Serious Games for the Learning and Practices of Hazard Recognition: Understanding the Design Complexity for 3D Construction Site Modeling

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ABSTRACT

Among the various construction safety and health (S&H) training methods, 3D digital game-based learning is believed to have a great potential. This method can combine various educational strategies to engage learners that have grown up with computer gaming. To this end, an increasing number of 3D serious games have been developed for the learning of construction S&H. However, developing a virtual construction-site simulation for serious gaming is a tedious process. Little has been done to understand the simulation parameters that should be controlled in order to adequately represent the dynamics of a construction site and, as a result, to influence student learning. Therefore, the purpose of this study is to understand and prioritize the 3D construction-site simulation parameters for learning hazard recognition. In the paper, the researchers reported their findings on the S&H game design framework as an initial step to identify how simulation parameters such as texture, lighting, and animation could align with game contents and positively affect student learning. A future experiment for validating each parameter was also introduced. The researchers expect that the final research outcomes will enable construction education stakeholders to better understand and manage the design complexity of 3D construction-site modeling for S&H serious games.