MKowalska_22045541_ThesisProposal

by Martyna Kowalska

Submission date: 29-Jun-2023 12:18PM (UTC+0100)

Submission ID: 209609650

File name: 902646_Martyna_Kowalska_MKowalska_22045541_ThesisProposal_990297_940393465.pdf (139.77K)

Word count: 2005

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Research Proposal - Martyna Kowalska

Research title or question:

Between Light and Shadow: How adaptive environments can sculpt the immersive experience?

Draft Introduction:

"The first step in lighting design is to establish the character of the place. (...) Furthermore, our perception is affected by our moods and our interactions with other people." (Tregenza and Loe, 2014, p.87)

The movement of light throughout the day plays a significant role in our daily routines and how we interact with the world around us, providing structure and regularity. The impact of light and shadow is particularly interesting for projects which strive for a narrative component like games and VR environments. Contemporary lighting design in the space can have a substantial influence on its overall appearance, affecting visual comfort, defining space, highlighting textures, and enhancing colours. It also influences the way we perceive the shape and size of a room. Furthermore, studies have shown that light affects our mood, concentration, and overall well-being.

Architectural lighting showcases and enhances specific design elements that contribute to a building's aesthetic, history, and purpose. It is a blend of art, design, and technology, incorporating various fields such as physics, engineering, and the psychological and physiological impacts of light.

This paper aims to investigate how lighting can be used as a design strategy in 3D spaces and adaptive environments. Although lighting is often considered for its technical or aesthetic features, it can also serve as a powerful storytelling tool, improving the cinematic experience of digital backgrounds. The research focuses on architectural lighting and strives to contribute to the design conversation in a way that is accessible to readers outside of academic circles.

Key words searched:

Light and Shadows, Luminous Architecture, Architecture Lighting, Adaptive Environments, Immersive VR, Stage Lighting

Research Design Methods:

The researcher's objective was to investigate academic sources about lighting design in adaptive environments. To gain a deeper understanding of the subject, qualitative studies were selected to examine the process, context, and interpretation. The focus was on peer-reviewed academic sources that explored the topic in a theoretical manner, with a few technical manuals included to provide accurate fundamentals and practices. After collecting the sources, they were cross-examined and analysed to identify innovative techniques and opinions.

Draft literature review:

The critical analysis of the studies about lighting design in architecture and its use in 3D environments has been conducted in this thesis proposal through the review of several books or articles investigating those subjects.

In particular, the study by Tregenza and Loe (2014) covers the comprehensive architectural approach to lighting. It emphasizes the technical aspects of lighting in the context of architectural design, providing a solid foundation before delving into more advanced topics. Their approach focuses on imagination in architectural light while offering practical knowledge in the presentation of the tools necessary for creative design. On the contrary, Barker (1997) takes a more theoretical approach in his book, *Lighting: lighting design in Architecture*. He delves into the natural and artificial illumination of interior and exterior spaces, considering both the scientific and aesthetic aspects of light and colour theory in architecture.

Light as an inseparable part of architectural design is the common thread also in the *Fundamentals of architectural lighting* by retired architect Samuel Mills (2018). This guide provides a thorough understanding of the visual and psychological perceptions of the luminous environment, aiming to bridge the gaps in current research on the topic. In his book *Light: The Shape of Space: Designing with Space and Light* Lou Michel considers other important factors that impact light design, including the effects of light and its influence on perceiving form and space. Taking a non-stylistic approach to design, architectural lighting educator analyses

constructions from the perspective of how the users see their surroundings as they move through space. Michel also provides an insight into the interaction of lighting and spatial design colour theory. An interesting approach to how vision and perception can be applied to architectural spaces has been presented in Christopher Cuttle's *Lighting Design: A Perception-Based Approach* (Cuttle, 2015). Opposite to notions which focus on efficient performance or decorative lighting, his alternative lighting strategy looks for a balance of brightness to achieve additional visual elements (for example sharp edges or colourful spaces).

Various articles have been analysed to consider architectural illumination and light installations as a reflection of the role of luminance as a multifaceted and interactive design element. *Bright: architectural illumination and light installations* (Lowther and Schultz, 2008) and *Bright 2: architectural illumination and light installations/production* (McNamara and Martins, 2015) present a rich selection of innovative projects that have been implemented in both commercial and cultural contexts around the world. On the other hand, *Stage lighting explained* (Fraser, 2002) and *Light Fantastic: The Art and Design of Stage Lighting* (Keller, 2010) analyse theatre illumination through modern lighting theory. Max Keller points out that focus on emotion is useful for a transfer to architectural interior spaces and Neil Fraser offers an introduction to the theory behind the practice. Combined, both sources offer an alternative method for lighting design, connecting the real world and digital spaces.

Throughout art history, the representation of light and its derivative shadow modified architecture's appearance and meaning. Tadao, Sverre and Gerhard (2002) in their book *The Secret of the Shadow: Light and Shadow in Architecture* address the aspect of shadow. The first chapters describe its link to visual history, while the last section is dedicated to the shade in contemporary architectural concepts. Moreover, the absence of light can be an essential tool for adding emotional depth and animating spaces This theme is explored by Jukes (2018) in the *Emptiness Is Not 'Nothing': Space and Experimental 3D CGI Animation.* The chapter explores space as a material in experimental 3D CGI animation practice. It draws on Heidegger's discourse on space and uses emptiness and the void as methods for investigation. The exploration is both theoretical and practical.

The different approaches and concerns regarding digital environments and Virtual Reality (VR) as a platform for cinematic storytelling were explored by Ole Christoffer Haga (2019) in his master's thesis *Animated Storytelling in 360 Degrees*. The author discusses the lack of pre-established framing and editing positions the spectator as the ideal observer. This highlights

the unique way in which VR can change our perception of space and provide a more immersive experience. Being surrounded by a fully spatial virtual world, viewers can adjust their view in three dimensions, giving them the sensation of real-world experience. With the absence of multiple cinematic features, Gallardo (2001) attempts to explore digital spaces from a practical point of view. His book *3D Lighting: history, concepts, and Techniques,* studies the art of lighting in 3D graphics including detailed fundamentals of 3D graphics and general lighting techniques.

These sources have been thoroughly examined to create the concept map of architectural lighting design in 3D spaces. The research about the luminous environments in this thesis provides a wide panorama of the approaches to lighting in digital surroundings. Due to the scope of the paper, I will not be discussing the semiotic perspective or colour temperature of light.

Title and general outline of each chapter:

Chapter 1: The first chapter delves into the architectural approach to lighting as demonstrated by three different architectural studies.

Chapter 1.2: This subchapter provides a better understanding of how lighting affects our perception of form and space using specific design and construction techniques.

Chapter 2: This chapter discusses the significance of light art and stage lighting in terms of cinematic aspects and narrative techniques, bridging real-life spaces with digital ones. It questions whether the luminous impression of a setting is more important than the engineering or architectural concept behind it. Additionally, it considers whether lighting can overshadow the point of a realistic simulation by enhancing shades, contrast, and brilliance.

Chapter 3: In the fourth chapter, the lighting design theories and methods discussed earlier, are applied to 3D environments by analysing games and VR experiences as case studies.

Chapter 4: In the final chapter, various perspectives and issues related to digital environments are discussed, such as the concept of space and emptiness.

A draft chapter (Title):

Chapter 1 (Luminous Architecture; light as an inseparable part of architectural design.)

The surface type, colour, and lighting in an interior can convey meaning through their overall pattern of light and shade, as well as the light sources themselves. According to Tregenza and Loe (2014) when we are designing lighting, we are designing the architecture. In Le Corbusier's well-known definition (1923), 'L'architecture est le jeu, savant, correct et magnifique des volumes sous la lumière' light is an essential part of architecture. Internationally influential Swiss architect and city planner has played masterfully with orientation, openings, and textures to create kinetic architecture with daylight. The hidden diffuse lighting in his design allows the dynamic layers of light to transcend the static building volumes.

Similarly, Italian architect Carlo Scarpa is known for incorporating the materials, landscape, and history of Venetian culture into his work. He places a strong emphasis on natural light as a crucial element in architecture. It plays a vital part in defining how space is perceived in terms of scale, textures, materiality, and overall atmosphere. Architecture and light have a reciprocal effect on one another. Scarpa has developed design techniques that use light to enhance a building's design. By creating vistas, sculptural shadows, and unique light projections through voids cut into solids, Scarpa seamlessly integrates light into their designs.

Add quotations

Barozzi Veiga, an architecture studio established in Barcelona in 2004, often utilizes mono materials to emphasize the three-dimensional quality of spaces. This approach enables them to effectively work with light in a straightforward and uncomplicated manner. The importance of natural light in spatial design goes beyond its primary function of illumination, as architects can skilfully manipulate it to imbue a space with a metaphysical essence, influencing the emotional well-being of its inhabitants. Light and shadow hold a phenomenological impact on the human psyche, and their interplay has been utilized to evoke a sense of divinity and spirituality like religious structures. The relationship between architecture and light holds cinematic values comparable to a film's structured narrative.

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GENERAL COMMENTS

Instructor

Establishment of research potentials and objectives

An excellent submission representing a high level of engagement and enquiry. A significantly developed proposal with focused objectives for the study. The introduction identifies the context and establishes the topic areas for discussion. A robust structure and appropriate chapter topics to present the enquiry. The discussion in the draft chapter is very competently articulated with excellent synthesis of complex concepts and strong critical analysis to contributing to theoretical and practical knowledge.

Relevance of Literature and referencing

A strong bibliography reflected in the literature review that provides support for your enquiry identifying key perspectives and arguments within the topic. Excellent synthesis and clarity on how the sources will inform the study.

Research design approaches and methods

An appropriate approach. Name the key authors and technical sources you mention.
As you progress the study more detail on how the analysis will reach reliable findings can be added.

Writing style and communication

A very articulate writing approach with excellent organisation and presentation.

Use of citation and referencing conventions

Accurate use of Harvard citation conventions. Excellent use of citation to support your observations and arguments.

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Add quotations

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