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ScienceDirect

Procedia - Social and Behavioral Sciences 119 (2014) 549 – 556

Procedia Social and Behavioral Sciences

27th IPMA World Congress

Interdisciplinary Design: Influence of Team Structure on Project Success

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Abstract

The conceptual building design phase is crucial in the overall design process, determining the life-cycle quality of a building. Early collaboration of architects and engineers should provide for creation of new knowledge and solutions beyond specific scope of disciplines. This paper presents the research on collaboration of students of architecture and structural engineering in conceptual design phase, within interdisciplinary design class, at the same time the student competition Concrete Student Trophy at the Vienna University of Technology.
The research focus is to find out the impact of the team composition on the design quality in terms of competition success. The first findings generated through the logistic regression indicate that more architects are beneficial to the probability of success, while more civil engineers in the team are harmful to the probability of success of a student group in the Concrete Student Trophy. The future research will explore the impact of further drivers such as professional experience or former acquaintance of team members on the success.

Keywords: Conceptual Design, Interdisciplinary Design, Design Study; Collaborative Planning; Sustainability; Energy Efficiency

1. Introduction

The earliest design stages are dominantly responsible for the latter building performance during the lifecycle - conceptual design plays crucial role for building design quality. Therefore, the interdisciplinary collaboration

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doi:10.1016/j.sbspro.2014.03.061

should be initiated at this early stage, when interconnectedness of a project's goals can be recognised, new solutions can be developed through complementary knowledge of different experts, improvements are made easily, and new common knowledge can be created (Wang et al 2009, Rossi et al, 2009). In the early planning phases there is an unlimited universe of possible solutions, however still very few tools, methods or knowledge on actual collaborative, interdisciplinary design, which would be helpful for the process. With project progression, the number of possibilities is decreasing, however the number of available design or planning tools and methods is increasing (Fig.1), creating a large gap between the opportunities and possibilities.

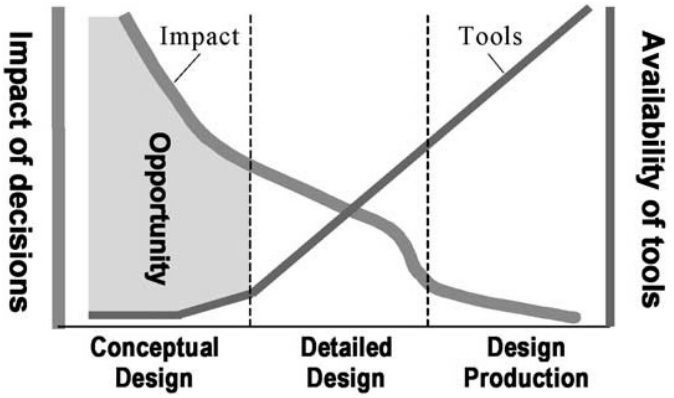

Fig. 1. Opportunities versus Possibilities, Wang et al 2009

Due to the formal university education, which is based on splitting of engineering and architectural schools and disciplines, the students are trained to think in their own scope of activity, instead of working in collaborative manner.

The Department for Industrial Building and interdisciplinary Planning at Faculty of Civil Engineering at Vienna University of Technology together with Austrian Association for Cement and Concrete has initiated in 2006 the Concrete Student Trophy – an international student competition with aim to promote the collaboration of architects and engineers in achievement of innovative formal and structural solutions in material concrete. The precondition for the partaking at the competition is, that competition-team has to consist of at least one architect and one structural engineer. In cooperation with the Institute for Concrete Structures, and, Department for Design and Construction, Faculty of Architecture an interdisciplinary design class accompanying the competition, where the teams consist of architecture and civil engineering students working simultaneously in the conceptual phase.

The Concrete Student Trophy has been carried out for eight years, with covering various tasks: coffee-bar, pedestrian bridge, watchtower, floating bridge, highway station, multi-functional sports hall, flap bridge. The winning contribution of pedestrian bridge has actually been constructed, and is located in the 14th Viennese district.