HUMANITARIAN ENGINEERING SERIOUS GAME

Public summary

"DESIGNING A SERIOUS GAME THAT EDUCATES STUDENTS ABOUT THE IMPORTANCE OF INCORPORATING SOCIAL JUSTICE PRINCIPLES IN TECHNOLOGY DEVELOPMENT FOR UNDERSERVED COMMUNITIES."

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This bachelor assignment is an assignment for the research group of Humanitarian Engineering at the University of Twente. Humanitarian Engineering is committed to addressing problems that arise in underserved communities. For example, these communities often lack access to basic needs such as: water, sanitation systems, health care and education. Humanitarian Engineering engages in tackling social injustice, such as the inequitable distribution of resources and the limited involvement of communities in decision-making processes. Humanitarian engineering strives to design and implement fair and sustainable solutions to improve the quality of life of these communities (University of Twente, 2024).

The University of Twente offers education on Humanitarian Engineering, there is one master courses and from academic year 2024/2025 onwards there will also be a minor, Fundamentals of Humanitarian Engineering (University of Twente, 2023). In the minor they would like to have a fun and interactive way to teach the students principles of social justice in Humanitarian Engineering and show them the consequences of their actions. That is why a serious game is proposed, which can be used for motivating students to learn about these principles of social justice. It is also possible to show students the consequences of their actions through a serious game. In addition, a serious game makes it possible not only to learn, but also to have an experience. This can be done by simulating real life scenarios, giving the students the opportunity to improve their skills such as decision making and problem solving (Ștefan et al., 2019).

In this thesis a serious game is designed to educate students about the importance of social justice in technology development projects for underserved communities. The serious game is designed to be used in the minor Fundamentals of Humanitarian Engineering. The main research question of this assignment is:

How can a serious game educate students (engineers and designers) about the importance of incorporating social justice principles in technology development for underserved communities by simulating real-world scenarios?

The serious game was designed by using the method of design thinking. The different phases have been gone through in this thesis. A literature review was conducted, several interviews were held and several case studies were examined to answer the research question. Learning objectives and requirements were drawn up. Next, several ideas were ideated, which were merged into a concept. This concept was further developed, tested and prototyped.

The designed serious game is an analogue role-playing game, where the players represent five different stakeholders. Each of the stakeholders have their own interest and knowledge. These stakeholders have to make decisions about a Humanitarian Engineering project in Tanzania, where humanitarian engineers and a local non-governmental organisation (NGO) visit a underserved community to respond to issues faces by this community. The players discuss and choose from various options, which are presented on a gameboard. The players face communication barriers, reflecting the difficulties and power differences which are often encountered in real-life scenarios. After discussing with each other, each stakeholder votes blindly on their preferred option, with different weighing to reflect the different power positions between the stakeholders. One of the main goals of the serious game is to educate the players about the need for inclusive participation and to show that every stakeholder's perspective is important in finding just and sustainable solutions. In the end of the game there is an evaluation, in which the players are asked though-provoking questions. Which require the players to reflect on whether they incorporated social justice principles, such as inclusive participation, while playing the serious game and whether and how they could have done this better. In addition, in the evaluation, the player is told possible outcomes of their project, allowing them to see what possible consequences of the project might have been.

Figure 1; final design front and back stakeholder cards

By playing this serious game, students will better understand the ethical and social aspects of Humanitarian Engineering and learn to listen to all voices, hidden perspectives and design solutions that address inequities. The game can be used as a tool to connect theory and practice and encourage them to prioritize social justice in their future work.
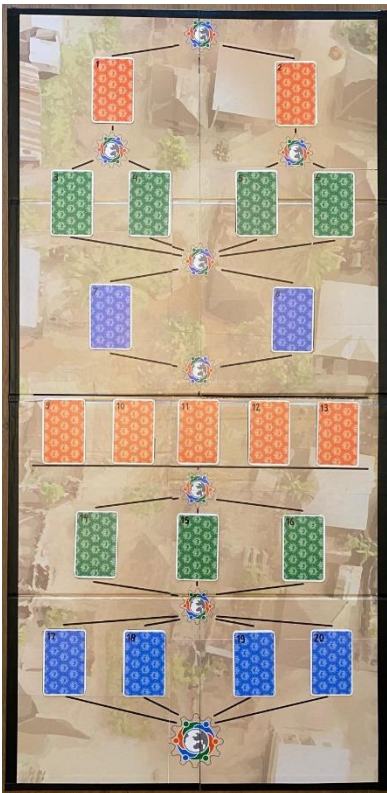

Figure 2; prototype game board

Figure 3; prototype game board with choice card closed on it

Figure 4; prototype game board with game scenario

In the future the serious game can be tested with the actual target group, during the minor Fundamentals of Humanitarian Engineering. With the observations and feedback from this testing, alterations could be made to the serious game. There would also be the possibility of expanding the serious game, new choice cards could be developed, allowing multiple versions of the game to be played. More stakeholder roles could be added and the evaluation could be extended. By expanding the serious game, other principles of social justice can be incorporated or can become more prominent in the serious game.

Figure 51; all game components of the prototype

References

University of Twente. (2024, April 3). *Humanitarian engineering*. Retrieved April 9, 2024, from

https://www.utwente.nl/en/et/dpm/chair/amme/HE/

University of Twente. (2023, September 20). *Humanitarian Engineering*. Retrieved April 9, 2024, from

https://www.utwente.nl/en/humanitarian-engineering/

Ștefan, I. A., Hauge, J. B., Hasse, F., & Ștefan, A. (2019). Using serious games and simulations for

teaching Co-Operative decision-making. *Procedia Computer Science, 162*, 745–753.

https://doi.org/10.1016/j.procs.2019.12.046