Web-based IVEs for User Experience Evaluation in the Architecture Studio

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Virtual Reality, User Experience, Architecture, 3D Modeling, Web-based

Research on the use of immersive virtual environments (IVEs) in architectural design has rapidly permeated the practice for the last few decades, largely driven by a single prospect: the possibility of sufficiently simulating the genuine interactions and experiences of a design well before it is actually built. The implications of this achievement when fully realized would revolutionize the profession, effectively igniting a new period of David Harvey's space-time compression in the industry, such that IVEs would enable designers to, symbolically, cross temporal distances, and bring a legitimate experience of their final products to the present, at any point in their design process. Yet this reality remains out of reach as the potential applications of VR technologies in architecture have yet to be realized sufficiently. VR technologies today, although quickly developing, remain too inefficient and cumbersome for full adoption in the real-world practice of architecture. This, arguably, discourages its adoption as well in other regions of the discipline including education. As a result, this research embodies an effort to achieve the goal identified earlier by introducing IVEs for practical use in the architecture design studio. It seeks to develop a useful and accessible implementation of VR using WebXR and Three.js, a JavaScript library used to create and display 3D computer graphics on the web, for architecture students. A preliminary workflow has been developed for generating a navigable immersive virtual environment in the web using conventional architectural modeling software such as Rhino to create a 3D model of the environment, then exporting the model in an OBJ file format which can then be imported into the web using Three.js and the WebXR API. However, more work needs to be done to enable a truly immersive and effective implementation of WebXR for experience research in the architecture studio, including enabling interactivity with objects within the environment and developing components that engage other senses. When realized, this approach to creating IVEs would enable architecture students to not only manifest an immersive instantiation of their never-to-be-constructed designs, but it will further equip them with the ability to conduct quick, and effective usability tests to assess the user experience of their design, elevating their awareness of the true experiential implications of their creations.