Midterm Progress Report

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Abstract

In this report we will describe the progress made in the Sage Feasibility Study and Publication, Gameful Affinity Space, Curricula Integration, and Gameful Direct Instruction epics. The features and stories we have completed so far are the Parson's Puzzle Library (26), Curricula Analysis (27), User Centered Design | codeHER (325), Semi-Structured Interview Protocol (347), Survey and Distribution Plan (341), IRB Training and Conflict of Interest Document (356), and Pre-distribution Volunteer/Teacher Survey (366). Features in progress are Curriculum Presentation (30) as well as the Feasibility Publication (340).

Architecture

Several iterations of the IRB protocol have been underway in terms of solidifying, specific questions, interview personnel as well as the environment in which the interview must take place. Throughout the progression of these changes and decisions, the protocol has been tracked and amended on RASCAL.

The fieldwork is conducted through in-person voice recordings as well as transcriptions. Meanwhile, surveys are distributed through Google Forms. The data will be analyzed through Grounded Theory, a general method of comparative analysis where we can make consistent comparisons across interviews and grasp general themes from users' responses.

Parson's Puzzles were created within the affinity space and quests on the instructor dashboard in design mode to build a gameful direct instruction library and use as demonstrations when time comes with further UCD sessions. These puzzles are created referencing literature as well as a thorough compilation and analysis of the computer science curriculum state standards across the United States. With regards to the Gameful Affinity Space, AngularJS Material is being used to update the UI of the teacher dashboard. AngularJS Material is a UI component framework. Its library is a mature and stable product that is ready for production use.

Design and Implementation

Thus far, we have created and distributed a pre-distribution survey and the SAGE official survey for teachers and volunteers through codeHER and TeCanal. The pre-distribution survey was developed by referencing the UCD HURIE literature as well as a compilation and analysis of CT curriculum standards across US public schools to prepare for the distribution of the survey in order to examine sample responses regarding the way teachers approach CT lessons. The survey itself was adapted by Jeff, Johan, our team, and others in the group in order to assess educators teaching styles, familiarity with Gameful Learning and overall impression of Scratch as a tool to use in education computational thinking. The survey thus far has 12 responses. Following the distribution of the pre-distribution survey and survey, field studies comprising one-on-one semi-structured recorded interviews and user-centered design sessions were initiated by Lalitha in the codeHER and TeCanal classrooms in Maryland as well as remotely. UCD was conducted with 4 volunteers while semi-structured interviews were conducted with 6.

In finalizing the IRB Protocol, certain systems such as medium of contact and informed consent policies had to be established. Grounded theory is being used to gain specific insights on user feedback from volunteers, instructors and students. The largest factor in establishing an analysis on qualitative data surrounds selecting what qualifies for further analysis and what does not. The selection of the most frequently occuring patterns are those that may qualify for further investigation.

Parson's Puzzles are being built such that they are embedded within SAGE. The puzzles are created in design mode with their purpose and answers documented in a separate document and saved as .sb2 files for later use since there is no save functionality in the instructor dashboard currently.

Mahzabin is working on integrating Gavi Rawson's wireframes for the teacher dashboard. The Mission Management creation UI is currently being revamped to represent computational thinking concepts in the Gameful Affinity Space. Selecting the Mission focus is currently being revamped, balancing the previous tree structure with new conceptual groupings.

Limitations and Assumptions

As we await upon IRB approval, we have been unable to bring any of the students from codeHER and TeCanal into the UCD process to get their feedback on the features. However, we have been able to get valuable direct information and in-person interviews and UCD sessions done during break from willing TeCanal and codeHER volunteers.

Parson's Puzzles cannot be successfully embedded within the framework currently because scoring mechanisms are not working and the puzzles are unable to be saved and loaded from the dashboard themselves. When saved and opened as .sb2 files, the files won't load, and when opened in the Scratch MIT website, the blocks appear as red errors. However, the puzzles are still being created and saved as well as documented on a word document for future use.

The demonstrations in UCD sessions are limited by the bugs present in the instructor dashboard on the developer website. When we conduct UCD, we are currently emphasizing the working portions as well as the potential that some of the in-progress tools, such as intelligent hinting, have. In terms of analysis, in some ways, transcripts require abstraction of data. In addition to assessing what is recorded on the transcript, there are elements that are insightful from the actual interaction. Updating the UI of the Gameful Affinity Space have been limited due to the delay in the environment setup and the lack of experience with AngularJS.

Future Work

Building from the progress set in place from semi-structured interviews is the analysis of the data. Semi-structured interviews and user centered design sessions can be leveraged for their empirical data. The first and most intuitive step is documenting participants responses. Manually written transcription in addition to natural language processing techniques can be leveraged in order to assess feedback. A major step in configuring the selection of tools and establishment of processes is in selecting tool of choice, potentially IBM's Speech to Text, Mozilla Deep Speech,

or Carnegie Mellon Sphinx Toolkit. There are still several things to work toward in preparation for Sprint 5, There must a streamlined process for recording and transcribing sessions with both teachers and volunteers. Additionally, there also must be an established toolkit / establishment of processes that operates with the already existing SAGE ecosystem. After data analysis is complete, we will derive clear and concise graphs as well as commentary for the data we've gathered for the publication. Once the Parson's Puzzles library grows and can be saved on the instructor dashboard, UCD and semi-structured interviews will also be conducted with South Bronx Early College Academy. Once saving ability is developed, we also hope to clean up the instructor dashboard and have relevant gameful quests for future UCD sessions.

Continuing to update the UI of the teacher dashboard is a priority, as per Gavi's wireframes. After updating the tree structure to a checklist of conceptual groupings, integrating computational thinking within the space is a priority. Presenting the definitions of the concepts to the teacher without overcrowding the UI is the next step to be taken. After these two milestones have been completed, the same would be repeated for the Quest Creation UI. After completing the Quest Creation UI, future plans include revamping the Mission Management page as a whole by implementing a tabbed menu for Games, Quests, and Missions.