

SI Attendance Management

May 1709

Introduction

Supplemental Instruction

Supplemental Instruction (SI) is an internationally recognized academic support program offered by Iowa State University. Students who previously excelled in a course can become student leaders and hold study sessions to help students currently in the class find success. SI's main source of income is funding from the university, and in order to receive their funding the organization needs to present data to show that Supplemental Instruction improves students' grades. This is done by collecting SI session attendance data for each student and pairing that with their academic success in the given class.

The Problem

In the past, student leaders have collected this data by hand or by using ISU's Attendance tracking system (A-Track) This data is then copied into an excel spreadsheet on a shared Box account, a very tedious process. A-Track's system provides support for checking students into events using a card reader, however the system is cumbersome, not mobile-friendly, and works much better as a back end system.

Our Goal

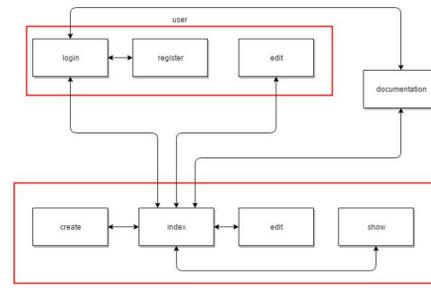
The primary focus of our project is to eliminate all of the tedious work student leaders are tasked with so they can focus on providing better sessions for their students. User experience also became a focal point of our work. From start to finish we want the user's experience to be straightforward and intuitive. Part of improving this experience is making sure the site is fully responsive and looks great on the mobile devices that SI has outfitted with card readers.

Technical Details

- Python
 - OpenpyXL
 - Cybox API
- Laravel/Composer
 - Carbon
 - Eloquent Database Queries
 - TableSorter
 - DatePicker
 - Bootstrap-Select-Picker
 - jQuery
- A-Track API



Design Approach



This diagram shows the navigation flow of the web application

Fall Semester - 491

- Started with a Demo of the front end only meeting with SI Department leaders
- At this point a strictly PHP website running locally

Spring Semester - 492

- Got our site running on live server
- Started focusing on the Processing/Excel populating of Sessions
- Rolled out live site to SI Student Leaders to begin beta testing (Still strictly PHP)
- Began the transition to the Laravel framework
- Continually met with SI Student Leaders every two weeks

Why a Web Application?

At first, the problem we were given to solve was the tedious, manual data transfer from one excel file to another. We realized this could be accomplished with a simple Java application. However, we continued to look at the SI program's attendance procedure and discovered major user experience flaws. This led us to decide on a web app, a form of software that is much more maintainable and doesn't require any installation. After getting through the first semester of our project, we realized we needed a better way to organize the code of our app, and found the Laravel framework to help us accomplish this. Moving to Laravel's MVC format (shown here on the right) ensures that future changes needed will be easy to add and the code will be less confusing to future developers.

Python Algorithm Design Process

The Python code was developed before the website was finished. This led to a modular design because the interface with which the Python would communicate with the controller was not known. It was important that the code could run not only with the controller's help, but in standalone mode as well. This feature also helped greatly with development, as the code could be run by itself, independent of the changes being made to the website.

Testing

Test Environment

- Separate Test database
- Tested by eight current SI Student Leaders
- Feedback at meetings with the leaders every two weeks

Bugs Found

- Being unable to login to the application
 - Cause: Not all user data was migrated from the development environment to the test environment
 - Solution: Migrated the correct data into the test environment
- Cell formulas within the Excel file stopped working
 - Cause: Data inserted into the files from the Python algorithm was in a text format
 - Solution: The Python algorithm was edited to ensure numbers inserted were in a "Number" format
- Processing a session on mobile device caused a crash
 - Cause: Unknown, believed to be caused by the Swipr iOS application
 - Solution: Bug can't be replicated and was a one-time occurrence. We've considered it irrelevant.

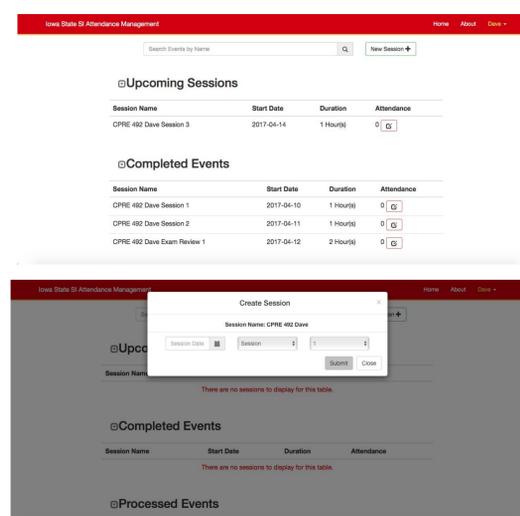
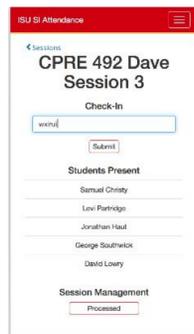
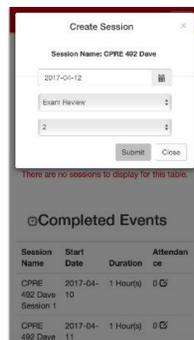
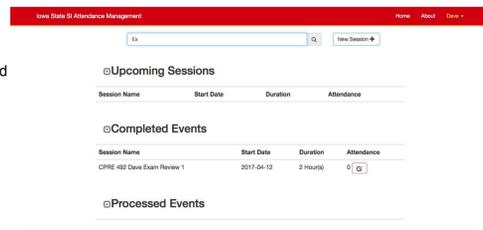
Design Requirements

Functional Requirements

- Authenticated user accounts
- Utilize A-Track API for creation of SI Sessions
- Display all events related to proctor only on their homepage
 - Sessions categorized by Upcoming, Completed, Processed
- Check-in students using both the Swipr App and manually
- Create event from home page
- Attendance data processed automatically in CyBox
- Completely Mobile Friendly

Non-Functional Requirements

- Speed up the data transfer
- No installations
 - No applications required
 - No files ever downloaded from CyBox
- Security
 - Never store users net-id's and ISU id numbers side-by-side
- Scalability
 - Covers all SI Courses, even ones that currently don't exist
- Usability
 - The user interface is easy and intuitive



User Workflow / SOP



Example of using the Swipr app

Student Leader Workflow

1. Before the session starts, log in to the SI Attendance Management site.
2. Create a new session by setting the session type, date, and duration.
3. Navigate to the newly created session.
4. Check students into the session by entering any of the following:
 - ISU Student ID Number
 - ISU NetID or full email
 - Swiping their ISU ID card using the Swipr app on an iPod or iPad
5. Hold the session
6. After the session, return to the session and click the Process button.
 - This will automatically update the logged-in leader's excel file with the data from that session.
7. View data migration results on CyBox if needed.

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