

Improving the 3D scale model of a Treatment Center and transforming it into a serious game to aid the WHO builders in their training

In collaboration with the *World Health Organisation - Téchne* a project has been conducted with the goal to improve the 3D scale model of a *Treatment Center*, and transform it into a serious game to aid the *Treatment Center* building team in their training. The main learning outcomes of the game include achieving a more effective facility layout and workflow optimization, and enhancing teamwork and group problem solving, focusing on the cases of the three infectious diseases *Ebola*, *Cholera*, and *Covid-19*. A *Treatment Center* can be described as a modular hospital, which is erected in the epidemic center of infectious disease outbreaks. Extensive research was conducted on *Treatment Center* preparation, construction, and operation for the three discussed diseases, on the fundamentals and application of serious gaming, and on the current offering of the market in terms of similar projects and consumer products, each of which were required to form an idea on how to approach the game design. The findings concerning the game design contained a few key factors. In order to be effective towards the learning goals, the game must contain real, practical information and knowledge, and simulate real situations as closely as possible (Krstovska & Kok, 2024). The principles of emotional engagement and flow impact perceived learning of serious games heavily, where the state of flow is a product from the right balance between the challenge offered by the game and the skill of the player (Hamari et al., 2015). Lastly, in the consideration between a competitive and collaborative gameplay style, the latter is preferable in a context where encouraging teamwork and enhancing group problem-solving are the focus (Vegt et al., 2016). As one of the main focusses for the game was for the players to understand how people and resources are moving in *Treatment Centers*, a versatile, acrylic game board was designed which can be drawn on with whiteboard markers. Other design choices for the physical attributes of the game, such as the 3D models, the playing cards, the manuals, and the packaging have been based on accordance with *African* cultural believes, practicality and design theory based on experience and in relation to the other attributes, and the preferences of *the client*. The game could be manufactured within budget due to the availability to execute most of it in-house at the *University of Twente*. After manufacturing was completed the game was shipped to a representative of the *World Health Organisation - Téchne*, who took it to a conference in *Ghana, Africa* in November 2024, where the game was first exhibited. Although the game meets its design requirements on paper, in theory is able to achieve the learning goals for its players, and left a very positive impression at the conference, its effectiveness in achieving its intended learning goals and true potential are not yet proven as the game has not yet been played by the intended target group. The *World Health Organisation - Téchne* is strongly encouraged to facilitate and conduct testing with the intended target group to assess and enhance the game's effectiveness and impact. Further research must be conducted to enable further development, in order to elevate the game to the next level.

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