The role of control factors in the impact of occupational safety training based on immersive virtual reality

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The potential of immersive virtual reality (IVR) in the implementation of occupational safety training has been highlighted in earlier studies. Nevertheless, there is a lack of theory-based pedagogical models to guide the design of safety training process based on IVR. Furthermore, while previous studies have highlighted the importance of the amount of control users have over their actions in the VR- environment, the role of control factors has been little explored in empirical studies. Our study investigates whether control factors contribute to the effectiveness of IVR safety training. By compiling a synthesis of earlier studies, we have developed an integrated pedagogical model for IVR that takes the contextual, situated and social dimensions of safety learning into consideration. We are carrying out a RCT to study the effects of a safety training process based on the integrated pedagogical model. 100 workers from two work organizations will be randomly allocated into two groups. The first group participates in a safety training process, in which elements emphasizing the user's ability to exert control over their actions have been added to the IVR learning environment. The second group participates in a similar training process containing the same educational content without these additional elements. During the training, study participants practice safe working methods. The training process also incorporates facilitated group discussions before and after IVR-based learning. The training process is targeted at individual-level antecedents of safety behavior such as safety self-efficacy and safety knowledge. We will conduct follow-up measurements immediately after the safety training and 2 months after the intervention. Learning transfer will be assessed by measuring self-reported safety behavior. We will also collect qualitative data by video recordings and interviews. Our study provides knowledge for the design of safety training utilizing IVR technology.