

ALT COMMUNICATIONS: Linguistic Learning Tool

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ABSTRACT

ALT Communications is an online Linguistics leaning tool designed to be used by Auburn Linguistic teachers and students. The teachers are able to upload notes, videos, audio, and tests to their respective courses for students to learn and take tests. When given tests, the students are given a specialized English IPA keyboard. These keyboards are available in three various levels with increased symbols available to the student.

This project required collaboration between our Computer-Human Interaction Team in the Computer Science Department and two Linguistic professors who's classes will be the initial test groups for the ALT Communications website. The Linguistic Professors provided the requirements before the HCI team worked on different requirements separately.

Author Keywords

CALL, Computer Aided Language Learning; Blended Learning; E-Learning; HMM, Hidden Markov Modeling; UI, User Interface; UX, User Experience; IPA, International Phonetic Alphabet; Azure RP

Categories and Subject Descriptors

Computer and Education: Computer Uses in Education

INTRODUCTION

In today's modern American society, learning resources are available through online resources such as Udemy, Blackboard, and Canvas. These examples have several features in common. These e-learning sites have three

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users: the administrators of the website, the teachers, and the students. The administrator is responsible for managing users in the system and what they have access to. The teacher is responsible for managing students in their respective courses and uploading course material and be able to review statistics of how the class performed as a whole on particular assignments. The student role is to be able to review the lessons and complete exams or homework uploaded by the teacher.

This project uses these roles as a basis for the ALT Communications Website under the idea that college students using e-learning sites similar to the role descriptions in the previous paragraph should be able to quickly adapt to a system similar to them. In order to make a Linguistics e-learning site that is targeted towards Linguistic students and teachers, we had to get requirements from the Linguistic professors.

Once the team met up with the Communications team, the original set of requirements were written down to make the first set of prototypes of the system in Azure RP. Once the prototypes were reviewed and further specific requirements were discussed to either modify, remove, or add certain visual features. The prototypes would be modified while several team members worked on different features such as UI, Algorithms, and Functionality.

After the UI templates had been made and grading algorithm had been finalized, the team could then modify the templates to conform to changing requirements while adding the functional code to the UI. When the final versions of the site began to develop, prototypes were no longer needed the team started showing the developing final product of the website to the Communications team. Certain questions regarding the integrity of students and the use of the website once it extends beyond Auburn.

LITERATURE REVIEW

To be realistic about the e-learning and its constraints, Computer Aided Language Learning (CALL) articles had to be researched. The conclusions that were reached was

that e-learning is not currently at a point of technological advancement and User Experience for current CALL systems to completely outmode face to face interaction.

CALL Articles

The article of [2] is about reviewing the advantages and limits of CALL(Computer Aided Language Learning) and how to get around them. The approach that was the most effective during this time was Hidden Markov Modeling (HMM) Approach. This approach includes Signal Analysis, Phone Models, Lexicon, Language Model and Decoder. Because of this approach, the system must be trained to here tone, spell words, predict word associations, and detect speech. The downside to these approaches is that it performs poorly when voice input is heavily accented or of a different dialect and can possibly misrecognize words.

The article of [1] is about using a blended language technique to increase English proficiency amongst the Chilean population. They did a survey that resulted in conclusion most Chilean students preferred face to face instead of e-learning alone. The students felt isolated if they did all their work online. The researchers decided to use both face-to face and e-learning to improve proficiency in English.

Design Article

The article of [3] is about the benefits of good User Experience (UX). The article explains the difference between UI and UX. UI is about visual aspects of the program, while UX is about the interactivity and functionality. When designing for the UX, it is important to keep the design simple and always have the user in mind-not what the designer wants. If the design accomplishes usability, simplicity, and user friendliness then the company would profit from it because users are more like to use or buy from the company.

FUNCTIONAL REQUIREMENTS

- Separation of access based on roles
 - Administrator
 - Manages Users
 - Teacher
 - Upload Lessons/Exams
 - Supports audio, video, and written notes
 - Manage Students

- Graphs representing distribution of exams and how students performed
- Student
 - IPA keyboard given in three different levels
 - Phonetics
 - Diacritics
 - Tones
 - Graphs representing distribution of questions and difference in given answer and correct answer
- Login Page
- Algorithm to determine difference between exam answers and submitted answers
- User Friendly
- Front End
 - HTML
 - CSS
 - Bootstrap
 - JavaScript
- Backend
 - Java Servlet
 - Spring Boot

DESIGN

Before designing the final look of the website, the team had to make prototypes of the system by using Azure RP. The prototypes were basic pages of the preliminary layout of the interactive tools and the containers that held them. The prototype would be shown to the Communications team and the prototype would be modified accordingly. Once there was an overall idea of how the system would look, the design templates for the website would be made in Bootstrap, HTML, CSS, and Javascript.

The Concept Models in Figure 1-5 are examples of what needed to be in these web pages. Examples 6-10 are the templates that were designed based on the prototypes. Even though the templates look like the final website to integrate functionality and the visual aspects, the templates are not the final product. The team members roles who are responsible for integrating the system to the visual are currently modifying the template to change according to new requirements. The templates make it easier for them to insert or remove lines of HTML and CSS code or copy templates that are needed for different roles.

Concept Models

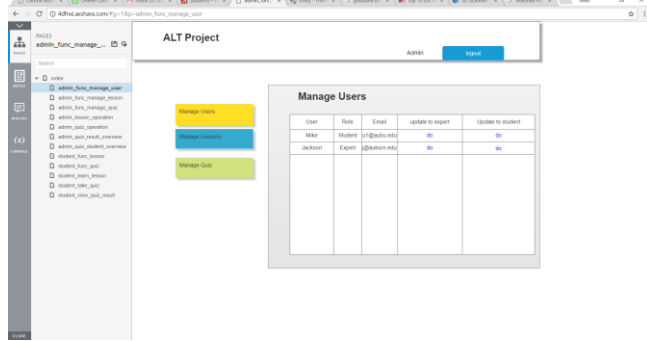


Figure 1. Concept for managing Users

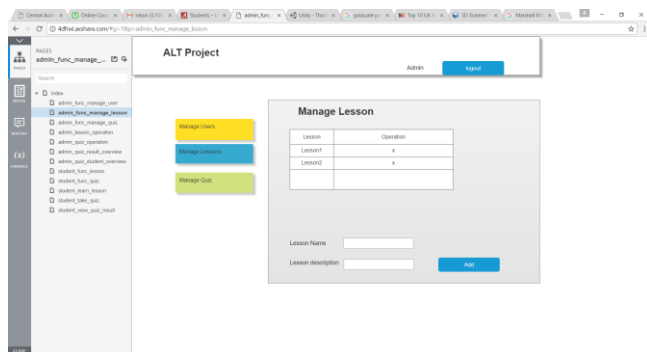


Figure 2. Concept for Managing Lessons

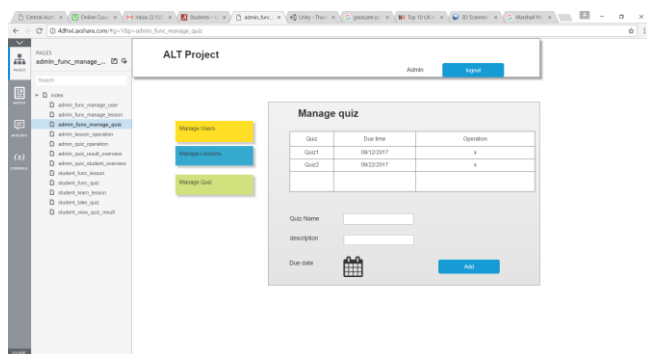


Figure 3. Concept for Managing Exams

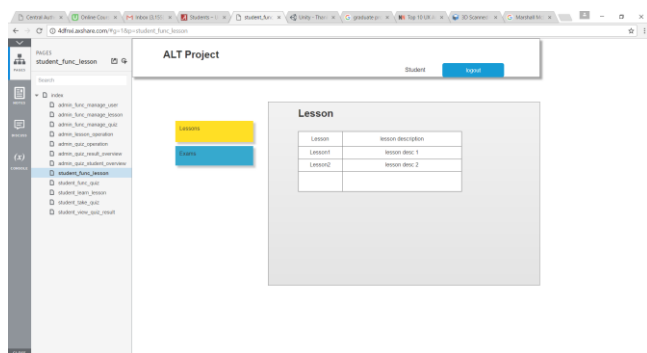


Figure 4. Concept for viewing available lessons

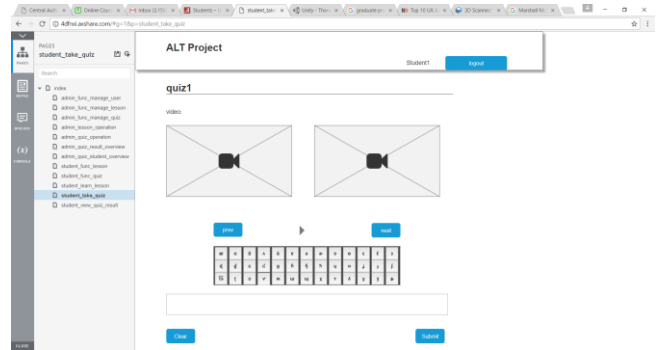


Figure 5. Concept for taking Test

UI Templates

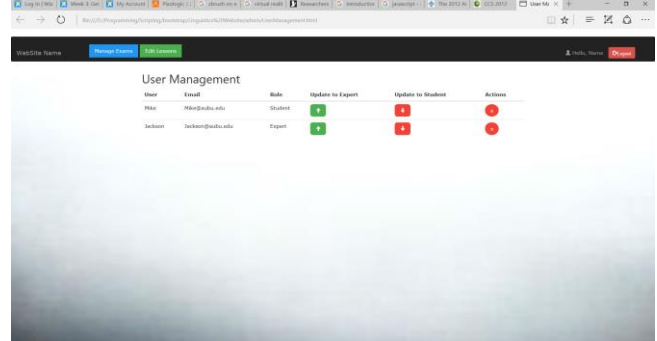


Figure 6. Managing users

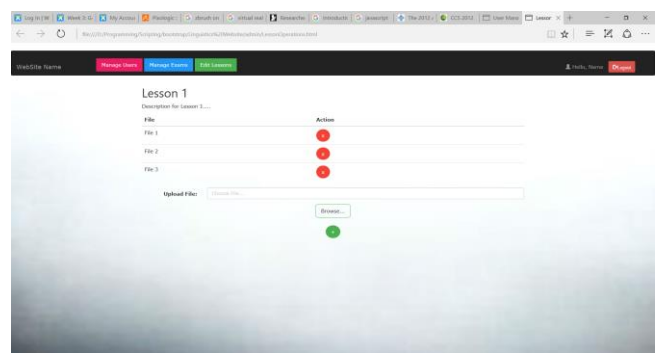


Figure 7. Lesson Operations for Teachers

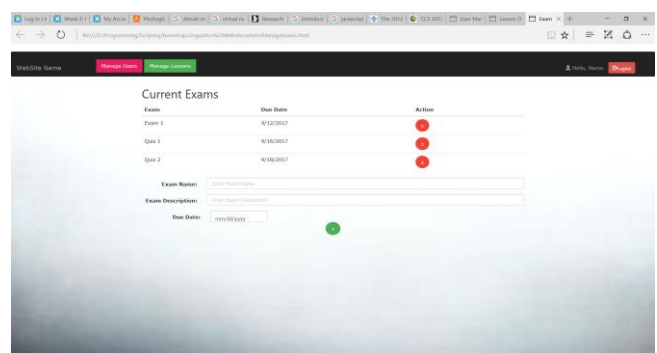


Figure 8. List of Current Exams submitted into the system by teacher

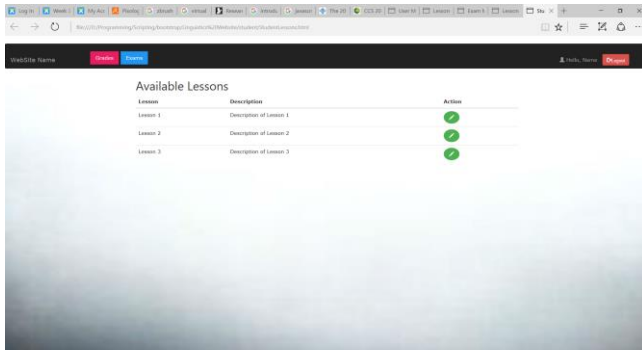


Figure 9. List of Available Lessons students can learn from

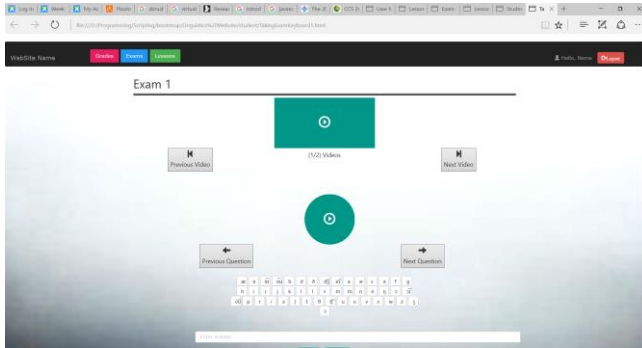


Figure 10. Keyboard 1

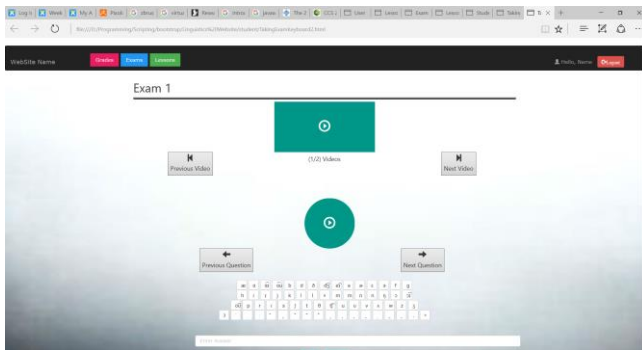


Figure 11. Keyboard 2

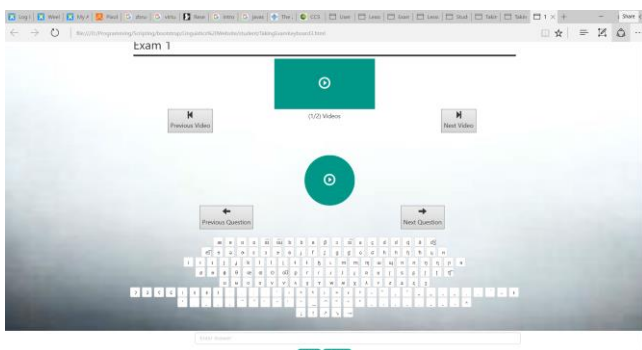


Figure 12. Keyboard 3

ALGORITHM

The algorithm for finding the difference between the correct answer and the submitted answer by students had to be specialized, since marking a student's answer completely

incorrect is illogical in this case. There are two strategies in solving how different the words are. One of the strategies of the algorithm will find the common longest substring of the two words and compare the letters to the left or right of them, if any. The points taken off will be determined if parts of the word has been substituted, added or deleted.

PROS/CONS

Some of the pros for this project is the following:

- The keyboard levels conform to learning curves so that it gets students adjusted to the IPA Keyboard
- The design and layout of the system is simple and easy to look at.
- Algorithm works automatically and results can be seen immediately after the test

The cons of this system are the same with any e-learning system. When the scores come back from these tests/quizzes, they may be somewhat skewed if students decide to cheat. Currently, the system can only be used by Auburn Linguistic Students as a way to review results of students who use the system (Auburn) and students who do not use the system (non-Auburn).

CONCLUSION

Our goal was to make a Linguistics targeted e-learning website. To reach our goal, the Computer Human Interactions Team had to collaborate with two Linguistics Professors that made up the Communications Team. The process required using Rapid Prototyping to develop the website layout and different people working on multiple components of the UX and UI design. In the Fall, the CHI team hopes to collect data from Linguistic students using the system.

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