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CS6460

Project Proposal (Individual)

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STEPS: Student-Teacher Education Process Supplement

The Problem and Existing Solutions

There is a strong demand for educational video games and that demand is growing[1]. Studies have shown that these video games are just as effective as more traditional educational games played in classrooms[2]. Previous papers have explained how many existing educational video games focus on getting educational content to students in an entertaining and engaging way, but very few are made primarily to provide teachers with meaningful statistics about their students' long-term performance and educational standings.

Kahoot! is a quiz-style game that allows teachers to project a series of questions up onto a projector[3]. Students will answer these questions on a hand-held device and the program will record each individual student's scores. Results of the quiz are reported at the end. This application is very effective at engaging students and getting a snapshot of student standings for the teacher but does not do very well at highlighting student progress over time or giving students a study tool they can use outside of the classroom.

StudyMate is a similar tool designed to give students a way to study flashcards and create quizzes for themselves and friends. This plugin for Canvas does a great job of aiding student self-study but does not include the teacher at all. The audience for the application is also very specific as only Canvas users can utilize it.

The existing problem is that there is a serious need for a quiz-style educational video game whose primary purpose is to provide meaningful, long-term data on student performance and progress to teachers while still acting as a direct educational aid to students.

A Better Solution

Based on the existing quiz-style applications on the market, an ideal solution to our problem would be an application with the following characteristics[4,5]:

- Available on a variety of different platforms.
- Gives users the option to create and enroll in classes with student/teacher roles.
- Can generate flexible quizzes based on user-supplied questions.
- Provides meaningful statistics to teachers for each student and the class as a whole.
- Contains a database of created quizzes which users can share, search, and use.

Originally, this project was going to focus on creating an application that gathered information about students through the use of competitive quizzes that students would take together to try to get a high score or beat their friends. The application would keep track of their scores and which categories of questions the individual students were weak in. These data points would be

compiled and delivered to the teacher in an easy to read format such as a graph or progress report based on the teacher's preference.

After speaking with different teachers, I learned that competition does not often put students in the correct mindset to learn. Instead of focusing on learning the material, students often only want to win the game. This can take the form of students memorizing only the answers, losing motivation to learn if they are at the top of the class, or students becoming discouraged when they find they always lose to their classmates. Most of the teachers I talked to felt very strongly against an application which forces students to compete against each other. One teacher even went so far as to say, "as a teacher, I would never use a tool that has increasing student competition as a part of its mission" (L. Trammer, personal communication, 14 June, 2018).

Because this application is primarily meant to benefit teachers, some adjustments had to be made. The application will still be a quiz-style game that which allows students and teachers to build and share question decks to test or practice knowledge in virtually subject. However, the option to challenge other students one on one will no longer be featured. The application will still allow teachers to host a classroom test for a large number of students, but students will only be able to practice question decks in an individual setting. This will still allow students to practice on their own time, provide teachers with updates about how their students have been progressing, and take away a lot of the competition aspect that was previously present.

The portion of this application that sets it apart from others like it is how it keeps track of student performance over time and provides teachers with statistics so they know how to better teach their classrooms. While the application will benefit students directly by providing practice quizzes, it mainly seeks to equip teachers with information about their students, so they can more effectively teach.

The Application

This application will be developed using Unity. C# will be the primary language used to script the program but MySQL will be used to create databases, and the program will ideally be able to export information to Excel.. While primarily meant to be accessed through mobile devices and tablets, users will be able to use the application on their desktops as well. The application will look similar to a simple mobile trivia-style app such as Trivia Crack.

If, for whatever reason, the application is not able to be pushed to the Google Play store, it will be compiled as an executable that can be passed around via share drives, the cloud, etc.

For additional information about the research and thought process behind this project, please reference the Qualifier Question paper submitted 11Jun18.

Task List

This project will be split up into 6 weeks, beginning on 18 June, 2018. The dates beside each week indicate when the tasks for that week are due. These are meant to be the latest these tasks should be completed and can most definitely be worked on early. These dates are also subject to change based on the demands of development. The italicized hours next to each task indicate the approximate amount of time each task will take. Each Status Check will be a very short update on the progress of the assignment thusfar. While it is only required that the Status Checks be a few sentences long, I plan to utilize them more as a tool to ensure the project is staying on track and will be making them longer.

Week 1 (Due: 24Jun18) (18hrs)

This week will focus primarily on setting the ground work for the application. The rest of production will stem from the framework produced this week, so a good chunk of time will be spent on storyboarding and creating a code/layout skeleton.

- Storyboard different pages (*4hr*)
- Create simple graphics for use throughout the application (*4hr*)
- Create code/layout skeleton of app (*10hr*)
    - Basic design of pages without functionality
    - Persistent side menu option
    - Navigation between pages
    - Code skeleton for major classes/functions
- Status Check 1

Week 2 (Due: 01Jul18) (15hrs)

This week will be devoted to getting the quiz page functional. This will include the scoring system as well as animations and transitions for the page. Additionally, the first project milestone is due. This milestone submission will include a short 2-5 minute video outlining the project progress thusfar and a low-fidelity prototype.

- Quiz page functionality (*6hr*)
    - Create scoring system based off correctness of answer and time
    - Create sample quiz for testing
    - Create animated timer
- Begin testing application by running on local Android device (*2hr*)
    - Set up Unity to allow this
    - Configure phone to allow this
- First Milestone (*7hr*)
    - Provide brief video of the project progress thusfar
        - Figure out how to use a screencam for a demo of the project
    - Provide low-fidelity prototype
    - Gather feedback from instructor and other students
- Status Check 2

Week 3 (Due: 08Jul18) (14hrs)

This week's focus is a lot of small functionality implementations. Once each of these pages is up and running, the application will feel much more complete and it will be easier to tell where improvements can be made.

- Login page functionality (*2hr*)
- Selectable side menu functionality (*2hr*)
- Quiz Creation page functionality (*2hr*)
- Profile page functionality (*2hr*)
- Classroom page functionality (*2hr*)
- Quiz search page functionality (*2hr*)
- Home page functionality (*2hr)*
- Status Check 3

Week 4 (Due: 15Jul18) (18hrs)

Week 4 will be spent solely on creating the databases needed to make the application functional. This includes the profile database and the quiz database. I am not extremely proficient at SQL, so I anticipate this to be a challenge.

The second project milestone will include the same artifacts as the first, but the application will be roughly 80% complete and will be submitted with the hopes of other OMSCS students acting as Beta testers.

- Create basic database for teacher and student profiles (*6hr*)
- Create database for quizzes and classrooms (*4hr*)
- Connect databases and existing application framework (*3hr*)
- Second Milestone (*5hr*)
    - Provide brief video of project progress thusfar
    - Provide functional prototype at roughly 80% completion for testing
    - Gather feedback from instructor and other students
- Push for Beta testing to people outside OMSCS
- Status Check 4

Week 5 (Due: 22Jul18) (18hrs)

This week will be the most important as it is the week where the teacher supplement is added. There will be a lot of time spent on making sure the information can be manipulated by the teacher in different ways as well as making sure it is an accurate reflection of the data stored for each student in the student database.

- Create effective means of delivering statistics to teachers/students based on quiz results (*14hr*)
    - # of quizzes taken for each student, correct answers, percentage correct, etc.
    - Graphs
    - Option to have information emailed to teacher in to Excel file
- Create Teacher page for users with teacher permissions (*4hr*)
    - Ability to look at information by student, groups of students, particular quizzes, dates, etc.
    - Ability to create classes and add quizzes/students to the class
- Status Check 5

Week 6 (Due: 29Jul18) (17hrs)

This final week will be the time to put any last-minute changes into the application that are necessary. This includes things such as visuals, sounds, extra sample quizzes, page transition effects, etc. The final, completed project will be due this week. Additionally, there will be a paper to report on the completed project, limitations, strengths, and future possibilities of the application. Finally, I will create a 5-10 minute video to showcase the project and summarize the main points of the paper.

- Project finishing touches and clean-up (*5hr*)
- Final Presentation (*12hr*)
    - Finished application
    - Final paper
    - Video showcasing project

Project total: 100 hours

Works Cited

[1] Adkins, San S. “The 2016-2021 Global Game-Based Learning Market.” Ambient Insight, 26 July 2016.

[2] Bellotti, F., Berta, R., Gloria, A. D., & Primavera, L. (2009). Enhancing the educational value of video games. Computers in Entertainment (CIE), 7(2), 23.

[3] Dellos, R. (2015). Kahoot! A digital game resource for learning. International Journal of Instructional Technology and Distance Learning, 12(4), 49-52.

[4] Squire, K. D. (2008). Video games and education: Designing learning systems for an interactive age. Educational Technology, 48(2), 17.

[5] Baytak, A., & Land, S. M. (2010). A case study of educational game design by kids and for kids. Procedia-Social and Behavioral Sciences, 2(2), 5242-5246.