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Define Immersive Need Level for Optimal Adoption of Virtual Words with BIM Methodology

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Abstract : In the construction industry, there is a large amount of data and interconnected information. To manage this information effectively, a transition to the immersive digitization of information processes is required. This transition is important to improve knowledge circulation, product quality, production sustainability and user satisfaction. However, there is currently a lack of a common definition of immersion in the construction industry, leading to misunderstandings and limiting the use of advanced immersive technologies. Furthermore, the lack of guidelines and a common vocabulary causes interested actors to abandon the virtual world after the first collaborative steps. This research aims to define the optimal use of immersive technologies in the AEC sector, particularly for collaborative processes based on the BIM methodology. Additionally, the research focuses on creating classes and levels to structure and define guidelines and a vocabulary for the use of the " Immersive Need Level." This concept, matured by recent technological advancements, aims to enable a broader application of state-of-the-art immersive technologies, avoiding misunderstandings, redundancies, or paradoxes. While the concept of "Informational Need Level" has been well clarified with the recent UNI EN 17412-1:2021 standard, when it comes to immersion, current regulations and literature only provide some hints about the technology and related equipment, leaving the procedural approach and the user's free interpretation completely unexplored. Therefore, once the necessary knowledge and information are acquired (Informational Need Level), it is possible to transition to an Immersive Need Level that involves the practical application of the acquired knowledge, exploring scenarios and solutions in a more thorough and detailed manner, with user involvement, via different immersion scales, in the design, construction or management process of a building or infrastructure. The need for information constitutes the basis for acquiring relevant knowledge and information, while the immersive need can manifest itself later, once a solid information base has been solidified, using the senses and developing immersive awareness. This new approach could solve the problem of inertia among AEC industry players in adopting and experimenting with new immersive technologies, expanding collaborative iterations and the range of available options.

Keywords : AECindustry, immersive technology (IMT), virtual reality, augmented reality, building information modeling (BIM), decision making, collaborative process, information need level, immersive level of need
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