Chapter 20

Improving Interior–Design Decision–Making in Daylit Spaces: A Case Study

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ABSTRACT

Case study represents a principle methodology when an in-depth investigation is needed. It can be an alternative to traditional approaches to emphasize the researcher’s perspective as central to the process. In an effort to allow for tool application purposefully selected architects and decision-makers were encouraged to apply a new decision-support tool; which that aims at enhancing decision-making though visual comfort evaluation. A selected case study space was used for application: a daylit museum located in Washington DC Metropolitan was examined for visual discomfort problems. Since museums are typically carefully lit because of the sensitivity of exhibits, this case study evaluated the daylighting condition in a museum using a series of illuminance field measurements, simulations and views experienced by occupants along a circulation path through the space. The case study also aimed at understanding how small design changes can affect visual comfort as a tactic for the case studies. A collaborative design effort was used in different stages of the case study.

INTRODUCTION

Case study represents a principle methodology when an in-depth investigation is needed. It can be an alternative to traditional approaches to emphasize the researcher’s perspective as central to the process. It has been particularly successful in sociological and educational studies as it can be used to bring out the details from participants’ different perspectives by using multiple sources of data. Yin demonstrated that using multiple sources for data collection in the case study can maintain the reliability of the study (Swofford, 1998). Several definitions exist for the case study: Mitchell (1983) defined a case study as
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a “detailed examination of an event (or series of related incidents) which the analyst believes exhibits (or exhibit) the operation of some identified general theoretical principles”. Yin (1994) defined a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”. Jakubiec and Reinhart (2010) defined it as “an in-depth, multifaceted investigation using qualitative research method, of a single social phenomenon”.

Design decision-related visual comfort studies are critical factors in daylit buildings especially ones with acute lighting conditions like museums where adaptation is an essential aspect of comfort. This chapter primary goal was to enhance interior spaces connection through visual comfort. To achieve this objective, a decision-support tool was applied to a case study to provide designers and decision makers with scenarios where representations from the tool can improve designing through re-imagining spaces.

BACKGROUND

Collaborative activities are an important application, especially when it comes to evaluative process. A study by (Mattessich and Monsey, 1992) examined the factors of successful collaboration; the study conducted important factors including environment, membership, process, communication, purpose, and resource. (Schrage, 1995) suggested 13 factors, which influence collaboration including: competence; a shared understood goal; mutual respect, tolerance, and trust; creation and manipulation of shared space; multiple forms of representation; the representation; communication; environments; clear lines of responsibility without boundaries; decisions do not have to be made by consensus; physical presence is not necessary; selective use of outsiders for complementary insights and information; and collaboration’s end.

The collaborative case study design is most appropriate for this research for data triangulation and to maintain the qualitative aspects of the case study where the group of members collaborates to select the evaluation metrics and the design decisions.

IMMERSIVE CASE STUDY METHOD OVERVIEW

To allow for tool application a group of purposefully selected architects and decision-makers were encouraged to apply the new tool on a selected case study space: a daylit museum located in Washington DC Metropolitan was examined for visual discomfort problems that could affect the interior spaces connections. The study started by identifying primary visual discomfort zones. Illuminance and Luminance evaluation took place where high contrast was detected. Afterward, a series of design alternatives were proposed based on the initial evaluation results. For each alternative, visual comfort condition was compared with existing conditions to select an adequate alternative regarding glare controlling and visual comfort between spaces. Finally, the selected option was re-evaluated, and visual comfort conditions were compared with the as-built space conditions.

Collaborative Design Participants

The members were chosen based on their background and expertise and consequently their ability to effectively understand the goals of the research and to interact with the tool. Participants with a strong