The constructs used 5 Likert Scale (1 strongly disagree and 5 strongly agree) and open-ended questions. Descriptive analysis was used to study the knowledge gained by architecture students in learning construction through model making in Project 1 (designed model) and Project 2 (case study model). Project-based learning is a very familiar learning method for architecture students in architecture design studio. Architecture students like collaborative learning providing distribution of work is fair. This study proves that architecture students had a successful learning outcome through project-based learning of model making (Holmes & Mullen, 2013) developing construction knowledge. Students found project-based learning of construction model a very engaging method to learn construction. Students highly opinionate that they have learned the following by completing both Project 1 (designed model) and 2 (case study model) on (1) construction process,