Steeve Gandhi Nsangou
CSC498 Senior Seminar Final Report
Fall 2024

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Original Proposal

Please see "Steeve Nsangou – Compass - Original Proposal."

Deviations from Original Proposal & Justifications

1. **Recreating Tables and Artificial Data**
    a. My initial set of tables were created using Python. However, in the late stage of my project, I pivoted and recreated these tables with PostgreSQL (pSQL). This decision came from issues with importing .csv files from my GitHub repository, which were created using Python. The schemas remained the same, but all the content differed. For example, Table 1 (created with Python) with columns *studentID, first_name, last_name*, and *gender*, was recreated as Table 2 (created with pSQL) with *studentID, first_name, last_name, and* gender, but the *names* and *gender* field inputs differed.
    b. When remade with pSQL, a few schemas had to be restructured to include/exclude certain columns to reflect a more realistic output. For example, I added the *grade_as_year* column in the 'student' schema, whereas the original ERD used integers to indicate a student's grade (e.g., 1 -> Freshman, 2 = Sophomore, etc.). Lastly, entirely new tables were added following feedback from usability tests that were not as apparent in the prototyping phase. One of them was 'topics'; this was not originally in my ERD *and* was necessary for a visual on my dashboard.
    c. The "School" table was the only table from my ERD that did not make it to the final product due to time constraints.
2. **Usage of Assistive AI**
    a. ChatGPT was leveraged as a tool to create insert statements when recreating my tables. By comparison, I had used for-loops and manual scripting when using the faker class to create my tables in Python; the original approach to creating artificial data in my final proposal. Using a tool like ChatGPT decreased my time spent populating tables greater than 10 rows (e.g., 'asignments_entry'). I will note that even with ChatGPT, the majority of my tables and scripting were manually populated.
3. **Verification and Data Security**
    a. Implementing a verification form could not be accomplished nearing the last checkpoint. As a result, *Compass currently* holds no form of verification. This is a significant security issue given the volume of personal identifying information that my platform if intended to store. On the other hand, Power BI requires that a user is signed on to view the visualization. This is an unexpected benefit to my security issue because the data will remain inaccessible unless the user has a Power BI account via Microsoft.
4. **Framework Switches**
    a. Originally, I intended to build *Compass* using HTML/CSS/JS. However, as I began building the front-end, I adopted the React.js platform to get hands-on with more contemporary frameworks. This was a mistake due to the steep learning curve. It cost me three weeks of development with very little

outcome. As a result, I returned to using only HTML/CSS/JS to develop the most recent version of my webpage.

5. **UI & UX Design**
    a. I used a cooler color-palette compared to the one in my mock-up. This is because I reprioritized functionality over aesthetics in preparation for 4th checkpoint. The finalized color scheme is less vibrant; a choice made to showcase a sovereign design posture and avoid a negative experience for color-blind users. This was a tough, but necessary decision to ensure that *Compass was,* first *and* foremost, usable. The prime aspects of the prototype, such as its layout and navigation, remained the same.

Reports

Please see the attached documents:

- Steeve Nsangou – Compass - User Test 1
- Steeve Nsangou – Compass - User Test 2
- Steeve Nsangou – Compass - User Test Notes
- Steeve Nsangou – Compass - User Testing Questions

Alternatively, please access in a folder here: Compass User Testing.

Project Code

The best option is to upload it to GitHub and share it with me that way, though if it fits, you can also upload it to Moodle. You can also upload it to your DePauw Google Drive and share it with me. Explain any rationale here as well. See below for one example.

Code via Google Drive: Senior Project – Compass – Code

For ease of access and to prioritize functionality, I have uploaded my code to Google Drive. The folder above contains all code across all my checkpoints, including Checkpoint 1's Python code, which is now depreciated. My reason for keeping this is because the code was functional and was used to create the first drafts of artificial data processed in Checkpoint 4. Compared to the Github repository, also explained below, the Google Drive folder solely contains code and no other forms of media.

Code via GitHub: *Web page & SQL*

I used GitHub through the entirety of Compass' timely to store code used in the web development and SQL querying process. This was in case my personal computer faced an error which resulted in the loss of my progress *or* rendered my code inaccessible. The only issue is that I do not have the strongest handle of git's structure. Often, commits were made through VS Code, and I could not always replicate a desired step in the commit process. This would lead to various branches or repositories being created, and as a result, pieces of my code ended up in different places, thus defeating the goal of a

centralized repository. Nonetheless, the branch attached above consists of the most up-to-date version of my web page and SQL code. Additionally, it includes all media used to create Compass and accomplish checkpoints, such as code, background images, a script for video demos, and more.

Conclusion and Lessons Learned

I am driven by any opportunity to mend my passion for creative arts, education, and technology. Through Compass, I attempted to meet these topics using UI/UX design principles, research, and programming. Theoretically, they should all fit into each other as a charger fits into a socket. In actuality, it felt like solving a 10,000-piece jigsaw puzzle. It required more strategy, consistency, and technical prowess than I had anticipated.

The preliminary materials were the most manageable to prepare. I enjoyed researching my topic and ideating the outcome of my senior seminar project. Making the ERD diagrams and drafting designs was exciting and fulfilling. Had I scheduled and dedicated more time to this initial process, I would have taken the extra step of assessing my work's structural integrity as it directly influences my next steps and would decrease errors in the developmental stage. For example, my ERD seemed structurally sound, but when I was creating the schemas for the dummy data, I realized there were crucial fields that were missing or entire tables that needed to be created to fulfill the final product's functional needs. Steps I can take to mitigate this in the future are asking for a second opinion – not just on visual outputs – but the back-end work as well.

Coding in this project was my greatest challenge. In one specific instance, I adopted the React framework to try and make my work more modern and give me new skills. This was a mistake as the learning curve was extremely steep for the limited time (two-to-three weeks) allotted for our succeeding checkpoint. The direct result was a failed checkpoint (score of -3) and a lot of frustration and disappointment due to nearly 20 hours being wasted. By this point, I was extremely set back in my development and needed a hard pivot to pass my next checkpoint. This led to creating a schedule for myself to follow in preparation for the final checkpoint presentation. Utilizing my notes and ChatGPT, I created a three-week game plan that spearheaded my completion of *Compass* based on the necessity of features and their difficulty in completing them. This was presented to Professor Webb, who revised it for feasibility and further guided me on action items, like reaching out to stakeholders early for user testing pending a holiday, to ensure my project's successful completion. The introduction of ChatGPT to my workflow also enhanced my troubleshooting and programming capabilities. As a result, I was able to populate a dashboard, create a webpage, conduct user testing, and complete my promise for Checkpoint 4 in under 2 weeks (1 week ahead of my scheduled deadline). If I were to approach checkpoint 3 again, I would remain with the framework of HTML/CSS that I am familiar with, and I would have been more resourceful/ask for help earlier in the process of programming.

I am nearing the end of my class and my prototyping of *Compass*. Senior Seminar has taught me a lot about my capabilities as an independent software developer. I have a strong lean toward creativity and ideation, but still have room for improvement in my technical approach to problem-solving. When I have someone to report to, or if the

timeline is tight, I tend to be more productive and disciplined. As important, I can be very resourceful but should also know *how* to best utilize my resources instead of taking a little bit of everything to solve one thing, which can be inefficient. My goal beyond this class is to continue developing Compass as a tool that can create impact in classrooms and help teachers help students succeed academically. It is not the all-encompassing solution to minimizing disparities in education, but if it can help teachers see it in their own classroom and lead them to better help children who may be struggling, then that's a start.

Creativity. Education. Technology. That will be *Compass*.

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