Litmus for SimSYS: A User Study on a Serious Educational Game

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Introduction

Our project focuses on SimSYS, software intended to one day be able to generate educational games on any topic, at any level, and with any set of learning objectives. The program, written in Java, loads information from an XML document (which can be a specification for anything from a senior level software engineering game to a 7th grade level geometry game) and uses it to create games with characters, music, and a good deal of interactivity and customizability. For this study, we primarily worked on improving SimSYS’s preview tool, which allows educators (experts in the game’s content but not in the game’s code) to preview the game and make any adjustments they need before the game is generated. We focused on the educator end of the preview tool by conducting a user experience study which combined elements from game user experience studies and software usability studies.

Designing a Study

This usability study combines the fact and techniques common to software-usability studies with those common to user studies on serious games. Software studies tend to pay more attention to usability, which is an abstract concept that depends very much on the context of the software. (Brooke, 1996) A particular piece of software, regardless of its interface, only exhibits a strong degree of usability if it is well suited to do what it was designed to do. These types of studies tend to use more surveys and focus groups. (Hahn, Pivoney, & Brothers 2011; Walker, Prichard, & Turner, 2013) Serious game user studies are much more interested in user experience, where success is fully dependent on the satisfaction of the user (or better, the player) and not on whether or not a certain goal has been accomplished. Since the goal of these studies is to capture the experience of the player while they are in the game, studies are increasingly favoring “sandbox evaluation” where all the assessment takes place during the gameplay and so the study does not use surveys and focus groups. (Hall et al., 2011)

The SimSYS preview tool is a hybrid of both categories since users must be able to use it for a particular purpose (to fine-tune the game for a specific context), and because the preview of the game retains many game-like qualities like interacting with a virtual environment and navigating the infrastructure of the game to make the necessary adjustments. Because of this, the study combines approaches to both types of studies. The users performed pre-determined tasks and answer questions in surveys so that data can be gathered on usability. User experience will be assessed through the data captured through video recording and screen recording. A combination of a user experience study and a usability study is well suited to the preview tool as a “hybrid” between the categories of software and serious games, and also because of the more holistic picture of the data that will be able to provide.

Method

We administered pre-surveys to get a sense of each participant’s IT experience, asking them basic questions about common computer programs they might have used, what kind of educational software they are accustomed to, and so on. We then showed each participant a brief instructional demonstration with information on how to use the preview tool, including moving elements and loading games.

For this study, we used laptops from Marquette University’s Center for Teaching and Learning which have built-in webcams and allowed us to serve as many as twenty participants at once. Then we had our study participants sit at computers and interact with the preview tool. The participants were given a prepared list of scenarios which they were instructed to work through using the preview tool. These included instructions for things like moving and resizing text boxes, inserting images (“props”) into the game, and mapping questions.

While the participant worked with the scenarios, screen capture and webcam software ran to record their reactions and interactions. The scenarios the users will work on as they interact with the preview tool were coordinated with very specific stages in the program (following the Act, Scene, Screen structure) and this will allow us to observe and take notes on the video of the user interaction with the different scenarios by looking at which part of the game the user is currently in.

We administered a final questionnaire for the participants to take so that they can provide feedback on using the tool. This is based on the Questionnaire for User Interface Satisfaction (QUIS,) a widely used questionnaire in software user experience research.

Conclusions

At present (early August 2015) we have not had sufficient time since the study to analyze all of the data. We have parsed through the information and will publish our results in the paper, “Towards a Lightweight Approach for Molding Serious Educational Gamers: Assisting Novice Designers,” which has been accepted at the Visual Languages Conference (VLCo).

References


Overall Study Design

Pre-Survey Video/Demo Perform Scenarios Post-Survey Data Analysis

Usability Surveys

Versions of standard usability surveys tailored to the task

Analyze The Data

Combination of all surveys, screen captures, and video

Tool Background

Educators are familiarized with the basic functions as well as the overall purpose of the tool

References

Gauge Tech Experience

Educators will primarily be high school STEM teachers

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Using SimSYS as an Educator

A Four Step Process

The Preview Tool allows educators to replace character images with existing characters or images.

Educators can insert objects into the game to tailor it to their individual educational context.

The Preview Tool allows educators to replace character images and set character emotions.