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CS 3410

CE Project Synthesis Report

Executive Summary

Our team project was to examine software used in testing letter-recognition within the Alpine School District. Our goals were to identify the requirements of such a product, navigate the current process and bottlenecks, understand the technical background of the users, and elicit user expectations. The methods and results of our observation are detailed in this report.

We conclude from our observation that there is a need to replace or modify the current software. Letter recognition testing is mandated at the state level. However, teachers feel that existing software is too time consuming and cumbersome. The program lacks synchronization with the student interface and requires deep technical knowledge to configure.

Results Summary

As we categorized our observations using the affinity group technique, we were able to identify key bottlenecks in the existing process. Specifically, a non-intuitive user interface that lacks synchronization between the student and teacher screens. The teachers we observed often prefer using paper and pencil tests because the technology gets in the way.

Our users had several feature suggestions to improve their experience with the application. The user interface should be simplified and evoke a "cute" emotion. This will help with user adoption. It should also have a method to collect and analyze the wrong answer. Most importantly, the student and teacher screens should be synced to allow efficient test-taking.

We developed several product requirements based on the contextual enquiry process. Our product must provide a quick and easy way for teachers to assemble and administer letter-recognition tests. It should provide historical data for the teacher to tailor their instruction. Lastly, the software must be able to keep up with the student's pace in taking the test and use a font that fosters easy recognition.

Affinity Grouping Screenshot:
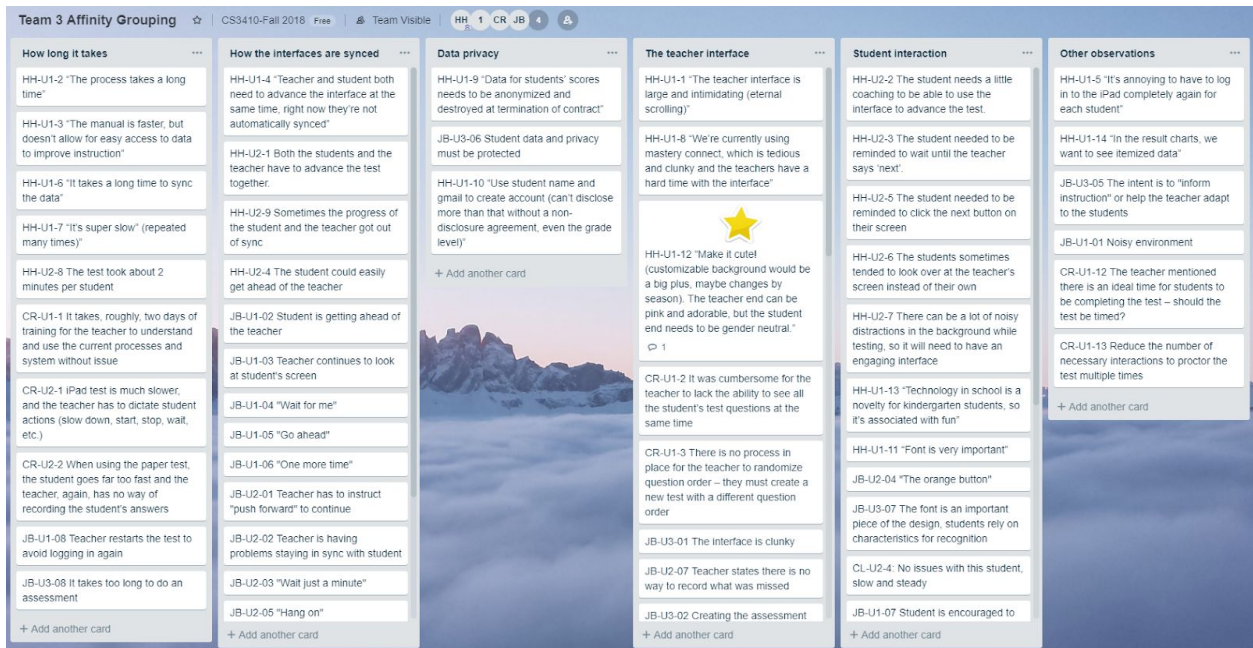
Observation Results

Test Taking Process

We performed a combination of informal in-person interviews along with an online questionnaire. Through our observation we noticed that children can be very patient if candy is involved. The teacher that we interviewed told us that sometimes the kids just want to play and not take a test, so the quicker the test taking process the better. What we observed through the test taking process is that when the student knew the letters by heart what ended up happening was that the student was going very quickly through the letters to the point that the teacher was needed to intervene and slow down the student and get the two devices synched up again by manually selecting the question where the teacher lost the student through the process.

Set Up Process

We observed as the teacher set up the test to get it ready to test the students. We found that the teacher needed to select the test, then select the student that she will be giving the test to, and finally generate a code that she will need to then sign in on the tablet for the student where the student will take the test and repeat for each student in the class.

Test Setup

We asked the teacher if she could go through the process of setting up a test from scratch, and what we found was that the process was tedious and repetitive. With each question there were about 15 fields that needed to be filled out, there were fields like which district was it from, school, test, etc. There was no way to add the questions in bulk, each question had its own page.

Questionnaire

Through our questionnaire we asked a variety of questions to get a better understanding of how the teachers feel about their current software, the results were interesting. It seemed that the teachers preferred to give the test manually rather than use the software that the district has provided them to use. We also saw through our questionnaire that they would use their software that was available to them if it was more user friendly. We also asked how they stored their tests if they were to take it manually, and most said in files, which is not the best over time.

Bottlenecks

Likely the most prominent bottleneck throughout the whole process was the fact that the students' and teachers' devices were not synchronized. This created a large break in the process where the teacher had to force the student to slow down so they could catch up while recording previous answers.

Another significant bottleneck was when the student finished the test. When complete, the student could return to other class activities while the teacher prepared for the next student's evaluation. In order to start another test, the teacher had two options. The first is to log out of the system, log in again, navigate back to the test (which by itself could was overly difficult) and select the student. The second is to navigate back to the beginning of the test manually. Given the fact that the test is based on the alphabet, navigating manually took at least 26 individual user actions.

The final major bottleneck we seek to alleviate with our product is the question order. The teacher or proctor had no way of changing the order of the questions in the

test. Varying the order in the test questions is a requirement by, not only the school and proctors, but the state. State level tests all have the same order and the teacher's test cannot be the same as the state's. It was mentioned by the stakeholder that it could cause legal problems if they were to copy the order of the questions from the state exam, as it's a copyrighted feature of the state tests.

Product Requirements

Given the scope of the project, it became apparent over the course of our contextual enquiry that some requirements were simply out of scope. However, there are facets of these requirements that cannot be overlooked or ignored. For example, the basis of the product must allow the primary stakeholder, the teacher, to see progress and update student data in real time. Implementing this type of real time state update across multiple devices would require a server through which the devices can communicate. Given the goal of this project is a high fidelity prototype, we will be only partially implementing this behavior.

Our goal, as a team, is to add essential features the legacy software entirely avoided and improve the areas where the user experience is significantly lacking. Subsequently, the product requirements fall into four distinct categories: Must have, retain if possible, would be nice, and out of scope.

Must have

- Real time state: the teacher must be able to see the student's progress as they move from question to question.

- Answer fields: as the student dictates their answers, the teacher must have a data field in which they are able to record incorrect answers.
- Minimal user action: in the currently used software, the teacher must re-authenticate or manually navigate to be beginning of the test to start testing another student. The teacher should have a "restart", "go to beginning", or "test another student" type of functionality.
- Data security: there is a lot of sensitive data that must be destroyed when the agreement between the educational body and SaaS entity is terminated. We do not need to worry about this because there is no data persistence in our prototype.

Retain if possible

- Data visualization: the teacher and student must have some way of viewing their data in an easy to interpret format (graph, chart, etc.).
- The interface should be pleasing to the eye and should not detract from user experience.
- The teacher should be able to export student test data in a format readable by their desired grading and scoring software.

Would be nice

- Import data: the teacher should have a way to import a list of students for whom they can proctor the test.
- Historical data: the teacher should be able to see the progress of the student and past test answers.

- Custom themes: the stakeholder stated the product would garner additional use and praise if it were possible for users to select their own themes or colors.

Out of scope

- There are many facets of the above requirements that are out of scope (e.g. behavior that requires a server or database, epics, or features, that require multiple releases or development cycles.

- User authentication: the teacher should be able to log in and be authenticated on both their own device and the student's.

- Custom tests: the teacher should be able to create custom tests with many different types of test questions.

Diagrams

Flow Model
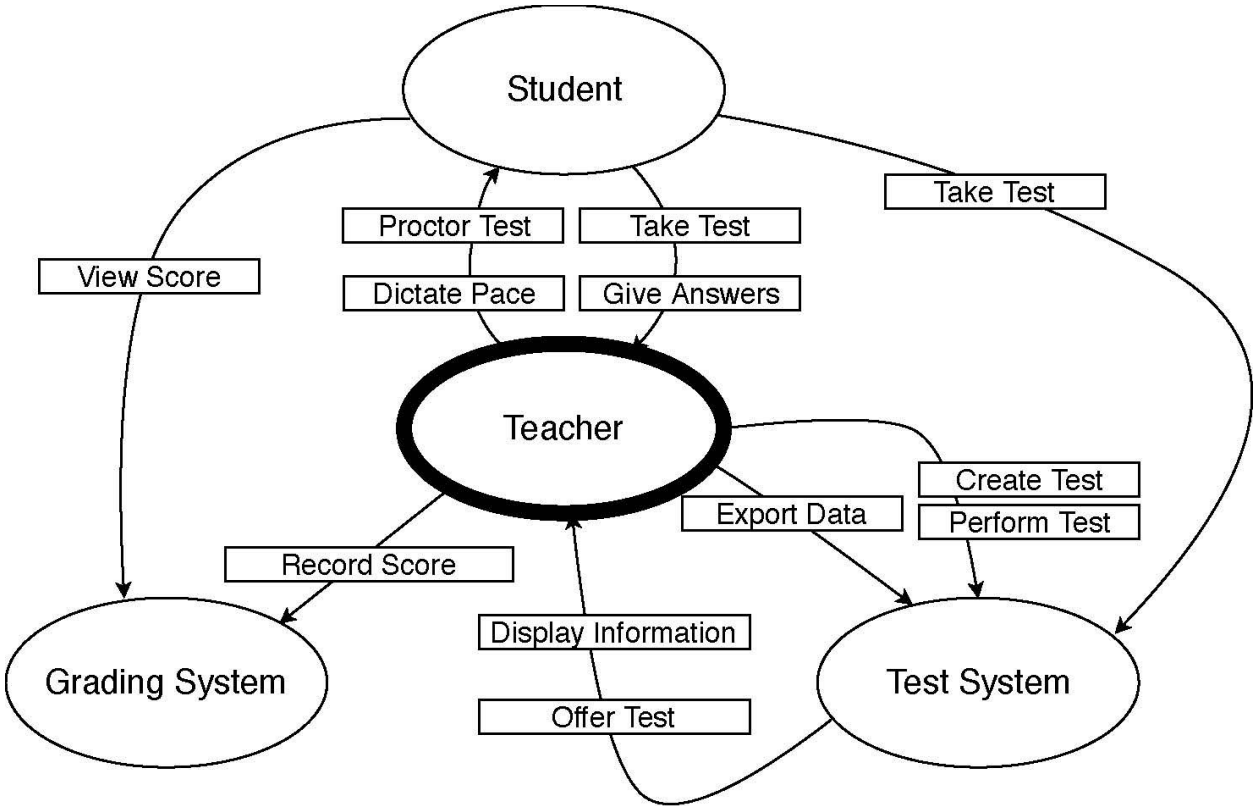
Use Case Diagram
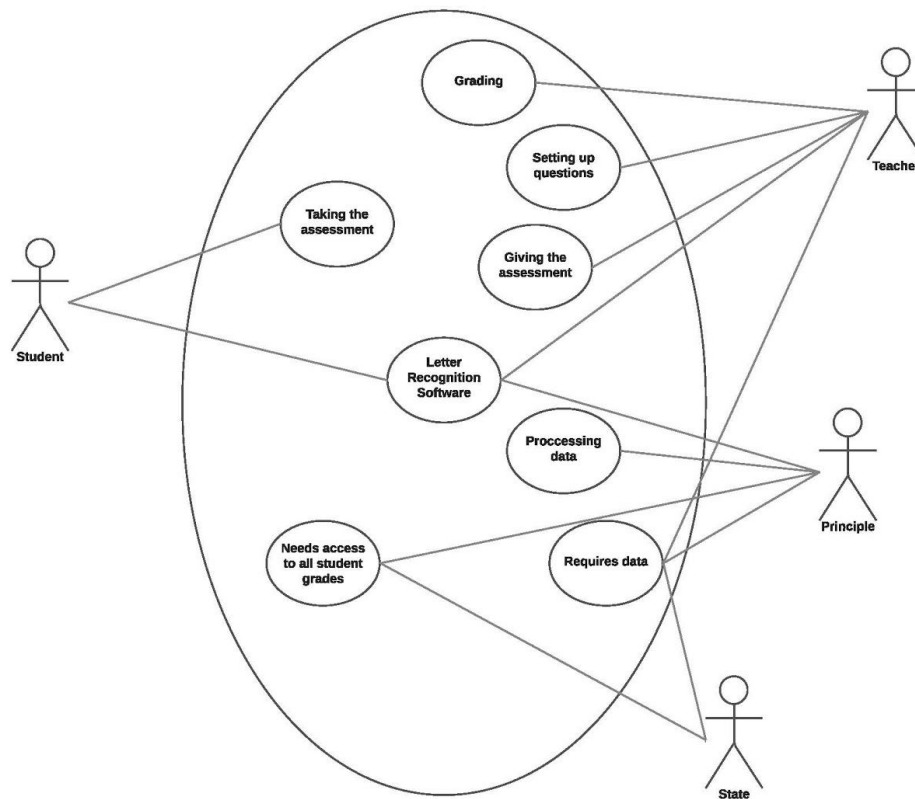
Main Scenario/User Story

Mrs. Barnes is a kindergarten teacher. She's been teaching for over 30 years, so

she's seen alot of different testing methods come and go. She needs to perform letter

recognition tests with each of her students once a month. These assessments are

performed one-on-one, which can take alot of time, so the faster she is able to proctor

each test, the better. She calls over Jimmy and sits him down in the back of the room in

front of an iPad. She controls the test with her laptop, selecting the student she's testing

from a premade list. She explains to Jimmy that he needs to read allow each letter he sees on his screen. When he identifies the letter correctly, she moves along to the next letter, marking when he gets a letter wrong, and making a quick note in the program of what letter he said instead. She is able to finish the test within a couple minutes and moves on to the next student.

Culture Model
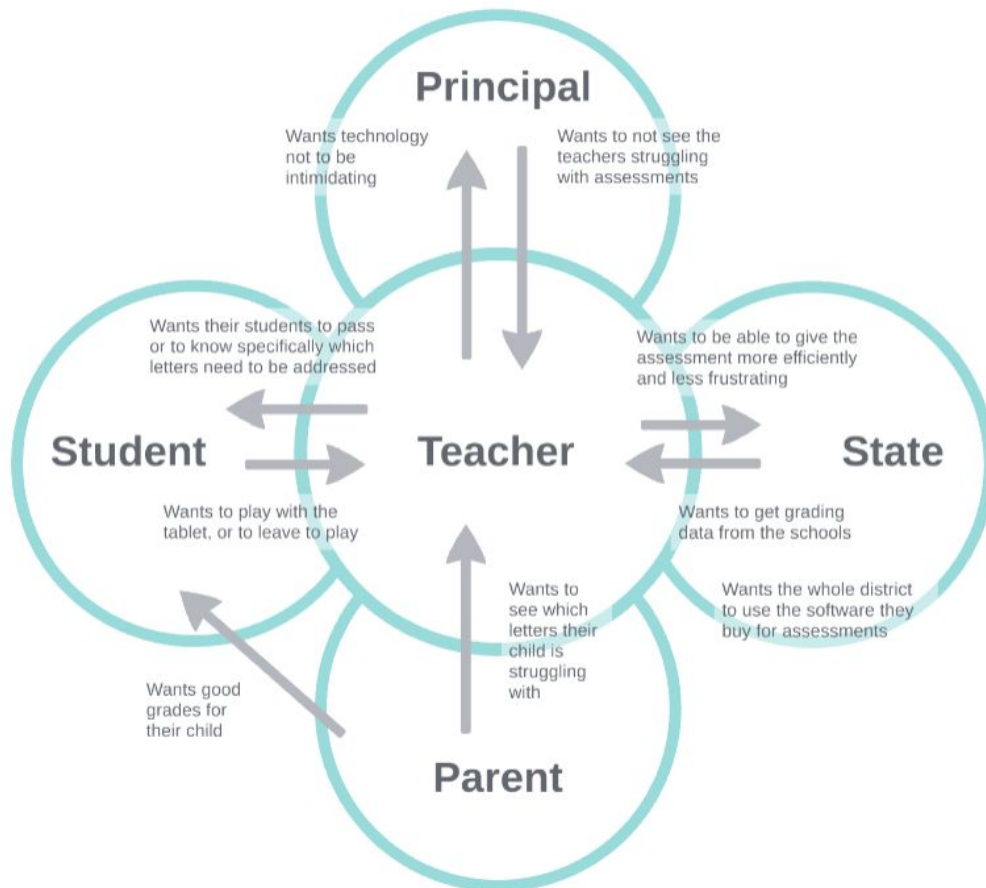
Hierarchical Task Analysis

```
                        ┌─────────────────────┐
                        │  0: Complete test   │
                        └─────────────────────┘
        ┌──────────────────┬──────────┴──────────┬──────────────────┐
┌───────────────┐  ┌───────────────┐  ┌───────────────┐  ┌───────────────┐
│ 1: Collect    │  │  2: Sign in   │  │  3: Start test│  │ 4: Record     │
│    student    │  │               │  │               │  │    Results    │
└───────────────┘  └───────────────┘  └───────────────┘  └───────────────┘
                                                                         ┌─────────────────┐
                                                                         │ 4c: Import data │
                                                                         └─────────────────┘
        ┌───────────────────┐   ┌───────────────┐   ┌───────────────┐
        │ 2a: Go to system  │   │ 3a: Create    │   │ 3c: Restart   │
        │     website       │   │     test      │   │     test      │
        └───────────────────┘   └───────────────┘   └───────────────┘
                                                              ┌──────────────────┐
                                                              │ 4b: Navigate to  │
                                                              │     records      │
                                                              └──────────────────┘
              ┌────────────────────┐   ┌───────────────┐
              │ 2b: Enter          │   │ 3b: Locate    │
              │     credentials    │   │     test      │
              └────────────────────┘   └───────────────┘
                                                    ┌──────────────────┐
                                                    │ 4a: Export data  │
                                                    └──────────────────┘
```

Two options to restart test:
1: Navigate to beginning manually
2: Sign out, sign in, restart
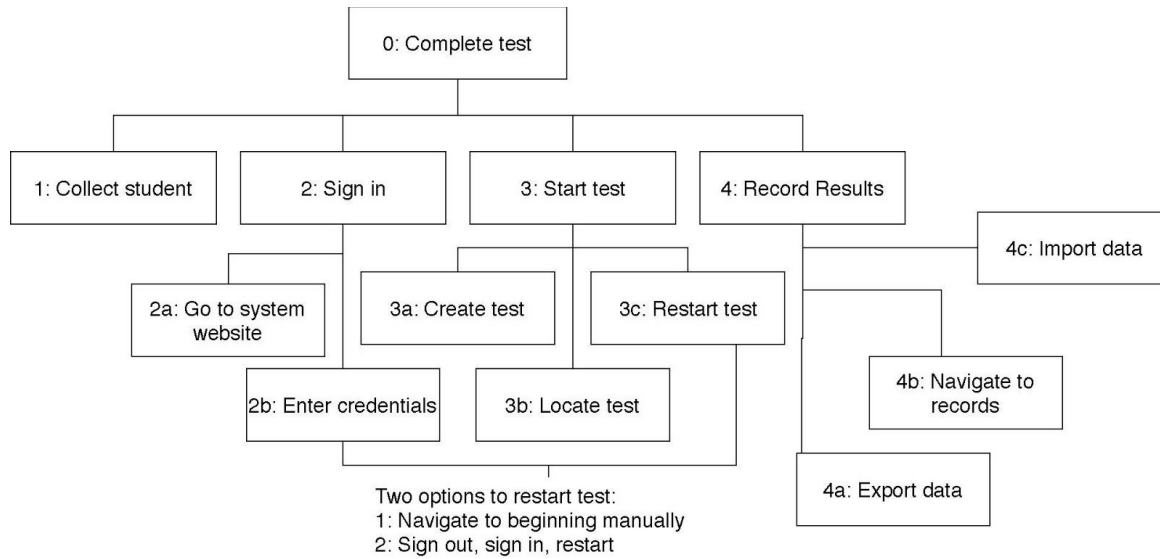
Persona

Martha Barnes

AGE 62
OCCUPATION Kindergarten Teacher
STATUS Married
LOCATION Orem, Utah
ARCHETYPE The Caregiver

Friendly   Admired   Focused

"I love my little kindergarteners! They bring joy and light into my life and I feel like I have hundreds of grandkids"

MOTIVATIONS
- Incentive
- Satisfaction
- Acheivement
- Love of Learning
- Personal Growth
- Social

GOALS
- To foster a caring learning environment
- To inspire students to explore
- To keep track of everything

FRUSTRATIONS
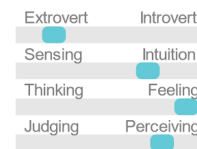- New state requirements
- Learning new technology
- Demanding parents

PERSONALITY
Extrovert — Introvert
Sensing — Intuition
Thinking — Feeling
Judging — Perceiving

TECHNOLOGY
IT and Internet
Software
Mobile Apps
Social Networks

BIO
Martha has been a kindergarten teacher for over 30 years. She loves working with little kids and being inspired by their creativity and desire to learn. She doesn't adapt well to changes, especially when it comes to learning all the new technologies she's required to use for her job. But she tries her best to set a good example for her students and learn new things. She has alot of curriculum to cover though, and doesn't have much free time. She believes interactions with people are the most important.