Title

Building a backchannel communication platform designed for Q&A in lectures and big classes and exploring its effects in augmenting the classroom experience.

Advisor

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Abstract

Present-day classrooms are repleted with technology. Specifically, the application of technology to establish backchannel communication is becoming prevalent in modern classrooms. Backchannel communication is a secondary electronic conversation that takes place at the same time as a conference session, lecture, or instructor-led learning activity [1]. While the application of backchannel communication can take different forms based on the environment, technologies and applications used, the goal remains consistent: allow for a more intimate discussion-based experience where the participants can comment and ask questions without interrupting the speaker or instructor. One of the most significant applications of backchannel communication in education is motivating students to ask more questions. There are several factors that hamper students from asking questions during class including shyness, intimidation, and fear from seeming less intelligent than their peers. For my project, I will seek to build a platform modeled with a focus on the function of backchannel communication in the classroom and how to utilize it to facilitate asking questions and enhance education. While there are other platforms that allow students to ask questions such as Piazza, a backchannel communication based model allows for a more in-depth classroom experience during class rather than after the class had disbanded.

Proposal

For my senior project, I am interested in exploring the application of technology to augment the classroom experience. I’m specifically interested in a platform that focuses on optimizing Q&A in lectures and bigger classes. There are a few tools that achieve backchannel communication such as Harvard’s Berkman Question Tool [3] and Purdue’s Hotseat [2]. However, neither emphasizes the classroom in particular. Hotseat has no questions ranking system to present the questions to the instructor in order of priority.
At the same time, Berkman Question Tool has a questions ranking system, but it has no option to down-vote a question, leaving room for bullies and inappropriate commentary to find its way in discussions, which is one of the main drawbacks in current applications of backchannel communication [1]. For the aforementioned reasons, I aim to create a platform that can serve as a foundation for classrooms and have the potential to be further developed into a hub for data related to education and scholarship where several data analyses can take place to give us more insight into the classroom experience. Furthermore, the collected data can provide instructors with valuable and unbiased feedback to gauge students’ understandings and confusions. My project will allow students to ask questions anonymously, which will motivate them to ask more questions and ward off shyness and other reasons that prevent them from engaging the classroom. Accordingly, issues of bullying and inappropriate commentary will be penalized by allowing questions to be up-voted as well as down-voted.

**Plan**

**Technology Stack Review: 2/8/18 - 2/21/18**

Conduct a thorough review of MongoDB, Express, React, Node.js (MERN) as well as how to implement a backend server using WebSockets which provides a seamless UX when multiple students are posting questions at the same time.

**Authentication and Privileges: 2/21/19 - 3/7/18**

Implement backend server and connect it to a database server. Design preliminary relational database schema. Configure WebSockets to work with the backend server. Configure user authentication for students and professors with different privileges. Enforce different validations to ensure that only students from the same university as the instructor can interact.

**Implement API and database: 3/7/18 - 3/21/18**

Design the full relational database schema. Implement tables and relations in the backend server. Build API and configure routing to allow CRUD (create, read, update, delete) operations. Initialize test suite and write tests to ensure the database endpoints are working as intended.

**Design and Implement User Interface: 3/21/18 - 4/4/18**

Design and draw mock ups for the instructor view and the students view. Implement the landing page and the different pages for instructors and students. Instructors view will allow them to start a new class session, invite students to enter the sessions, and to access questions from the questions queue in order of priority (votes). Students will have the ability to join sessions, post questions, and vote. Implement WebSockets on the frontend to update all students when new questions are posted or votes are cast. Frontend design should be simple and easy to use to allow students to ask questions seamlessly without distraction.
Session key and Security: 4/4/18 - 4/11/18

Implement a security feature to allow instructors to generate a key necessary to log-in the class session to prevent unwanted access.


Build test suite to ensure the features are working properly. Write a report about the technical choices taken and the problems faced while building the platform. Deliver a presentation showcasing the features of the project and the directions it can take in the future.

Deliverables

- User Authentication and Access Privilege Management
- Database schema and implementation
- Live ratable questions platform
- One-time pass key to limit access outside the classroom
- User testing
- Collect feedback from professors
- Security
- Demo

References

[1] EDUCAUSE Learning Initiative (ELI)
   https://library.educause.edu/resources/2010/2/7-things-you-should-know-about-backchannel-communication

[2] Purdue University
   https://www.itap.purdue.edu/learning/tools/hotseat.html

[3] Harvard University
   https://cyber.harvard.edu/node/99127