Disease Transmission Educational Simulator Oral Proposal

Authors: Emily Gallagher, James Meurer, John Kulins, Thomas Kohut

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The Customer:

The Center for Disease Control and Prevention (CDC) was established in 1946 and is one of the major components of the Department of Health and Human Services. The agency strives to protect American citizens from health and safety threats using the highest scientific data available. The CDC also monitors global health concerns and works with global health organizations, such as the World Health Organization (WHO), to detect and fight diseases before they reach America.

The Customer's Needs:

The CDC is in need of a way to educate how typical diseases are spread and how people can prevent diseases (social distancing, washing your hands, wearing a mask, etc). There are many individuals who still do not follow proper health safety guidelines, even in the midst of a global pandemic, often due to a lack of understanding of how diseases spread. The CDC wants to demonstrate this through simulations depicting diseases found on the WHO's top infectious disease list.

In this simulation, the user may select preventative measures, such as practicing social distancing or wearing a mask, and see the effects they would have on the spread of the outbreak. From each simulation there would be a counter showing those who are alive, dead, and those who are infected or cured. The interface should be smooth and easy to use in order to make it easily accessible to anyone, regardless of their knowledge of using computers.

Objective Analysis:

The objective of our analysis was to determine what users would value most when using our program. Whether it be accuracy, usability, or anything else they could think of which would help to improve our program. The program is a simulation on infectious diseases based on the list of the World Health Organization's (WHO) top ten most infectious diseases, as well as the COVID-19 'Coronavirus' in order to show the infectivity of the virus as compared to other diseases such as the Dengue virus and other viral infections. The way we determined this was through various interviews with multiple workers in a medical profession as well as a school monitor. These were the questions we had given them and the answers they had responded to us in tandem.

Interview Questions:

1.) If you were to use a software like this what would you say would be the most important thing you would want from it?

2.) How useful do you think this kind of software would be in your workplace? Do you think it would be a special case scenario situation or could it possibly be used daily?

3.) Other than this application being used in the specified locations, do you think it could have a use anywhere else?

Interview Answers:

Kristin Meurer-(Position: Occupational Therapist)

1.) I would say that accuracy is the most important thing when it comes to this type of software. It is very important to accurately depict the spread of disease.

Nancy Meurer-(Position: School Monitor) :

1.) Accuracy would definitely be the most important thing when creating this type of software. The accuracy of the infection rate needs to be accurate in order to teach people correctly.

2.) I think it could have a pretty good daily use. In fact it could probably have a lot of use as an orientation tool to not only new employees but students as well.

3.) This kind of software could be used almost anywhere in the current situation. Airports, Train Stations, Bus Terminals. Anywhere there can be a great amount of people.

Catherine Kulins (South Shore Ambulatory Surgery Center)

1) She believes that it would be best to educate the masses.

2) To educate new workers, undergraduate students and ancillary staff. Very useful. Special case yes used daily in a large institution, like a hospital surgery center places with large staff

3) She could see this being used on College campuses. Use it where there are a large number of people, in outpatient centers. Many locations.

4) She thinks that this would best be used on an educational website, mandatory certifications/ things you need to know.

Henry Maurice-(Position: Nurse)

1) What methods show the highest probability in slowing/stopping the spread. Knowing what methods have the most success against an illness would allow us to focus on utilizing it to ensure it is done to slow/stop the spread. Also, if a certain time of year shows a definite increase in cases so that we can be sure to have proper quantities of supplies to handle this influx.

2) It depends on the situation. For COVID and other long term pandemics, it would definitely be helpful to have an idea of how the disease can be controlled. If it's for something like the flu, I don't think it would be used as frequently.

3) I think it would have use in other locations. Utilizing it in places such as airports could give those staff a better idea as to how to prevent further spread of the disease. For example, you have someone who just flew in from a location where a spike would typically occur, the software could influence the procedure in handling them, such as holding them briefly or testing them to ensure they are healthy.

Summary of findings:

Our group found that a lot of users would utilize our program for educational purposes and requested that accuracy be a top priority when developing the program. This was a surprise to us as we thought that useability would be the most important aspect for those planning on using the program. While this means that we would have to increase the focus towards accurate data readings, we still need to keep the ease in navigation and usability of the software in mind.

Prioritized list of functional and non-functional requirements:

Functional Requirements	- Users should be able to enter the data for the amount of people they wish to see infected(aka starting infection) - Users should be able to enter the data for the amount of people they wish to see healthy - Users should be able to enter the data for the amount of people they wish to see that are wearing masks - Users should be able to select from a list of diseases - User can enter how many days they wish to enter - Users should be able to start and view the simulation - Users should be able to review the results of the simulation when it reaches its end - Users should be able to redo the simulation with the same or edited parameters or terminate the program after results are displayed - Users should be able to run custom simulation of diseases with their own infection rates (however it should display as a custom simulation)

Nonfunctional Requirements	- One and only one disease and prevention method (including none) may be selected at a time - The population cannot be set to be less than 0 or over 1000 - The system should not crash unexpectedly - The data behind diseases and how prevention methods must be accurate - The results of the simulation that are displayed must be accurate to what occurred - The simulator cannot be run with no disease, population number, number of days and prevention method selected - The simulation ends when everyone is either dead or healthy/cured - Time limit must be an integer greater than 0 - Time goes by in a simulation at increased speed compared to real time (i.e. 1.5 seconds real time = 1 day in sim)