UNC WILMINGTON BUSINESS WEEK ATTENDANCE TRACKER

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ABSTRACT

Business Week Attendance Tracker. Vanderhoof, Hallie, 2023. Capstone Paper, University of North Carolina Wilmington.

Beginning in 1982, the University of North Carolina at Wilmington and the Cameron School of Business started hosting Business Week. Business Week is a time for alums, recruiters, and mentors from each field of business to come and speak with current business students. This week offers a chance for students to network with their peers and potential colleagues. To make this week possible, professors must release their students from class to attend sessions. Because of this, most professors require their students to attend at least one session per class that removes them. The current system requires students to turn in a 'session ticket' to their professor that is handed out at the end of each session they attend. For this project, we are solving the problem of an outdated and inefficient attendance system. This system utilizes UNCW's active directory to use preexisting credentials for students and professors and the ADA server, which IT/Computer Science departments run. This system allows students to log in, select the session they are attending, select the professor they would like to notify of their attendance and enter a session code to verify their attendance. Students can view previously recorded sessions and delete sessions they may need to update. The system also allows professors to log in through a link specific to faculty members and view a table of students, along with the session name, who have selected them as the professor to notify. Not only is this system more efficient, but it will also save thousands of dollars each year.

CHAPTER 1: INTRODUCTION

For the last 41 years, during the spring semester, the Cameron School of Business at the University of North Carolina at Wilmington has hosted Business Week. This week is an opportunity for students to attend various sessions conducted by professionals in any desired business field to network and make connections that could benefit them throughout the rest of their careers. Because this is such a valuable experience, professors from the business school released their students from class this week to allow them to attend different sessions. As a tradeoff, professors want a way to ensure that their students attend at least one session. The school's approach to appeasing the faculty is that for each class the student is let out from, they must attend one session. Typically, students are not allowed to double count a session for multiple courses; however, this may be decided at the professor's discretion. As an alumna of the Cameron School of Business, my goal is to find a way to incorporate the latest technology into taking attendance while making the process both more straightforward and efficient for students and professors.

The newly developed system aims to create a way to leverage today's technology to replace the current archaic system for taking attendance that is in place now. As it stands now, physical tickets are stamped with the session name, date, and time and are handed out to each student at the end of each session. To receive credit, the student returned their ticket to their professor to verify attendance. The professor then manually marked the student as present for the class period they were released from. While this

system has been working for the last four decades, it is an outdated approach and an unnecessary expense that can be easily rectified.

CHAPTER 2: BACKGROUND INFORMATION AND RELATED WORK

2.1 Current System

The current attendance system ensures students are only attending one session per professor. This works so well because tickets cannot be easily replicated. At the end of each session, tickets stamped with the session data are handed out by student ambassadors. A student will receive one credit for one session to turn in for attendance credit for the course. The benefit of this system is that the student ambassadors control the disbursement of attendance tickets. The chance of double dipping is almost obsolete, as well as the ability for a student to collect more than one ticket per session to share with other students who are not in attendance. Each student in attendance receives one ticket, and when Business Week is over, and the student returns to their class, the session attendance ticket is handed to the professor.

2.2 Motivation

After attending many Business Week sessions over the years, I genuinely understand the need for a more efficient system. Today's technology allows us to leverage different technologies to create a better attendance tracking and management

system. After analyzing the current attendance system, I have found solid arguments for replacing it with a digital system.

While our current attendance system has been working fine, it is archaic and doesn't represent all the changes the University has made. Over the last four decades, hundreds of technological innovations have allowed companies to have more accurate data and a quicker turnaround time for data analysis. As technology advances, we need to ensure that we use it to make our everyday practices more efficient.

Cost is a significant motivation to replace the manual ticket attendance system. Printing tickets for all Business Week activities costs around three thousand dollars annually. This seems like an unnecessary, costly way to manage attendance. If the school were to purchase a system, it would be a one-time cost versus the recurring charge of three thousand dollars. Even if the school purchased a $30,000 system using the same process of paying three thousand dollars a year, the system would be paid out in ten years. Assuming business week will continue for another 40 years, the school would save tens of thousands of dollars. The costs to be saved by replacing the current system are a strong motivator.

Each year, students can procure multiple tickets after attending various sessions. Because of this, there is an unnecessary physical burden of ticket handling and managing. The tickets are small and can easily be lost, causing students to forgo the credit for attending a session. This is a headache from a student's perspective, and a single process would be more efficient.

Sessions run 10 – 15 minutes apart, often in different rooms. After waiting in line for an attendance ticket and navigating through congested halls, students may only have minutes before the next session begins. Streamlining the attendance process will incrementally enhance Business Week by allowing attendees more time to interact and network with speakers and guests.

Perhaps the most important motivation for switching attendance systems is to gain the ability to analyze and sort through the data capture, which would be the most beneficial. This would allow for exact numbers to be collected and comparisons to be made to understand better which sessions seemed to be the most sought-after and which areas were trending. This information can be used for planning future events, not just Business Week.

For these five reasons, it makes sense to investigate shifting the Business Week attendance system into the technology age.

2.3 Alternative Solution

While researching different courses of action to solve this problem, I found various solutions under the 'buy' or 'buy and modify' category. Out of the dozens of software solutions available, I narrowed it down to four products that would best solve

our problem: Arkaive, WebEx (formerly Socio), Whova, and EventMobi. These software solutions are all tremendously powerful and have similar features.

2.3.1 Buy or Buy and Modify

Arkaive, a software used primarily to take attendance for courses of any size, is the only solution of the four that is built solely for attendance purposes. While this software is smaller than the others, it still fits the ideal solution for the Business Week problem. This software utilizes geolocation functionality to allow students to check in for class only when they are within the set radius of the classroom. Faculty users also can limit check-in time to a particular window, ensuring students are present for the entire period. Students download the app to a smart device, register and create a profile, and then check in when they arrive at class. They can view their attendance history from their profile and submit excusal requests for missed classes. This software works exceptionally well in vast lecture courses where it is not likely the professor can meet one-on-one with each student each time the class meets.

The following three software programs cater to business conferences and hold more weight than we need to solve our Business Week problem. A lead conference management system, Webex (formerly Socio), owned by Cisco, has many great features but might have too many bells and whistles for our problem. Whova and EventMobi, other conference management systems, have many of the same features. Each software can be managed for in-person, virtual, or hybrid events. Virtual maps, digital check-ins,

custom branding, live polling, and data analytics are some of the basic features offered along all three platforms.

The last solution I considered was hardware. A one card is issued to all students and faculty members to identify themselves uniquely. Across UNCW's campus, hundreds of card readers allow access to restricted areas and purchases made via a student's account. Each classroom used for a Business Week session could have a card reader associated with it, and at the end of each session, students swipe their cards to receive credit. From my research, I found that this solution has already been attempted and proved more difficult. Each card reader needs to be connected to a computer to work. The computers are often not set up in students' paths to exit the classroom. Leaving the room would require a new flow, which would still cause a backlog.

2.3.2 Build

Completing this research, I concluded that these solutions are not what we seek. Each of the software solutions offers vast amounts of features, but many of the features do not apply to help solve our problem. From my research, I did not find a solution we could buy or buy and easily modify to solve our problem. The solution that seems to solve our problem best is building the system ourselves. If we build the system, we can cater it to our exact needs while still utilizing other features from other software applications in a future version

CHAPTER 3: BUSINESS WEEK ATTENDANCE TRACKER

The process of manufacturing a new system is a lengthy process. I have already gathered data to see if there was a need for this system, but now, we need to collect information on how it will be used and what features are most desired. Building a system from data makes it more efficient and easier to use. Based on the input received, we created a list of requirements, assumptions, and a plan to explain the development process. Below, I have briefly listed the specifics for each of the different parts of the development process.

3.1 Plan

A project this size must be broken down into smaller, more manageable pieces to tackle. A plan must be created after breaking down the different parts needed to complete this project. I broke this project down into several more manageable phases: the analysis, setup, development, and testing phases.

During the analysis phase, I asked who would use this system and what features would benefit it most. I began by gathering facts on Business Week and surveying faculty and professors from the business school. From here, I created use cases from both the professors' and students' perspectives. After I understood the problem that needed to be solved and what was required from a system to solve this, I began researching solutions. I performed in-depth research on both hardware and software solutions. Ultimately, I

concluded that the only way to find a system that met our requirements would be to create our own.

After coming to this conclusion, I took the existing use cases and began to create illustrations to represent the system that needed to be made. These illustrations included Entity Relationship Diagrams, Activity Diagrams, and User Interface Mockups. Choosing an environment to build was the last detail that needed to be ironed out. Selecting a proper environment sets the foundation for the entire project.

Setup began after choosing an environment. Help was needed from various individuals across campus to host the project on the University's ADA server. The Application and System Administrator and the IT Security Architect supported this project and got the system running on the server. A database account was also created through phpMyAdmin to store the system's data.

During development, I worked to create a system that met the current requirements and accommodated the use cases outlined during the analysis phase. Throughout this process, I discovered additional requirements and use cases and ensured these were also covered.

Besides development, testing took up most of my time, and the two phases began to bleed together. Once I executed various test cases, I went back to development to fix bugs that arose and modified existing features to be more efficient.

3.2 Requirements

From the analysis phase of the project, a list of requirements that the system must meet was created. Below is a list of these requirements.

a) Students will be able to log in with UNCW credentials.
b) Professors will be able to log in with UNCW credentials.
    a. Only faculty will be allowed to use this login page.
c) The system will hold session data.
    a. Session name, time, date, & session code.
d) Students will be able to make session attendance selections.
e) Students will be able to view a list of sessions they have recorded.
f) Students will be able to update previously recorded attendance selections.
g) Students will be able to delete previously recorded attendance selections.
h) Professors will be able to view a list of students who selected them as the professor to notify
    a. Other session information will be presented
i) The system will mitigate the risk of cheating.
j) The system will be usable through a web browser, smartphones, and tablets.

3.3 Assumptions

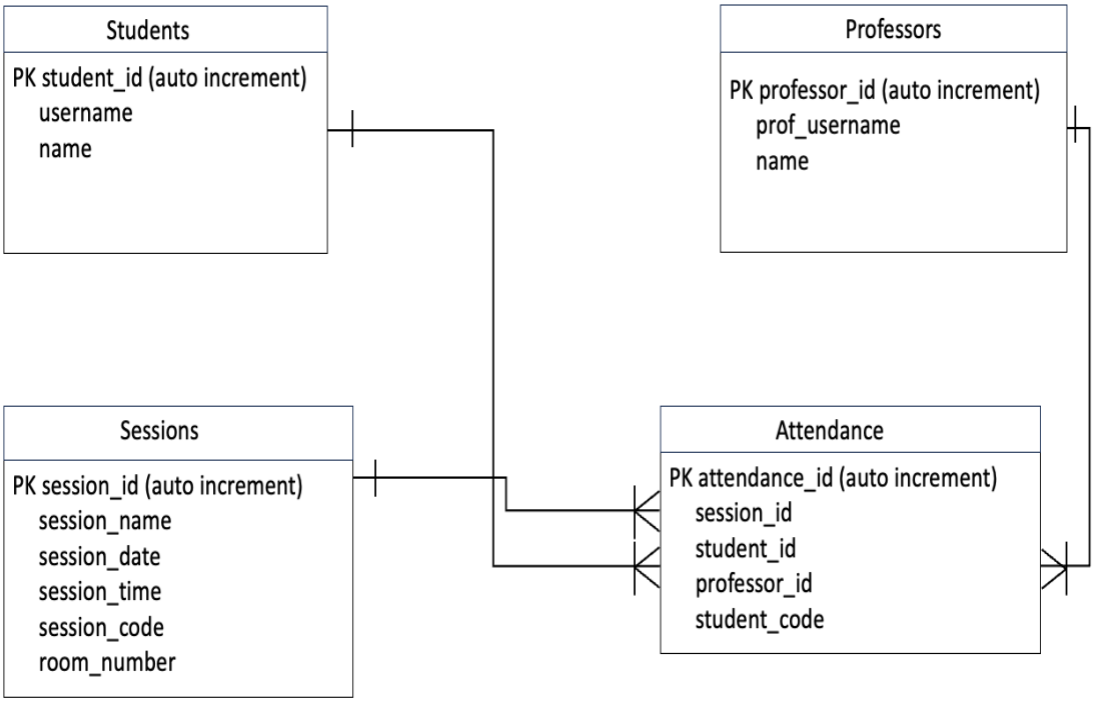
While developing this system, there were several assumptions made. These assumptions guided the paths that were taken when outlining a solution. The first few

assumptions made detail that each room to hold a session will have a computer or whiteboard where a code can be displayed. Each room will also have a faculty and student host who can aid in presenting the code for students to enter into the system. Since the system is web-based, the solution assumes that each student will have access to a laptop, tablet, or smartphone to use the system. Lastly, an assumption discovered during development is that the system will only be loaded with the names of business professors for the current semester. These assumptions made for a smoother development process.

3.4 Project Analysis

Throughout the analysis of the project, several illustrations were created to understand what is needed and how the project will flow. First, an Entity Relationship Diagram (ERD) was created. This diagram helps visualize the tables and relationships required for the system to work. This ERD has four tables: Students, Professors, Sessions, and Attendance. The Students, Professors, and Sessions tables have a one-to-many relationship where the Attendance table is the junction table. When a student submits after selecting and entering a session, professor, and session code, the submission values are entered into the Attendance table.

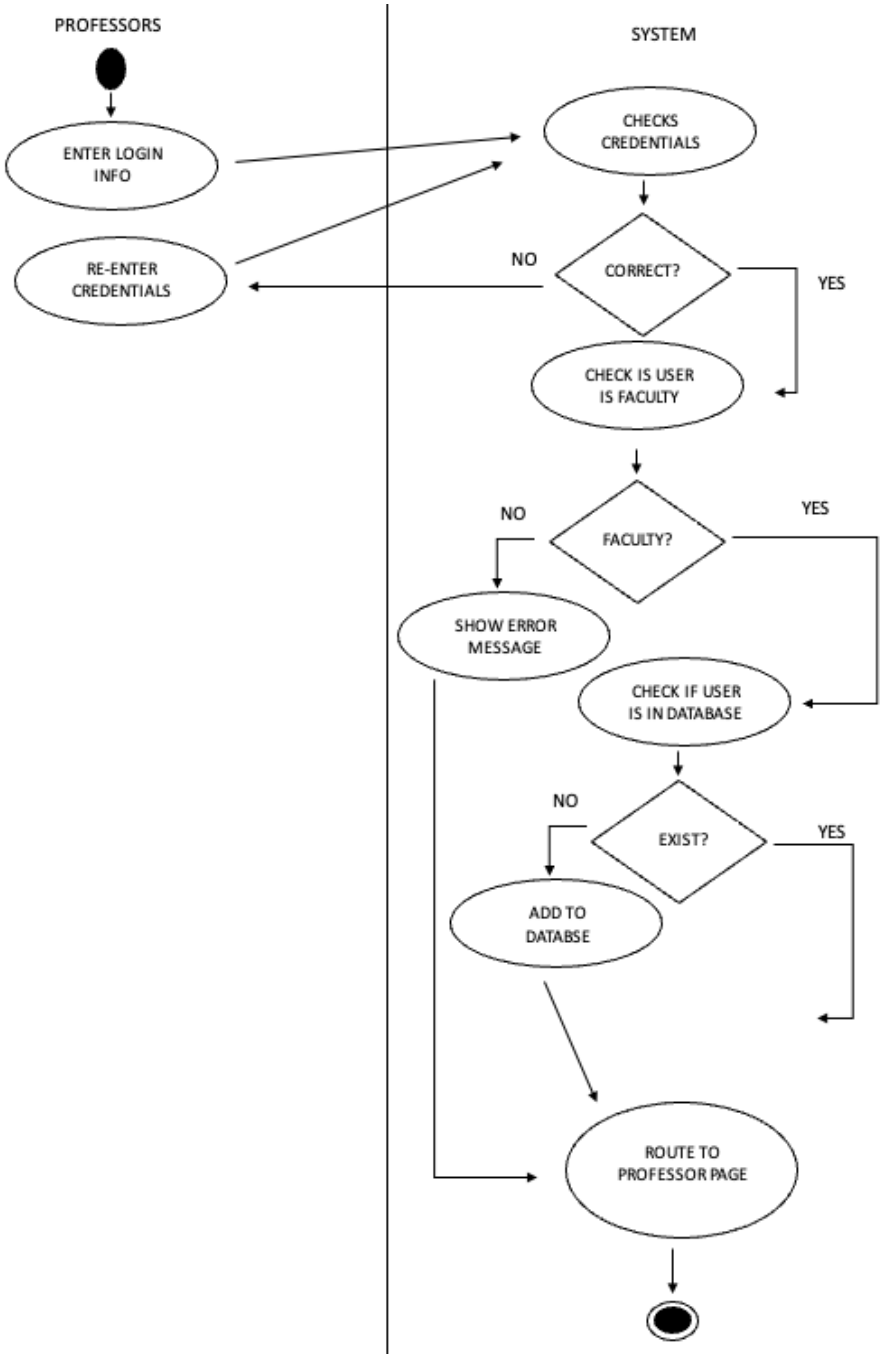
Figure 1 - Business Week Entity Relationship Diagram



Next, two Activity Diagrams were created. These diagrams represent the flow of the system. I have divided the flows into the student and professor flows so we can understand how the system will behave when the different paths are taken. The diagrams show what happens when users and the system need to make decisions and what the final results will be.

Figure 2 - Business Week - Student Activity Diagram

Figure 3 - Business Week - Professor Activity Diagram



3.5 Project Risk

When completing the analysis phase of this project, a risk table was created. This table allows us to predict any risks that might occur during the project's duration, along with the severity and impact—the table first lists the potential risk, then the risk category: Project Size or Business Use. The next columns are the probability of the risk occurring along with the impact values. To assess the impact of the risk, we assign it a number value between 1 and 4. A value of 1 = catastrophic, 2 = critical, 3 = marginal, 4 = negligible. The final column is the Risk Mitigation, Monitoring, and Management (RMMM). The RMMM column proposes various ways to control the risk.

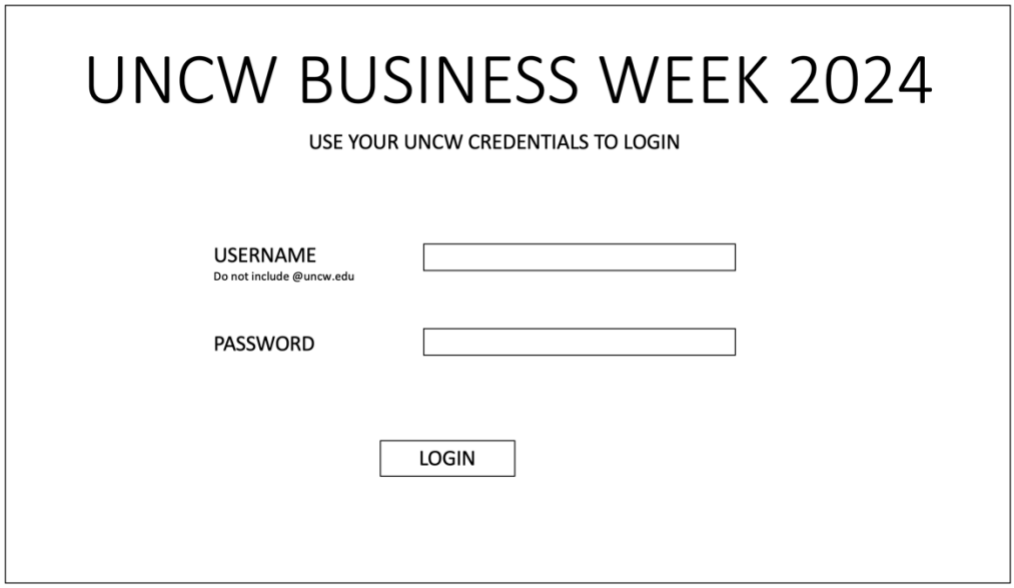
Table 1 - Project Risk

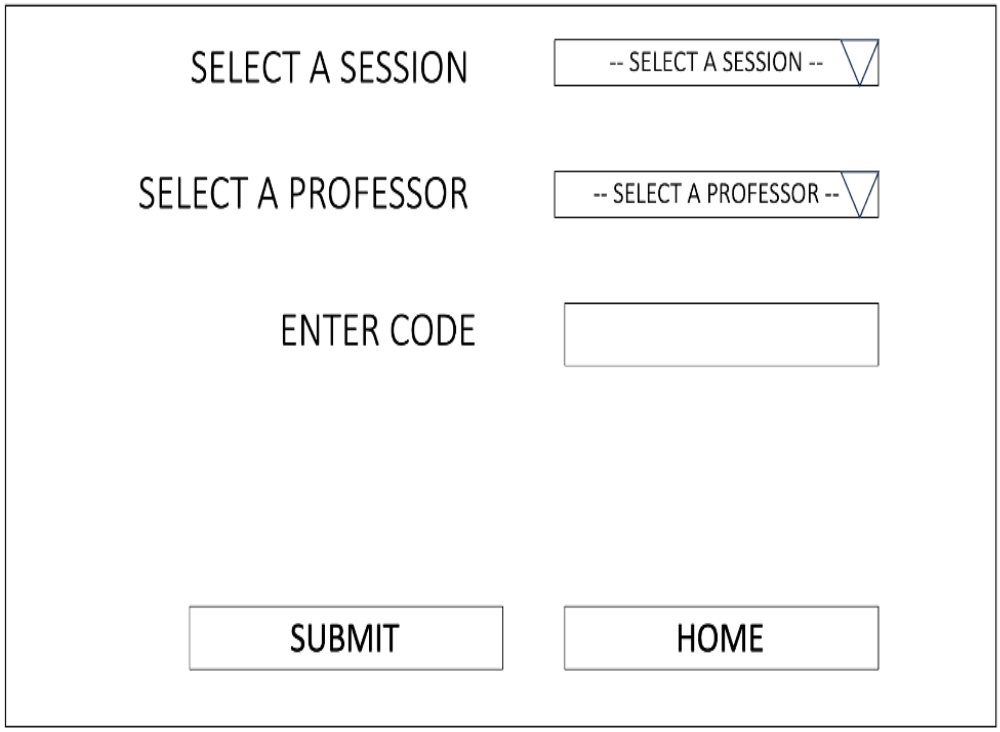
Risks	**Category**	**Probability**	**Impact**	**RMMM**
Project difficulty may be underestimated	PS	90%	2	Divide the project into smaller parts and decide which parts can be removed or completed in a future version.
The project deadline may need to be extended	BU	90%	3	Dividing the project up into smaller parts can also help mitigate this issue.
End users (faculty and students) do not have positive feedback	BU	30%	3	It is taking more time once released and surveying users about likes and dislikes of products.

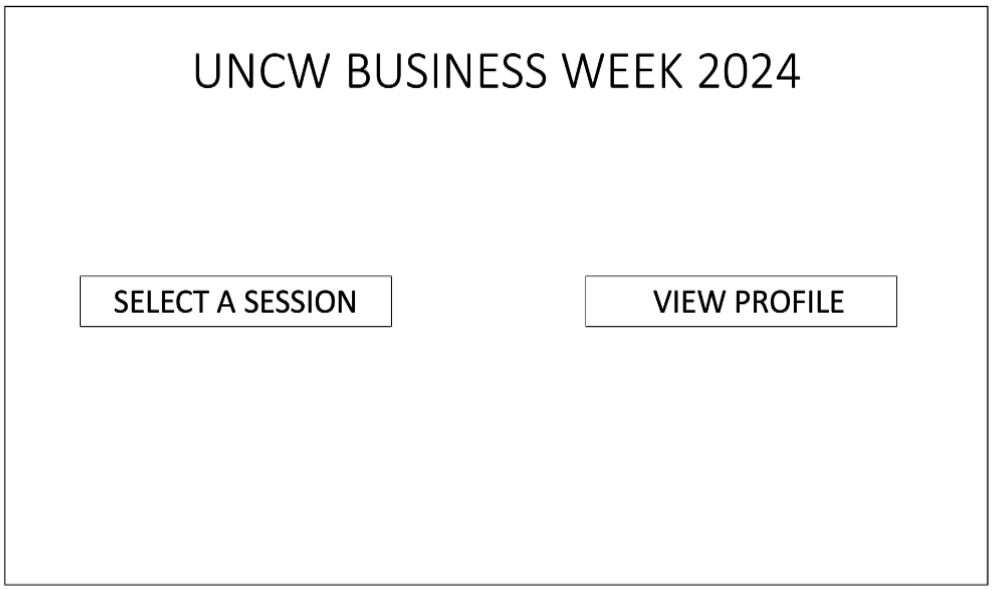
3. 6 Project Limitations

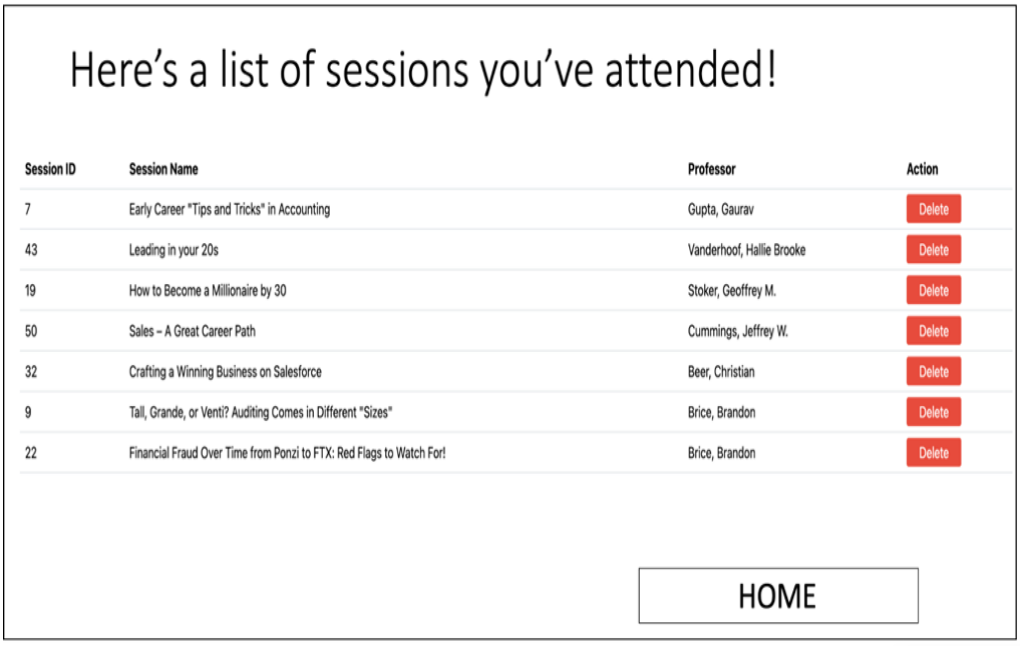
Because we are building this system to be as lightweight and straightforward as possible, we have encountered a few limitations that must be addressed. These drawbacks were discovered during the development process but in no way restrict the use of this system. Because we are hosting this system on the University's ADA server, anyone using this system must be connected to Hawk WiFi or a Virtual Private Network to access the school's network. Because no time limits have been set for when sessions can be selected and submitted, any session can be recorded during Business Week, even if the session hasn't happened yet, which will be recorded in the Attendance table. The session code will remain the same for all sessions through Business Week. If students have the correct session code, they can receive credit for a session they may not have attended.

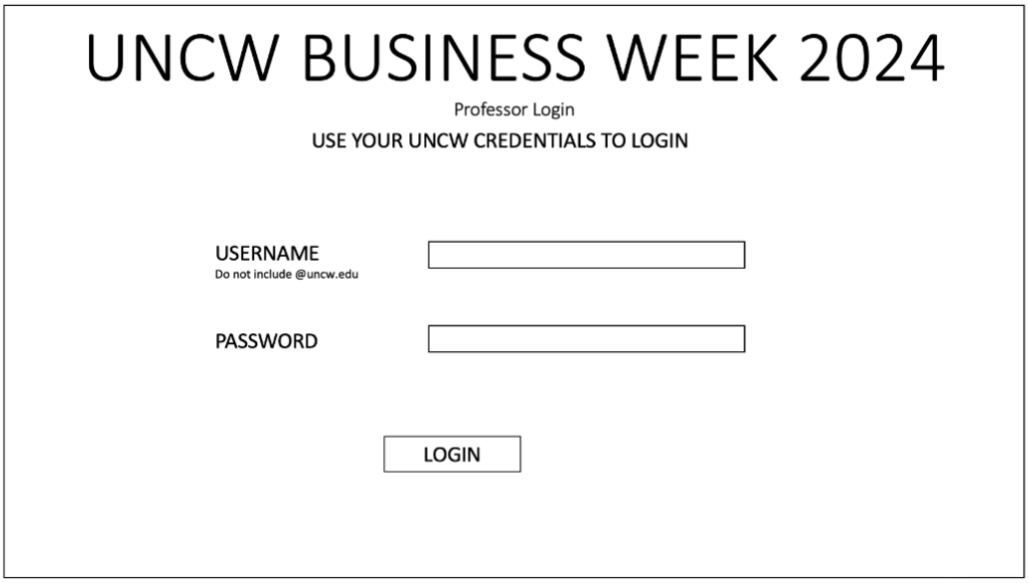
3.7 Software Design


UNCW BUSINESS WEEK 2024
USE YOUR UNCW CREDENTIALS TO LOGIN
USERNAME
Do not include @uncw.edu
PASSWORD
LOGIN


SELECT A SESSION
-- SELECT A SESSION --
SELECT A PROFESSOR
-- SELECT A PROFESSOR --
ENTER CODE
SUBMIT
HOME


UNCW BUSINESS WEEK 2024
SELECT A SESSION
VIEW PROFILE


Here's a list of sessions you've attended!
Session ID
Session Name
Professor
Action
7
Early Career "Tips and Tricks" in Accounting
Gupta, Gaurav
Delete
43
Leading in your 20s
Vanderhoof, Hallie Brooke
Delete
19
How to Become a Millionaire by 30
Stoker, Geoffrey M.
Delete
50
Sales – A Great Career Path
Cummings, Jeffrey W.
Delete
32
Crafting a Winning Business on Salesforce
Beer, Christian
Delete
9
Tall, Grande, or Venti? Auditing Comes in Different "Sizes"
Brice, Brandon
Delete
22
Financial Fraud Over Time from Ponzi to FTX: Red Flags to Watch For!
Brice, Brandon
Delete
HOME



Business Week Report

Here is a report of sessions your students attended this week

Student	Session Name	Session Date	Session Time	Session Code	Student Code
Vanderhoof, Hallie Brooke	Financial Fraud Over Time from Ponzi to FTX: Red Flags to Watch For!	2023-03-28	09:00:00	1234	123456
Vanderhoof, Hallie Brooke	Best of Both Worlds: Small Consulting Company, Large Financial Clients	2023-03-28	13:00:00	123456	123456
Vanderhoof, Hallie Brooke	Sourcing & Supply Chain at GE Hitachi	2023-03-28	10:00:00	1234	124456
Vanderhoof, Hallie Brooke	Fireside Chat: Life on Wall Street, Managing the World's Biggest Influencers, and Building $100mm C	2023-03-28	09:00:00	1234	123456

CHAPTER 4: DESCRIPTION OF COMPLETED PROJECT

There are two different flows for this project. Below, I have broken it up to walk through the flow from the student's point of view and then through the professor's point of view. There is little difference between the two flows, except that professors only use the system to view a table, so they have fewer steps.

4.1 Students

The student will start on the login page for the system, where they will enter their UNCW credentials without the domain name attached to the end. From there, the system will check if the credentials are correct. If an invalid login has been entered, an error message prompting the student to re-enter their information will appear. This will continue until the system receives a valid login. If accurate login information has been provided, the system will check to see if a record in the database belongs to the student matching the login credentials. After completing the login process, the student will be routed to the session page. This page will display dropdown menus for the user to specify the session they are attending, which professor they would like to notify of their attendance, and a text box used to enter the session code. Once the user fills out each field and clicks submit, they will be directed to the home page, where they can return to the session page to make any updates, create a new submission, or choose to view their profile. The profile page presents the list of sessions the user has attended and which professor is associated with that record. The results are displayed in a table that allows the user to delete a row, removing the record from the student's profile. The delete button can be used if the user has made an error when recording the session. Once the record is

deleted, they can create a new submission with the same session that was recently deleted. This is the end of the student flow and can be repeated for as many sessions as the user attends.

4.2 Professor

The professor will start on the professor login page for the system, where they will enter their UNCW credentials without the domain name attached to the end. From there, the system will check if the credentials are correct. If an invalid login has been entered, an error message prompting the student to re-enter their information will appear. This will continue until the system receives a valid login. Once valid credentials are entered, the system will check if the owner of the credentials is a faculty member. If the user is not a faculty member, they will receive an error message stating to use the student login page. If the system can validate the user is a faculty member, it will then check to see if the user is in the database. If no record of the user is found, they will be added to the professor table and routed to the professor page, but if a record is found, they will be automatically routed to the professor page. Only the business professor's information will be prepopulated in the professor's table; however, if a professor from a different department wishes to use this system, they still can because of this second check.

The professor page presents a table that displays the record of any student who selected them from the professor dropdown. The columns for this table are student name, session name, session date, session time, session code, and student code. The student's name, session name, and session date column will all be sortable, and if the student code

does not match the session code, the student code will be displayed in bold red font. These features have been added for a better user experience for the professors.

CHAPTER 5: TESTING

Testing during development is critical to the development process to ensure each individual piece is working, but testing after the development is even more critical. During this testing, you can verify all the pieces work together as expected. Testing that the system works via the 'happy path' is only one part of the quality assurance process. I have outlined various pieces I have tested below, including testing in ways I know will cause a failure or error. This ensures that the system has proper error handling in place. This helps with accidental or intentional misuse of the system.

5.1 Test Cases

Test cases have been written based on the requirements defined during the analysis phase. Having these tests in place makes for a smoother testing process and allows others to view each test and validate that the system is working correctly. Since this system has two flows, I divided the tests into two parts.

5.1.1 Student

- Validate successful student login
- Validate error for incorrect student login
- Validate each field on the Session page is required

- Validate minimum and maximum character length on the Session Code field
- Validate submit button adds a record on the Profile page
- Validate home button doesn't add records to the Profile page
- Validate home button takes you to the homepage
- Validate that the student cannot enter the same session twice
- Validate the table on the session page
- Validate the delete button on the profile page

5.1.2 Professor

- Validate successful professor credentials
- Validate error for incorrect professor credentials
- Validate professor is faculty
- Validate professor is not faculty
- Validate all columns appear on the table
- Validate student name, session name, and session date columns are sortable
- Validate Session Information on the Professor Page matches what is on the Student Profile Page
- Validate Session Code and Student Code match
- Validate table scrolls with page if there are multiple rows in the table

CHAPTER 6: LESSONS LEARNED

Throughout the three semesters that I have worked on this project, I have faced and overcome many obstacles. Whenever I felt I had a good idea of how to solve a

problem, I realized the solution opened my challenges that would then need to be solved. From start to finish, I have worked with several people who have helped get the system to where it is today. I have learned many things from the start of my capstone project to the end of development.

6.1 Choosing a project

Three semesters ago, I knew I wanted to build a project that would be put to use and not just stuck on the shelf and left to collect dust. Initially, I could not think of what I wanted to work on. One of the best pieces of advice I was given was to choose a problem, not a project. Things started falling into place when I started looking at it from this perspective. After hearing about improving the attendance system for Business Week, I was instantly interested. I attended Business Week three years before starting this project and felt a tie-in with this project. I could personally identify with having some of the motivations to improve the existing system, and having a good idea of how the system works helped immensely with creating a solution to the problem.

6.2 Time management

As a graduate student working a full-time job, I have had to face setbacks when it comes to managing my time. Working on this project has often been put on the back burner to work on other things. When I found time to work on a part of the project, I would put it down at the night's end and not pick it back up for a week or two. When this happened, I would forget almost everything I did and have to start over. Eventually, I learned to take better notes and add better comments to my code, which helped me

remember what I had been working on. Another piece that helped immensely with my time management was admitting I had a problem with this and then reaching out to my advisor and having more regular contact. This was a great reminder to stay on top of my project, and I learned not to leave it without working on it for so long.

6.3 Simple is best

I had many ideas when I started envisioning a solution to this problem. After presenting my ideas to my committee, I was encouraged to scale down and ensure the basics were covered first. This was another piece of advice that was crucial to my project. Because I used basic HTML and PHP pages in this system, I could find various help online when I ran into an issue. Keeping things simple, I have access to more resources than I would have had if I used a specific platform.

6.4 Use what you know/have

During my undergraduate time at UNCW, I learned HTML, SQL, Python, and other helpful development tools. In this project, I have used most of those tools. This made for a smoother development process. This project is built on the ADA server hosted by UNCW. Computer Science and Information Students all have individual pages on the server. Utilizing this, I could see what the project would look like outside of my local machine, send a direct link to others, and tap into my SQL database on phpMyAdmin. In addition to the tools I had access to, I also had multiple individuals who aided in developing this project. Different parts of this project required help from others outside my committee. With the help of faculty members across campus, I was able to utilize the

Ada server and UNCW's login system, both of which helped make the project more successful.

6.5 Importance of testing efforts

Performing unit testing is critical to the development process. This ensures that each piece is working individually. However, testing the system after development is just as important, if not more important. One of the most significant issues I found was caught while smoke testing the system. The sessions listed on the student's profile did not match those on the professor's report. This was an issue with the query on the professor report page. During development, I had only tested that both pages returned results from the queries. I also validated that when users performed an action that wasn't a part of the 'happy path,' the system handled this correctly. This will save us from having any mishaps during Business Week.

6.6 Asking for user feedback

When you spend so much time on a project, it is hard to step back and think about different scenarios from a user's perspective. I, of course, know what to do and how the system is supposed to operate, which makes it difficult to find issues with other scenarios. Towards the end of the development process, I ask for help from other students to get their feedback. Thanks to this, I could think through different problems when solving for their feedback. Without user feedback, this project wouldn't be

CHAPTER 7: FUTURE WORK

There is always room for improvement with any application; this project is no different. This first version has laid the groundwork for a new and improved attendance system for Business Week. Listed below are various ideas I think will make great additions to this project in a future version. Updating the interface to be more user-friendly for all devices, limiting sessions in dropdown to only sessions for that day and/or hour, and only allowing session submissions for one hour after the session ends. If the student navigates to the profile page without having first selected any sessions, add empty state text to prompt the user to make an attendance selection. Lastly, log the student out & re-route to the login page after a specific time. These recommendations will only create a more intelligent and friendly system.

CHAPTER 8: CONCLUSIONS

This lightweight system allows students and professors to easily access their Business Week data. Two of the best parts of this system are that we can tap into UNCW's active directory and utilize the preexisting credentials that every member of UNCW already has. This has prevented the system from having a registration and login flow. It also allows for a more friendly and efficient user experience. A big problem with creating a login flow specifically for this system is maintaining and editing the credentials from year to year. It is assumed that a student will use this system for more than one year, considering Business Week happens every year and students usually attend business school for at least two years. Suppose these are the only days the students and

professors use these credentials. In that case, assuming they will remember their login information regarding Business Week the following year is unrealistic. This also prevents anyone outside the school from accessing the systems and inserting bad data into our database.

The second significant part of this system is the environment that it is built upon. With help from several members of UNCW's IT and Computer Science departments, we are hosting this system on UNCW's ADA server. The ADA server replaces the Satoshi server used in previous years by computer science and management information systems students. To access the server, you must be connected to Hawk WiFi or the school's network through a VPN. This goes a long way in preventing students from creating an attendance record for a session they did not attend.

To maintain this system, each year, a list of professors in the Cameron School of Business will need to be gathered from an admin in the business school and imported into the database. If the computer science department adopts this program, a list of professors must be compiled from their department. A list of sessions will also need to be collected and imported into the database. Depending on the format of this data, it will need to be cleaned before being uploaded into the database. This will be the only upkeep required for this system from year to year.

Because of how lightweight this solution is and our ability to access and use resources already owned by the University, this system will drastically reduce the expenses incurred by taking attendance during Business Week each year. The cost of completing this project can be measured in the time it took to build. However, since the

tradeoff of the time it took to solve this problem was a capstone project, a person could argue this is the most cost-efficient system.

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