Education Tool for Students

Technical Report
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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Significance

In the last century, education became public and institutions were formed to carry out standards, regulations, and practices for the majority of the population. With the explosion of technological development in the last quarter-century, these institutions made decisions on which technologies to include and exclude. As we move into the 2020s, more integration of technology in the form of online software can be expected. The potential upsides of software are always present but it can be simultaneously exclusionary, ineffective, and a nuisance to the students that rely on them. For example, throughout our learning experience since online learning temporarily replaced in-person meetings, we have noticed that for Office Hour, every class uses different platforms such as Slack, Zoom, Discord. Additionally, those platforms are not sufficient for an office hour queuing meeting because they lack the strong queuing system to match students with TAs, and thus resulted in situations such as meeting multiple teaching assistants reaching out to one student whereas it should usually be one TA to one student. Moreso, technological developments seem to focus on shifting power to obscure parties unknown to the majority of students and faculty. Thus is it the responsibility of future and current software designers like myself to make systems that democratize and distribute power to students and faculty.

Through the implementation of educational tools that empower students and faculty, one can start and be part of a technological culture shift that can inspire and influence other software designers. Thus my technical work is dedicated toward making such tools and distributing them to schools.

Technical Project

My teammate and I have decided on building a suite of products focused on empowering students and supplementing how students succeed in and out of the classroom. Initially, we planned to make one application. However, we saw ourselves capable of building multiple applications and saw the need in our communities for their development. We both had the experience of being TA's, being students, and being immigrants. Through our perspective, we sought to resolve the challenges that we experienced and prevent future struggles for students. While simultaneously, ensuring that its access and customization are suited for each individuals' needs.

Through reflecting on our own experiences, we found three situations where learning becomes bottlenecked and inefficient. First, online platforms and tools are becoming prevalent due to COVID-19, we found online learning to be inefficient or ineffective with some existing tools. In particular, Office Hours at the University of Virginia is somewhat ineffective with the existing software platforms such as Slack or Discord. Secondly, my teammate, Pablo, and I both are immigrants and we desire to learn English as efficiently or effectively as possible. Furthermore, according to Harvard Business Reviews, reading makes a person more effective in leading others, increases verbal intelligence, makes a leader a more adept and articulate communicator. Therefore, My partner and I came up with an idea that helps with reading experience. Last, we found reviewing exams tedious and inefficient. One of the reasons why is that exam questions and answers are distributed over different files and students often have to open both and navigate between different files. Therefore, we want to come up with a website that makes exam reviewing more efficient. All in all, the three products we are focused on creating are called Q-Dispatch, Word Assistant, and Practical Exams.

Q-Dispatch

Q-Dispatch is an application intended to facilitate queueing for instructor/TA office hours through logging each help request from students, removing the cognitive overhead of tracking where students are in a queue and facilitating student collaboration. The way that it works is by having an instructor who is interested in adopting the platform upload their class rosters and assign TAs. Every person added to a class is considered a member including the instructor. Each member that the instructor adds, is either designated as a “student”, “TA” or “co-instructor”. Now the instructor(s) would create an office hour schedule and assign the relevant TA's to their hours. When office hours begin, a student can go to the class website and are able to create a help request, which includes the fields of a topic and a description of the problem that a student needs help on. Additionally, students are able to view where they are in the queue once they send the request so that they can estimate how long they will have to wait until the TA reaches out to him or her. Additionally, we offer a grouping system where students with similar problems have the option to allow other students to join ongoing TA sessions and thus group them together to save time for TAs. Last, with the information collected by our analytic softwares that collect the kinds of problems students tend to have in a class, it allows instructors or TAs to see the types of problems that students are struggling with and update the curriculum accordingly. Due to the COVID-19, we find this application has utility in how online sessions are being conducted.

Word Assistant

Word assistant is a chrome extension and mobile application intended to help international students and domestic students comprehend English material by focusing on

understanding vocabulary. As immigrants, my teammate and I struggled with understanding the English language in the U.S. Due to our limited vocabulary, every question posed a challenge to not only understand the question but the words constituting its makeup.

For the mobile app, the method in which it functions is by hovering one's camera over words which are confusing and extracting the definitions of the words in English or the users' native language. Once a word is selected it has the option to be saved to a dictionary where students can look up their words later. With those saved words, it allows us to create a quizlet for our users where we can randomly test users with the vocabularies that a user has recorded.

With the chrome extension, we can achieve a similar function but for browsers. This can be useful as students can now better understand questions without having to consult online dictionaries. With the chrome extension, there is one more feature that students can use and that is a class crowdsourced dictionary of terminology relevant to the course. With a dictionary of that kind, students can better understand and work through problem sets with less misuse of terminology and more fluency of the subject. This can be done through having instructors upload a class roster which can then be used to restrict who can see the terminology for that class.

Practical Exams

Practical Exams is a website where students can more effectively review material through questions given by instructors or generated questions. The application requires instructors to upload class questions, quizzes, and prior/practice exams. In addition, questions can be recommended to students based on previous answers and time passed. An eventual goal was to be able to generate questions with a large dataset of questions and answers. We intend to do the

above through natural language generation algorithms if possible. However, our primary goal is to better allow students to self evaluate in preparations for final exams.

Reference

Coleman, J. (2018, December 20). For Those Who Want to Lead, Read. Retrieved from https://hbr.org/2012/08/for-those-who-want-to-lead-rea