Effectiveness of Class Response Systems: A Perspective of Student Experience

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Introduction. The use of educational technology in higher education classrooms has grown as a strategy for increasing student involvement in an active learning environment. Traditionally, instructors use oral questioning and answering to engage students actively in classroom. Students are asked to either answer the questions verbally or write down their answers on pieces of paper. However, interactions between students and instructors are limited due to factors such as students' hesitation to speak up in class and limited in-class Q&A time (Draper & Brown, 2004).

Previous studies suggested that Classroom Response Systems (CRS) can improve student learning outcomes by enhancing student engagement with course contents, instructors, and student peers (Bartsch & Murphy, 2011). CRS are pedagogical technology tools that allow instructors to collect and analyze a large number of students responses, display aggregated results with students and identify misconceptions in real time. CRS come in a variety of forms, of which many require purchasing an electronic hardware such as Clickers and can only be used during class. In recent years, there are a number of web-based technologies including poll everywhere (https://www.polleverywhere.com/), socrative (http://www.socrative.com/), kahoot! (https://kahoot.com/), just to name a few (Bakonyi & Illés, 2018).

Top Hat is an all-in-one teaching and learning platform that has been widely used in higher education classrooms (Wismer, Dosse & Barry, 2021). It can be used to administer attendance, present slides, ask in-class questions, create interactive textbook, and assign quizzes (https://tophat.com/). Instructors can use Top Hat to get a sense of students' understanding in real time by interspersing interactive polling, questions, and discussions between slides, allowing students to respond using their device of choice. Student responses can be recorded anonymously or by individual name. Once students respond to the live questions, the platform will automatically generate graphs that illustrate the distribution of students' responses. Instructors can then use the feedback to understand how well the students understand the course materials, identify misconceptions, and make needed adjustments accordingly. Top Hat can be used for both in-person and online instructions and can be seamlessly integrated with all major LMS platforms, including Blackboard, Canvas and Moodle.

Statement of Purpose. Student engagement is a critical component of teaching and learning in higher education. While CRS are designed to improve student learning outcomes by strengthening the interactions between students and instructors via its immediate formative feedback function, there is a lack of assessment of CRS effectiveness, especially from the student perspective. The purpose of this study is to assess the effectiveness of Top Hat by collecting empirical data from students who are currently using the platform. Results from this study could lend meaningful reference to colleagues in their adoption and implementation of Top Hat or other CRS in their classes.

Methodology. Top Hat was adopted in a large sophomore level fashion merchandising class at a large northwestern university in the U.S. in the spring semester of 2022. Top Hat was integrated into students' learning experience including take attendance, interactive polling questions and discussions between lecture slides, and monitored tests. To gain the insights of student experience of using Top Hat, a semi-structured survey was administered with students enrolled in the class via a Google Form at the midterm of the semester. Questions were focused on three aspects of student experience: satisfaction, positive experience/benefits, and concerns.

Findings and Discussion. A total of 31 students participated in the survey. Overall, the results showed that students were satisfied with the use of Top Hat and suggested continuing use in future classes. Students highlighted three main benefits of using Top Hat in their class, including enhanced interaction, increased student engagement, and fun and enjoyable learning environment. Students also acknowledged other features such as easy to follow lectures, easy to navigate, easy to take attendance, and convenient for taking exams online.

Enhanced Interaction. Majority of the respondents stated their appreciation of enhanced interactions in class accredited to the real time polling questions and discussions. Students commented "*in-class questions and activities keep me engaged*", "*the multiple-choice questions between slides is a good way to participate in class*". Studies showed that students normally lose attentiveness after 10-18 minutes of passive lecturing (DeBourgh, 2008). Creating interactive questions and discussions between slides will help students keeping up with course materials and staying engaged throughout the whole class time. In addition, discussions of wrong answer choices not only help students reinforce key concepts and increase their comprehension of course material, but also provoke further class discussions, hence promoting active learning.

Increased Student Engagement. There was a consensus among students that the anonymity feature greatly increased their engagement in class activities, such as responding to

polls and providing comments. As students stated, "*I won't feel embarrassed if my answer is wrong*", "*It's anonymous so there's no judgement if you get the answers wrong*".

  Fun and Enjoyable Environment. In addition to those more "function" related positive experience, students commented that Tot Hat was fun to use. Students mentioned that "*I am excited when the website showed statistics about the answers immediately and presented them in various formats*", "*complements the lecture with interesting activities*", "*posed questions and activities make the lectures more interesting*".

In terms of concerns, cost was the most often mentioned disadvantage. While the platform is free for instructors, students have to pay $30 per semester ($48 per year) to gain full access to the course. If students are enrolled in multiple courses that use Top Hat, they only need to purchase one subscription to access all courses for the semester/year. Similar to most online applications, technical glitches and connection errors were mentioned as other issues with Top Hat.

Conclusion. In summary, this study provided empirical evidence to the effectiveness of using Top Hat in a fashion merchandising class from the student perspective. The identified positive experience may provide meaningful reference and motivation for colleagues in their consideration of adopting Top Hat or other CRS in their classes. However, the results of this study are based on inputs from students who are at their earlier years of their curriculum. The experience of juniors or seniors might be different due to the nature of higher-level courses as well as their accumulated foundation knowledge in the field and more independent and self-driven motivations toward their study.

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