

HuskySync | Project Document

Capstone 2024

We are the BinaryBuddies! Our core values that led our development process are openness, creativity, and efficiency. Here is our team breakdown:

Team

Anumita Ghosh - Product manager and frontend developer

Varsha Palepu - UI/UX designer and frontend developer

Renusree Chittella - Tech lead and full stack developer

Thomas Kanenaga - Machine learning and data scientist

Anay Deshpande - Full stack developer

Problem Context

As a factor of education, study habits are developed from a young age. From rereading textbooks, to notecards and practice tests, studying is the correlation between the instructor's content and the way that students interpret and digest it. However, developing effective and efficient study habits are tougher than it seems. A study reported by the Washington Post discloses that an astonishing 66% of college dropouts grappled with the challenge of comprehending what and how to study. Cultivating research-based habits, such as creating notecards, utilizing study guides, and engaging in practice tests, demands a substantial degree of self-motivation. Despite the plethora of effective studying methods, psychologist Daniel Willingham observed in an interview that students often lean towards shortcut approaches like last-minute cramming or mere note review. This inclination arises from a desire for immediate results, which proves inadequate for sustaining long-term knowledge retention. The practice of pulling all-nighters before exams not only restricts the amount of knowledge retained but also impairs cognitive capacity during the test due to insufficient rest. Moreover, the process of rereading notes or textbook passages proves ineffective in truly comprehending and applying knowledge. Students cannot absorb information and confidently apply it without actively practicing what they learn. Harvard psychologist Jessie Schwab further underscores that the linchpin to effective studying lies in having a well-defined plan and proactively working ahead of time. However, as studying isn't a set deliverable with a hard deadline, motivation behind studying is diminished due to its ambiguous nature. Studying is ambiguous, requires patience and self-motivation, and often doesn't reap its benefits if done ineffectively. Every student retains knowledge differently as well, so setting concrete study methods for all won't work for everyone. The consequences of this necessary but obscure task is wasted time and energy, reduced academic performance, and ultimately reduced confidence. According to the American Test Anxieties Association, almost 20% of students in the US report having anxiety related to test-taking, which is a direct impact of ineffective study habits. We see this issue exacerbated in so-called "weed-out classes" at the University of Washington, which are introductory courses that often serve as prerequisites for competitive majors. With large class sizes and rigorous course content, studying in these classes are overwhelming to UW students and hinder their academic performance if not done correctly.

Problem Statement

How might UW students in introductory courses at UW achieve effective study habits so that they can be better prepared for class assignments and exams, ultimately achieving academic success?

Key Research Insights

Our research involved secondary methods conducting literature reviews as well as primary methods of interviewing stakeholders. From our literature review, the general theme we found is that studying is ambiguous, unlike clearly outlined assignments in college courses.

Students suffer from information overload across many courses, majors, and years. Some opportunities that arose from this research include self-testing for memorization, narrowing down the user base to those most affected (eg. freshman in introductory courses), repetitive quiz taking, give professors visibility to gauge student metrics and areas of weakness, and potential workflows for the product.

The market research we conducted gave us valuable insight into existing solutions and potential features to implement. We considered ideas such as integrating with canvas, incorporating more study materials than quizzes, implementing collaboration on quizzes, a student matching system, furthering collaboration to competition or games and quiz customization.

Our initial stakeholder interviews and surveys also posed as valuable metrics for bridging the problem and solution space. We found that there is a lack of study guides, a centralized place to access course materials, and overall collaboration with students, which were big concerns for a lot of students in UW courses. Many students also mentioned that they use memorization tools such as flashcards and quizlet frequently to study for exams. As for course resources, lectures are a valuable tool for information but can be overwhelming to study with, while group discussions are insightful and enjoyable. Additionally, most students use tools like Notion or Google Docs to take notes.

Personas

Nate (Freshman student at UW in Math 124)

Nate is in his first quarter as a college student at UW. He is a direct admit to engineering but is exploring his options to decide on a specific major. This quarter, he is taking his first math class at UW, Math 124. This is more challenging than his high school math courses, and he is already feeling overwhelmed with the content. After only rereading his notes for the first exam, he performed poorly and realized that he needed to plan better in order to pass his exams. As a new student at UW, he also doesn't know anyone in the 200-person lecture. Nate wishes he could make friends in the class so he can study with them, which would be a big motivator to achieve better study habits. He tried participating in his course discord channel, but it was not very active and he was overwhelmed by the complex questions that students were asking. He felt behind and alone in his struggles, without a way to connect with his peers over the class content. Nate's overall goal is to start building a network of peers, as he knows he will be seeing the same students in his classes that are pursuing engineering degrees as well. He wishes there was a way to start making those connections and form a sort of community within his large classes at UW.

Samantha (Sophomore student at UW in Bio180)

Samantha is a sophomore at the UW. In her two years at UW, she has taken quite a few pre-requisite classes to get into her desired major, which is Biology. Samantha has made friends in these classes, but they struggle to get work done together since they all have different study habits and are thus at different stages in reviewing the content. In Bio 180, Samantha and her friends use the practice quizzes that their professor provides, but it isn't comprehensive enough for what is actually on the exams. Another issue is that Samantha isn't good at taking notes, so there are gaps in her knowledge. Thus, she wishes there was a way she and her peers could combine their notes and study habits so they are all confident that there are no gaps in their studying and are all able to pass their exams. As Samantha is trying to get into the Biology major, she has a lot of pressure to perform well on her exams. Her goal is to be in the top 10% of her classes, including Bio 180. However, as it is a large class filled with similarly-motivated students, she feels overwhelmed in her efforts to compete. She wishes there was a way she could plan out her study methods so she always feels prepared and is less anxious when it comes to taking exams.

Solution Approach / Key Features

Our approach involves three key concepts:

- Integrating AI into learning creates a tailored experience for each student
- Enabling students to connect and collaborate to foster a welcoming learning community
- Allowing students to upload their notes along with their peer 's notes to create study material that is both relevant and cohesive

To achieve this, our platform HuskySync includes the following key abilities.

- Browse for different study quizzes for a given class
- Sign up for an upcoming quiz, or create and schedule a quiz
- Upload documents to a generate quiz content
- Customize quiz by setting a time limit, number and type of questions
- Take a generated quiz live with other students registered for quiz
- Chat with other students while taking the quiz
- View quiz results and leaderboard

User Testing and Validation

To validate the concept of our product and improve the design we conducted two rounds of usability testing after analyzing research from interviews and secondary research. In the first round of usability testing, we determined that we needed to simplify the user experience of creating and joining a quiz. While customers navigated the website effectively, there were many steps they had to go through. We found that the interviewees were engaged with the solution and

found it to be a ‘creative’ approach to efficient studying. We used our second usability test to validate our new and more simple workflows. We also wanted to validate the color scheme and how customers felt about our high-fidelity prototype. From this testing, we reorganized some page tabs and made the pages more aesthetically pleasing.

Ethical Considerations

We understand that privacy may be a concern while using our platform since we ask that users upload their personal study documents. To address this, we have a privacy acknowledgment on our ‘Learn More’ page. We use the uploaded study documents solely to generate quiz questions that are presented to all users registered for a specific quiz. The documents are not used in any quiz that it is not uploaded to. The study documents are uploaded to an S3 bucket which is not publicly accessible. Our algorithm takes in user notes data and passes it into the LLM we are using, Together AI, to generate a few questions on those topics. This process will minimize the AI bias concern that arises when using algorithms.

Next Steps Beyond Capstone

1. We plan to fork the repository to allow other developers to keep working on this product as an open-source project but we also would like to develop our version.
2. Use the handoff document to successfully transition an incoming capstone group
3. In our version of the repo, we will continue refining the front-end aesthetics and increase the group quiz capacity to 10 people instead of the current 5
4. Possibility for future teams to expand database to more courses as well as expand user base to UW professors