

Chapter 17

User Experiences and Differences in Viewing Architectural Images with Various Interfaces

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ABSTRACT

This paper proposes an empirical approach to the visualization phase of architectural images, employing established concepts, methodologies, and measurement techniques found in media psychology and user-centered studies. The paper proposes a human-centered approach for conceptualizing visualization technologies and evaluating the quality concept of images to simulate a satisfactory architectural experience. The authors use psychophysiological measures to capture the affective component of image quality experience facilitated by different displays, including immersive and nonimmersive displays. These types of visualizations are important for empirically evaluating the experiential aspects of an architectural space and other types of images.

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INTRODUCTION

The visualization of architectonic projects has evolved over the past 20 years due to 2D and 3D CAD-CAM technologies. Traditional photography and *maquettes* (French for scale model of buildings) are still employed as aesthetic resources for examining spaces and shapes. However, the use of infographic techniques allows the generation of images and animations, enabling professionals or architects to examine details and change textures or illuminations in a more rapid, interactive, and comfortable manner.

Today's professionals are increasingly employing the latest technologies to work and communicate on projects. However, taking into account a number of experiences gathered from the university environment, it has been found that users do not apply these technologies optimally. They do not control the size or resolution of the images, and in the majority of the cases, they do not consider the final user or the type of screen where these images will appear. This absence of resource optimization is disturbing, mainly due to the employment of digital images, which are considered essential in understanding the space and presentation of architectonic ideas. In this specific sector where visualization is crucial, we have found that there is a remarkable deficiency of usability studies that, which focus on the manner in which information should be presented. The impact that information has on a user is based on the effectiveness of the mode of communication employed and on the user's own preferences.

The research community is exploring the different possibilities that mobile or immersive devices offer users, producing studies ranging from optimizing the presentation of information, thereby creating an augmented reality, to those more focused on user interaction. Undoubtedly, one of the most investigated themes on the use of these new technologies is that of information visualization (IV). IV is a well-established discipline that proposes graphical approaches to help

users better understand and make sense of large collections of information. The small screens of handheld or immersive devices provide a clear imperative to design visual information carefully and with the goal of presenting it most effectively. The limited screen size makes it difficult to display large information, and the device capability and the network bandwidth are other important factors to take into account at the moment of the image creation. The main problems associated with vision in immersive and mobile devices are related to the distance of image visualization (away from the optimal range of screen visualization according to recommendations that fix the distance between 8–10 cm per inch of a screen's diagonal distance, <http://www.hdtv-expertos.com/2008/05/distancia-ngulo-y-altura.html>). A higher resolution is necessary to maintain the quality perception in a head-mounted display, but this slows down the load on a mobile device, a device that does not require this high resolution.

This paper includes a multidisciplinary approach that intends to examine a user's emotional response according to the technical features of an image and its display where it is visualized, in order to make headway in generating images with accurate parameters that will optimize the manner in which the user visualizes an architecture project.

The main goal of the study is to quantify and evaluate the differences in emotional behavior and the perceived quality of architectural images, based on the user experience and the type of device. The results will allow us to propose new compression rates or resolutions to adapt any image to different devices without reducing its communication without reducing its integrity.

We will apply techniques already employed in usability studies and examine a user's interaction with computing systems (HCI–HCC) to measure the user's emotional response (psychological and neuropsychological) according to technical aspects such as the digital image and the type of display (information technology). This relationship between visualization and emotional response has

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