

## **ENHANCING DESIGN EDUCATION THROUGH ADVANCED TECHNOLOGIES: A CASE STUDY IN ARCHITECTURE AND DESIGN**

Nazgol Hafizi  
Faculty of Design, Arkin University of Creative Arts and Design

**Abstract:** The accelerated development of technology has brought about revolutionary changes in numerous industries, including design and architecture. This extended abstract discusses the significance of integrating advanced technologies into design education, focusing on the practical application and results of a course entitled "Advanced Technologies in Design" taught by Asst. Prof. Dr. Nazgol Hafizi during the Spring Semester of 2022-23 (Faculty of Design, Arkin University of Creative Arts and Design).

**Keywords:** Advanced Technologies, Architecture, Design, Education, Virtual Reality, Augmented Reality.

The importance of design education in equipping students with the dynamic and technologically-driven nature of the design industry cannot be overstated. The development of sophisticated technologies provides educators with a chance to enhance the learning experience, broaden creative possibilities, and encourage innovation in design education (Sirror et. Al., 2021). This abstract centers on the incorporation of Virtual Reality (VR), Augmented Reality (AR), and designing with Artificial Intelligence (AI) as an opportunity to enhance the design process and improve the design outcomes of students.

Virtual Reality (VR) and Augmented Reality (AR) are two essential technologies that have received a great deal of attention in the design field. Virtual reality immerses users in a computer-generated environment, mimicking real-life experiences and allowing designers to experience their designs in three dimensions. AR, on the other hand, augments users' understanding and engagement with their surroundings by superimposing digital data onto the physical environment (Kharvari and Kaiser, 2022). According to the literature, virtual reality (VR) and augmented reality (AR) have great potential in design education since they enable students to interact with their creations in more immersive and interactive ways. It has been discovered that these technologies

improve spatial comprehension, ease design communication, and enable flexible design processes (Wang et al., 2018; Part et al., 2016).

The "Advanced Technologies in Design" course is intended to educate students, predominantly third- and fourth-year interior architecture and industrial design students, with vital abilities and understanding regarding advanced design technologies. Students were introduced to and taught how to use the modeling program "Rhinceros 3D" as one of the essential tools. Throughout the semester, students mastered Rhinceros and were able to construct comprehensive and intricate design models using its capabilities.

The course further examined the potential of sophisticated technologies in design by developing upon this foundation. Students were introduced to emergent technologies such as Virtual Reality (VR), Augmented Reality (AR), and designing with Artificial Intelligence (AI) with the support of Mr. Milad Ghelichkhani, a senior architect from the Megaron Architecture Office (Figure 1). The aforementioned technologies were thoughtfully incorporated into the curriculum in order to improve the processes of design, presentation techniques, and overall project outcomes of the students.



Figure 1: Lecture on Technologies and Digital Tools with Mr. Gelichkhani Collaboration.

In this regard, the second half of the semester was devoted to advanced design technologies, where students had the chance to implement their newly acquired skills to their design studios projects. Students could exhibit their designs in a more engaging and interactive manner by incorporating VR and AR. Using QR codes enabled the availability of AR experiences and 360-degree depictions, allowing jury members examine the works from a variety of viewpoints, Figure two presents some of students selected works. This innovative approach enhanced not only the quality of students' presentations, but also their understanding and acceptance of their design objectives.

The final results of the course were highly positive. Students exhibited exceptional growth in their design abilities and an increased awareness of the possibilities of emergent technologies in the field. Not only did the integration of advanced technologies enhance the standard of their studios results, but it additionally supplied them with skills that are in high demand within the industry. The students' use of QR codes to present their designs exemplified their adaptability to technological advances and their ability to utilize them as effective communication tools.



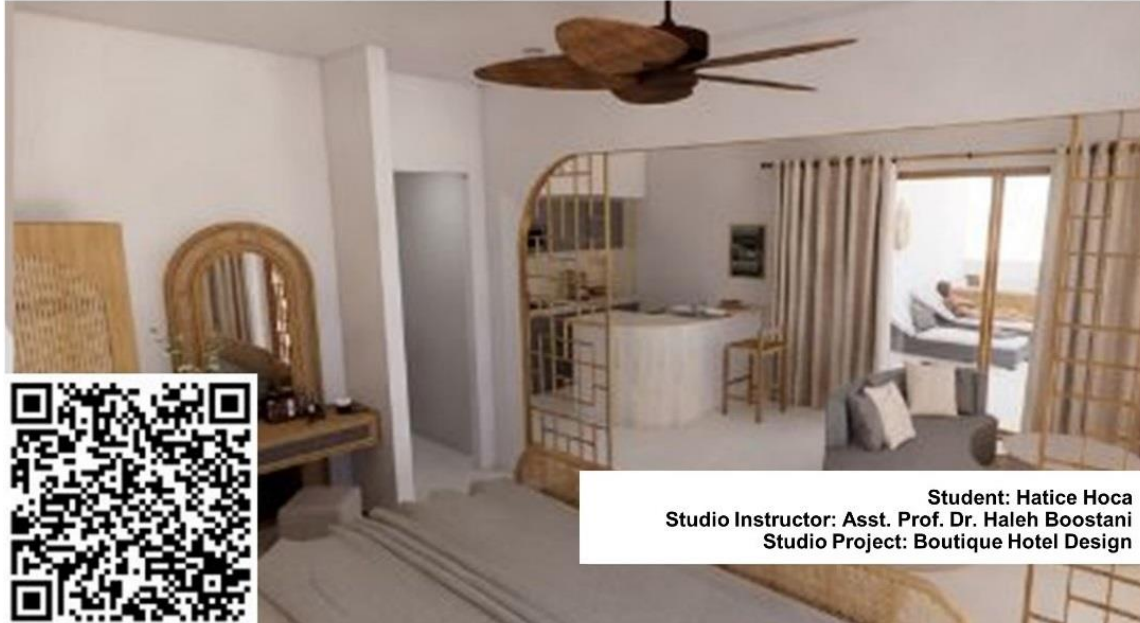


Figure 2: Samples of Students' Final Outcome.

Bringing advanced technologies to design education has become essential to educating students for the architecture and design industries' constant evolution. This case study highlights the advantages of merging technologies such as VR, AR, and AI-based design into the curriculum. By implementing these technologies, academics may promote innovation, increase student engagement, and empower future generations of designers with the expertise necessary to prosper in a world dominated by technology.

### **Conflicts of Interest**

The author declares no conflict of interest.

### **References:**

Kharvari, F., & Kaiser, L. E. (2022). Impact of extended reality on architectural education and the design process. *Automation in Construction*, 141, 104393.

Park, C. S., Le, Q. T., Pedro, A., & Lim, C. R. (2016). Interactive building anatomy modeling for experiential building construction education. *Journal of Professional Issues in Engineering Education and Practice*, 142(3), 04015019.

Sirror, H., Abdelsattar, A., Dwidar, S., & Derbali, A. (2021, March). A review on virtual reality for architecture education. In Proceedings of the International Conference on Industrial Engineering and Operations Management (pp. 944-950).

Wang, P., Wu, P., Wang, J., Chi, H. L., & Wang, X. (2018). A critical review of the use of virtual reality in construction engineering education and training. International journal of environmental research and public health, 15(6), 1204.