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Integrating Research Findings into Sustainable Building Delivery Teaching

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Abstract

Construction management is a practice oriented field and its course content needs to include many elements from practice. Many new developments take place, new technologies emerge and the necessity of redefining working dynamics among project stakeholders necessitates construction educators to constantly evaluate and reorganize the scope of courses. This situation justifies the necessity of bringing research findings into classroom. The paper exemplifies how research findings are brought into a major construction course. Project Management course at the University of Texas at San Antonio covers broad range of topics such as fundamental concepts of management and roles in the construction industry, project delivery and contract methods, detailed analysis and administration of different phases of a construction project.

The demand for sustainable projects is growing. Its delivery method requires lots of input from wide range of experts. So far, there is no set or accepted method for sustainable building project delivery. During the coverage of project delivery methods, the instructor brings the characteristics of a sustainable projects. The comparative analysis is made between conventional and sustainable projects. The phases of sustainable projects include many additional elements and early involvement of defined tasks from phases of conventional projects. A recent research study accomplished by the author highlights the differentiating aspects of conventional projects from sustainable projects. The findings obtained from a research that is conducted with the major national firms will be incorporated to future lectures. The research has explored the sustainable delivery practices of the major national construction firms. They will be used as a case study to complement the theoretical part of the lecture. The impact on students' learning will be identified. Students appreciate and value the knowledge brought outside the textbook especially if the research is original and accomplished by the course instructor. The approach can be taken as an example for various topics which are recent to AEC industry.

Keywords: Sustainability, buildings, delivery methods, pre-construction, construction, post-construction, design-build, CM at risk.

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1. Introduction

Construction management is a practice oriented field and its course content needs to include many elements from practice. Many new developments take place, new technologies emerge and the necessity of redefining working dynamics among project stakeholders necessitates construction educators to constantly evaluate and reorganize the scope of courses. This situation justifies the necessity of bringing research findings into classroom. The paper exemplifies a good example of a research that is conducted on sustainable building delivery process and its future coverage in the classroom.

The demand for sustainable projects is growing. It is slowly becoming an architecture-engineering-construction (AEC) industry standard. It requires lots of input from a variety of experts. So far, there is no set or accepted method for sustainable building project delivery. During the coverage of project delivery methods, Construction management at risk (CMR) and Design-Build (DB) are presented as the two possible delivery methods that can be used in sustainable projects. The majority of the top green building contractors in the United States are experienced in CMR and DB delivery methods [1]. These methods are well recognized with their processes which allow collaboration among stakeholders. However, the study by Korkmaz et al. [2] also revealed that design-bid-build (DBB) is used in green office-building projects' delivery.

Nomenclature

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C further nomenclature continues down the page inside the text box

2. The Theoretical Content of the Sustainable Project Delivery Lecture

The theoretical of the course introduces students to DBB, DB, CMR, and construction management – agency (CMA). In addition, project chronology and scope of each phase is covered during the lecture. The scope of each phase is revisited for sustainable projects as well.

The content is covered in the form of a comparative analysis between conventional and sustainable building delivery scopes.

The differences in sustainable project delivery can be attributed to the additional tasks in different phases of the project. The scope and tasks in each project phase from a detailed design phase to post-construction phase is compared. The following paragraphs describe the theoretical course content that is currently covered for conventional building project process.

The design phase of a building project is composed of four distinct sub-phases which are in order programming, schematic design, design development and construction documents [3]. Programming is the written statement of the requirements of the building, and it is the basis of design. It describes the spaces needed, defines the relationships of the functions to be performed in the building and it necessitates extensive involvement of the user. It is followed by the schematic design stage which is the preliminary phase of the design. Site investigations are accomplished in this stage. Decision is made on foundation types, alternate design are discussed, and conceptual estimates are prepared. Owners usually make go/no go decision for the project. The design is refined and the detailed information is obtained during the design development phase. Major building systems are finalized such as structural, mechanical, electrical, plumbing (MEP), elevator and exterior façade. Real costs are obtained. The final phase of design is the