Meducation: A Different Approach to Learning

By: Jan Markus Milan & Jasper Caballero

Mentor: Dr. Deborah Sturm

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THE CITY UNIVERSITY OF NEW YORK — College of Staten Island

THE VERRAZANO SCHOOL — COLLEGE OF STATEN ISLAND — UNDERGRADUATE HONORS PROGRAM

Abstract

We report on a study that investigates whether players, through interactive learning and gaming, can retain information about medications that a traditional pharmacology class would typically introduce. We rebuilt a previous iteration of our roleplaying game, Meducation, focusing on the modularity, scalability, and dynamicity of the codebase. We also added accessibility features such as the ability to have the NPCs speak. This feature also proved effective in the enforcement of learning among players.

Meducation: An Educational Game About Medicine

Introduction

Meducation is an educational game focused on teaching the basics of Pharmacology, more specifically, the medicine involved. It has Role-Playing (RPG) characteristics where you play as a new doctor that has opened their own clinic.

Users are introduced to 20 different medications and ten engaging scenarios involving patients and their respective conditions. In each stage you encounter a different patient showing different symptoms. Your job: give them the right medicine for the corresponding symptoms.

The Game & Data

Difficulty Selection

Medicine Cabinet & Medicine Descriptions

Giving The Medicine & Just-In-Time (JIT) Instructions

End Level Score

Before playing the game, players had to take a pre-survey to assess their knowledge on different medications.

If we look at this specific question, we can see that only 27.8% of participants knew the correct answer, being "Sumatriptan." Around 50% of the participants answered with "I don't know," while the remaining participants chose the incorrect medicines "Benazepril" and "Lorazepam."

Before Playing Meducation

After playing the game, players had to take a post-survey that asked some of the same questions previously asked in the pre-survey to assess if they learned and retained information regarding different medications.

If we look at the same question, we can observe an overall positive increase. Compared to the pre-survey results, the rate of "I don't know" submissions decreased to only 25%, while correct submission, "Sumatriptan" increased by around 25%.

After Playing Meducation

Player Feedback

The game was evaluated on by over 20 students at the College of Staten Island, including those in the nursing department. The game also received professional feedback from experts in the healthcare industry. Students were enthusiastic about the game as a fun way to learn and assess their knowledge of pharmacology. Everyone loved the graphics and the RPG-style gameplay.

At the same time, professionals in the industry critiqued the realism of the game. The game freely simplified the prescription process, meaning that it is not an accurate representation of real-life diagnoses, as there are many more treatments that are needed for certain illnesses or conditions besides just prescribing pills. Realism was the issue that stood out the most. But overall, the responses were very positive, and the feedback was incredibly helpful.

> I enjoyed the different starting points and the different patient scenarios that the doctor was placed in. They added more life to the game.

> The graphics were beautifully done, but the process was far too simple. There should also be consequences if the wrong medicine is given.

Conclusion

Responses were collected through a pre-survey and a post-survey (after playing the game). The results of this pilot study were promising. The data showed that half of the answers submitted in the post-survey were correct, where the highest correct submissions for a given question was 75%. This trend was seen for most of the assessment questions in the post-survey, averaging to a 60.4% correct submission rate. This was a significant increase in correct submissions compared to the pre-survey, where the rate of wrong or "I don't know" submissions was greater than 75%. The rate of correct submissions in the pre-survey averaged to only 49.9%, showing that after playing the game, there was a 10.8% increase in average correct submissions.

These results suggest that game-based learning can be effective when learning and retaining information about medications.

Future Work

- Improve on the realism of the game by adding situations in which the patient's symptoms escalate if you give them the wrong medicine.
- Shorten the amount of time it takes to choose a medicine and return to the patient.
- Add more dialogue where the doctor gives the patient a plan of action and asks them to return later for a checkup.

Meducation: An Education Game About Medicine

About

- ✗ A matching game with Role-Playing (RPG) traits.

- ✗ You control a doctor in their private clinic and are visited by different patients with different symptoms in every stage.

Goal

- ✗ Give the patient the right medicine for their corresponding symptoms.
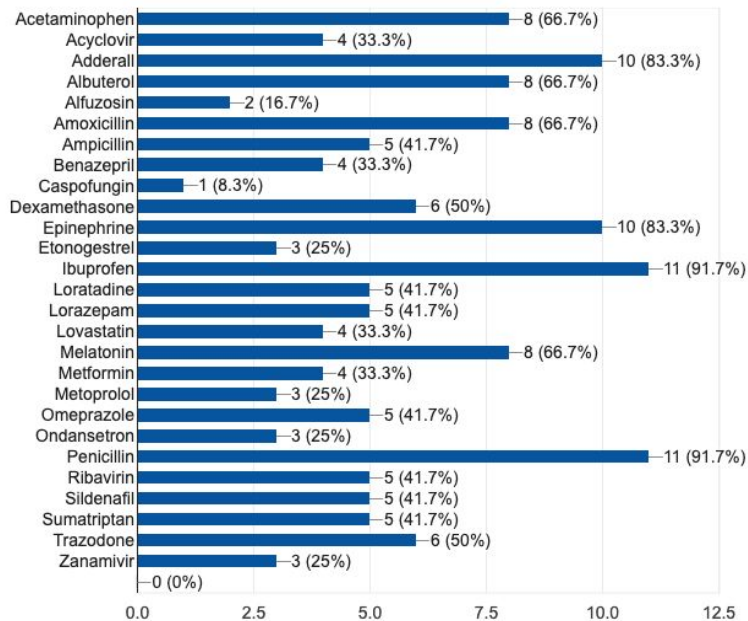
Features

- ✗ Tutorial, Easy & Hard levels

- ✗ Catalogue of 20 randomized medicine to choose from

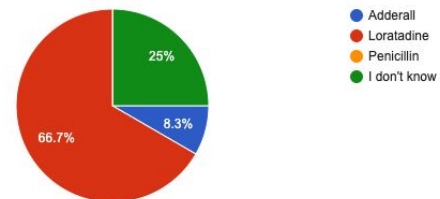- ✗ Dialogue & Text-to-speech

- ✗ Score system

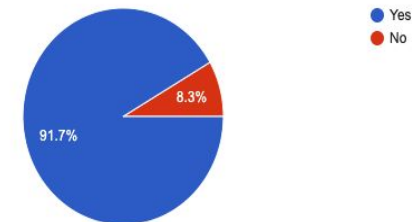**Check the following if you recognize any of the given medicines.**

12 responses

Medicine	Count
Acetaminophen	8 (66.7%)
Acyclovir	4 (33.3%)
Adderall	10 (83.3%)
Albuterol	8 (66.7%)
Alfuzosin	2 (16.7%)
Amoxicillin	8 (66.7%)
Ampicillin	5 (41.7%)
Benazepril	4 (33.3%)
Caspofungin	1 (8.3%)
Dexamethasone	6 (50%)
Epinephrine	10 (83.3%)
Etonogestrel	3 (25%)
Ibuprofen	11 (91.7%)
Loratadine	5 (41.7%)
Lorazepam	5 (41.7%)
Lovastatin	4 (33.3%)
Melatonin	8 (66.7%)
Metformin	4 (33.3%)
Metoprolol	3 (25%)
Omeprazole	5 (41.7%)
Ondansetron	3 (25%)
Penicillin	11 (91.7%)
Ribavirin	5 (41.7%)
Sildenafil	5 (41.7%)
Sumatriptan	5 (41.7%)
Trazodone	6 (50%)
Zanamivir	3 (25%)
	0 (0%)

To reduce the effects of natural chemical histamine (sneezing, itching, watery eyes, runny nose), your doctor may recommend:

12 responses

- Adderall — 8.3%
- Loratadine — 66.7%
- Penicillin
- I don't know — 25%

Have you learned anything about medicines than you did before by playing this game?

12 responses

- Yes — 91.7%
- No — 8.3%

Post-Survey Results & Conclusions

Game Design

✗   Built using the Unity game engine with scripts written in C#.

✗   Exported to WebGL to be played on a browser.

✗   UI was designed according to the Universal Design Principles.

✗   Link to the game: http://www.csdept.csi.cuny.edu/~drsturm/Meducation/