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Virtual Reality as a Tool for Participatory Architectural Design.

E Dedekargınođlu and M Yilmaz

Hacettepe University, Turkey

Technology has entered in architectural design as a tool since twentieth century. Architects use several programs like Autocad, 3D Studio Max and the other for visualizing their designs but what they skip is the users and the needs of them. To reach a sustainable design in buildings, besides the provision of clean energy, the needs and the quality of life of the users are also very important items for the future designs including the disabled people. Technological developments are also the basic tools for reaching an innovative design for the societies that consists diverse people differentiating in age and needs. In this context, the use of virtual reality, which is a new technology, will provide an efficient design for all that will bring economical beneficences as the users' needs will be covered and the quality of life will be promoted.

The ongoing developments in virtual reality have benefitted many different professions and enabled them to visualize and evaluate their work in more accurate and realistic representations. The growth in computing power and developments in virtual reality systems "have given way to a more systematic use of digital information on buildings" and affordable virtual reality hardware and powerful user interfaces provided new opportunities for visualizing the architectural design process (Whyte and Nikolic, 2018). By using virtual reality systems, the designers can visualize the end-result as a well-structured digital replica in a realistic environment and can easily solve problems or enhance their design.

Virtual reality can also promote and provide "participatory design" in architecture and other design fields and include the end-user into the design process to achieve better performing results. Nowadays urban transformation and regeneration projects are introduced in many districts of the cities throughout the world for ensuring more sustainable urban development. The success of these projects is determined by to which degree they can respond to society's needs and demands and how an end-user participates in the final design decisions. At this point, using virtual reality can help both designers and authorities by reducing costs and benefitting from resources optimally, resulting with more sustainable cities in the long term.

In contrast to recent developments, the usage of virtual reality systems has been limited to client visualizations and walkthroughs therefore, it can be said that virtual reality for architecture is still in its infant stages. This paper will evaluate the opportunities that can be offered by virtual reality for sustainable architectural solutions and provide a conceptual framework for the implementation of virtual reality into a participatory architectural design process. The paper aims to conceptualize a roadmap for designers to benefit from virtual reality as a design and interaction tool that promotes a sustainable and healthy development.