Uneven Participation in Classroom Response Systems (CRS)

Executive Summary

There is an assumption in the western world today that there is universal access to the internet and computers. This assumption applies to those within the education system, such as university students. Increasingly, instructors are using technologies like classroom response systems (CRS), such as the online program Top Hat, as tools for teaching and evaluating. These CRSs are meant to promote participation and interactivity within a classroom to help students excel. Why is it, then, that there is uneven student participation in classroom response systems at the university level?

Students have found these response systems to be engaging and effective tools for learning. They help students overcome certain barriers which normally restrict their participation. However, if students can not access these programs due to technological issues, they are unable to participate. Thus, the use of a classroom response system becomes obsolete if students can not access or utilize the platform. Based on our research and findings, we have created a list of recommendations for instructors and administrators of educational institutions. These suggestions should be used as preventive measures to make sure everyone has an equal opportunity to participate in class.

Recommendations for Instructors:

1. For on campus classes, use classroom response systems as a teaching aid, but not as a form of evaluation.
- Promotes interactivity and performance of students.
- Eliminates technological risks for impacting marks.
- Those who are anxious have an anonymous platform to participate.
- This will create a classroom environment that welcomes multiple forms of participation so that no one is excluded.
2. Organize an in-class "how-to" workshop for the program being used at the beginning of each semester. This eliminates uneven proficiency which leads to uneven participation.

Recommendations for Administration:

3. For subscription based classroom response systems, set up a sign up system through the University bookstore. Those who cannot pay via online can do so through registering at an in-person kiosk with cash or card.
4. Improve WiFi on campus and improve awareness of on-campus technical support.

In lectures, or courses where the professor teaches with electronics (where you can anonymously participate through platforms like Top Hat) how likely were/are you to participate?

Unlikely to participate	0	0 %
Slightly less inclined to participate	2	5 %
Neither more likely or less likely to participate	6	14 %
More inclined to participate	20	45 %
Much more likely to participate	8	18 %

Table 1: Visualization of uneven participation through CRSs (Source: in-class survey).

1. Description of Problem

Why is student participation in online response systems uneven given the assumption that students have "universal access" to computers and the Internet? For our research purposes, we have defined participation as a student's mental presence displayed through active engagement with an instructor and/or class via instances such as speaking, writing responses, and joining in classroom activities. Previous research suggests that there are many positive outcomes to using classroom response systems such as attendance, performance, and involvement of students. Students have also perceive classroom response systems to be "advantageous to learning" (Healslip et al, 2013, p.13).

Drawing upon first hand experiences with the program Top Hat, as well as secondary sources, our data has shown that these CRSs can help students overcome psychological obstacles such as shyness and anxiety. In this regard, the anonymity and visual aspects of CRSs make these programs a beneficial teaching aid. Comparable to our study, Sean B. Eom, H. Joseph Wen, and Nicholas Ashill examine students' motivation and learning preferences in "The Determinants of Students' Perceived Learning Outcomes and Satisfaction in University Online Education: An Empirical Investigation". This U.S. study concluded that students who regularly contribute to discussions in class continue to participate online; there is also an increase in online responses overall, compared to face-to-face participation.

Another study, "Voices from the Language Classroom", is a collection of qualitative research in English-as-a-second-language education. This examination includes first-hand encounters with students studying abroad, and speaking a different language both in a classroom and online setting. These studies include cases of uneven participation due to factors such as cultural differences. Our secondary research confirms that the use of classroom response systems and their effect on participation have an international scope. These technologies are being used more and more all around the Western World.

Due to the vast benefits of classroom response systems as teaching aids, the uneven participation of students using classroom response systems is problematic for an institution and its pupils. Rudi Volti has suggested that new technologies can "allow the resolution of fundamental problems" (2001, p.45). However, if these technologies can not be used appropriately due to obstacles, these technologies lose their purpose. If students are not able to participate in class effectively with the tools offered, the students may not feel comfortable participating or be able to reach their full learning potential. Our research shows that the most common factors which impede participation of response technologies are those which stem from technological problems. These problems are wide in range. Weak wifi connections, inability to sign up and/or sign in, and lack of program literacy were among the top rated problems reported by students.

2. Methodology

For our research we have gathered both qualitative and quantitative data. We have participated in and observed a second level university class at Memorial University for the Fall 2014 semester. This class made use of the classroom response system Top Hat. Each of us kept a journal which we would write in to reflect on our experience with technology in this classroom. We used our autoethnographies as a means to examine our "behaviors, thoughts, and experiences in relation to others in society" (Chang, 2008, p.1). These journals served as the basis for our research question. We gathered quantitative data by collaborating with the class in an online survey which asked a number of questions about a student's personal experience with classroom technology. We had 39 verified responses from the survey to use in our data analysis. We have also incorporated several secondary scholarly sources to support and contextualize our findings. We acknowledge our study has limitations, such as the size and homogeneity of the class studied. This study is intended as a starting point. In most instances, our findings require further research but serve as a solid starting point which gives insight into the situation.

3. Findings

3.1 Findings for the first recommendation: *For on campus classes, use classroom response systems as a teaching aid, but not as a form of evaluation.*

This first recommendation addresses the instructors, who are thinking about using CRSs, like TopHat, in their class.

3.1.1 Benefits of using classroom response systems as a teaching aid
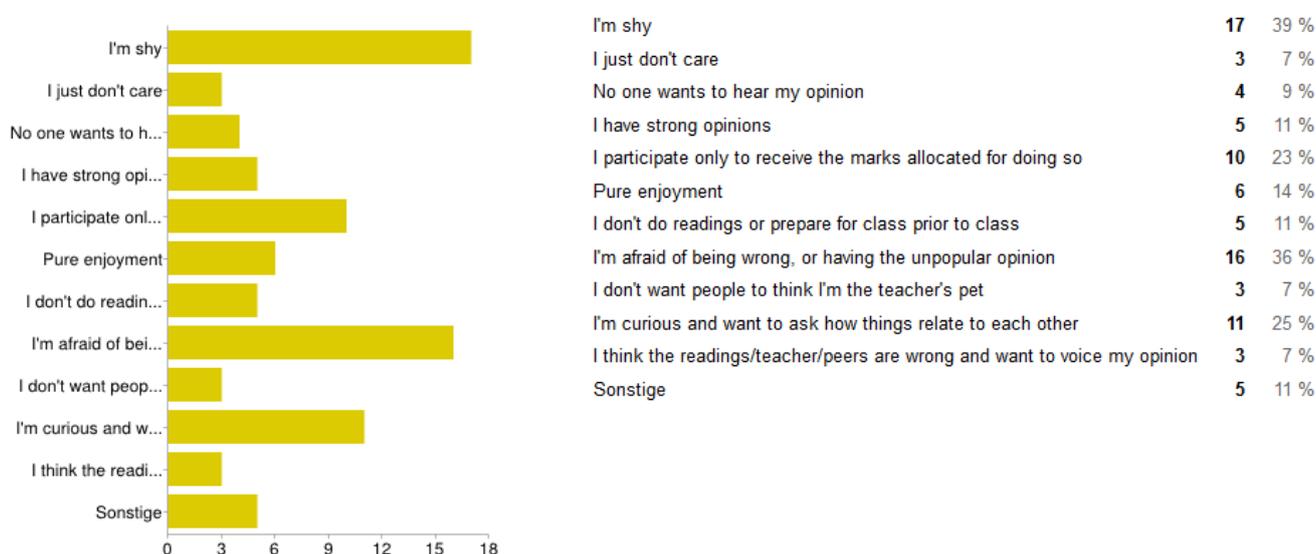
In lectures, or courses where the professor teaches with electronics (where you can anonymously participate through platforms like Top Hat) how likely were/are you to participate?

Unlikely to participate	0	0 %
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Neither more likely or less likely to participate	6	14 %
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Much more likely to participate	8	18 %

The use of CRSs clearly implies many benefits: it promotes interactivity and performance of students. In our survey, 45% of the students were more inclined to participate in lectures, or courses where the professor teaches with electronics (where they can anonymously participate through platforms like TopHat), 18% were even much more likely to participate in this case (see graph above). Especially students, which are shy or anxious and thus unlikely to participate by speaking in class, are more likely to participate anonymously through CRSs. In our survey, 17 students considered themselves to be shy (see graph below). Eight indicated they are more inclined to participate if they have the ability to participate anonymously, and five indicated that they are *much* more inclined to participate in lectures or courses where the teacher teaches with electronics and the students can participate anonymously. Thus there seems to be a strong relationship between shyness and an increased degree of participation when it is anonymous. An extract from a Classroom Technology Journal of a student explains this relationship is very salient:

"I also liked, that the answers [in TopHat] were anonymous. So nobody had to be ashamed of his answers during the whole class. In my opinion this is also the reason why much more students participated in class comparing with the technological-free and the normal-amount-of-technology class. I also participated much more in this class than in others." (Classroom Technology Journal; September 16, 2014).

How would you explain your overall level of participation?

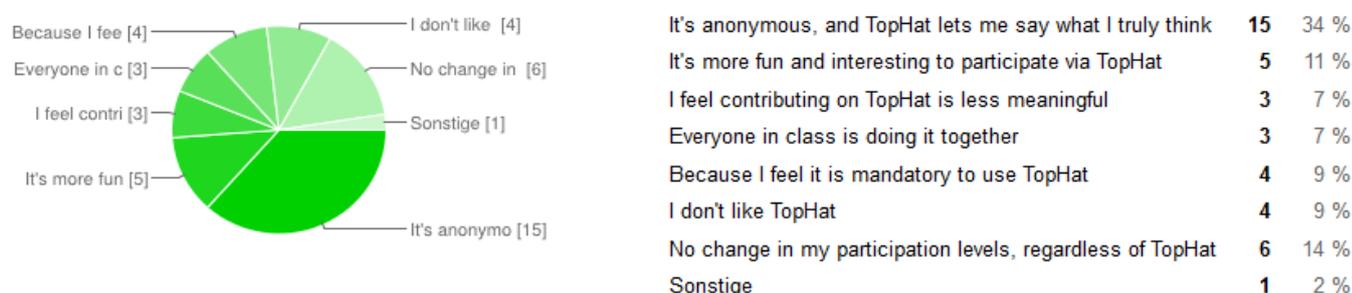|		
I'm shy	17	39 %
I just don't care	3	7 %
No one wants to hear my opinion	4	9 %
I have strong opinions	5	11 %
I participate only to receive the marks allocated for doing so	10	23 %
Pure enjoyment	6	14 %
I don't do readings or prepare for class prior to class	5	11 %
I'm afraid of being wrong, or having the unpopular opinion	16	36 %
I don't want people to think I'm the teacher's pet	3	7 %
I'm curious and want to ask how things relate to each other	11	25 %
I think the readings/teacher/peers are wrong and want to voice my opinion	3	7 %
Sonstige	5	11 %

Moreover, also English as a second language students, are (much) more inclined to participate in lectures where their professor teaches with electronics which allows them to participate anonymously. In our studied class there are nine English as a second language students. Seven of them indicated in the survey that they are (much) more inclined to participate in such lectures or courses. Their reasons for this include for instance statements like "It's easier for me to write something than to speak in class….I feel more comfortable when I can participate through TopHat" and "I think it helps me by taking away the stress of talking in front if everyone and making mistakes". Similar thoughts can also be found in the Classroom Technology Journals:

" . . . I noticed that I am participating much more through TopHat . . . This could be caused by the fact that English is not my first language and when I write something I can think about it. When I have to say something, I feel like I make much more mistakes and that's why I like participating in class though TopHat. Another point might be that the answers in TopHat are anonymous, so it doesn't matter if I make a mistake – no one will know, that it was me." (Classroom Technology Journal; September, 18, 2014).

Although more students are more likely to participate in lectures or courses where they can anonymously participate through platforms like TopHat, 5% of the students in our class are slightly less inclined to participate. An explanation for this might be that some students just don't like TopHat (which applies to 9% of the students studied in this class; see Appendix, Table 3) or that the feel like contributing on TopHat is less meaningful (which applies to 7% of the students studied in this class; see graph below).

If you have a different level of participation in class when using Top Hat, why?

It's anonymous, and TopHat lets me say what I truly think	15	34 %
It's more fun and interesting to participate via TopHat	5	11 %
I feel contributing on TopHat is less meaningful	3	7 %
Everyone in class is doing it together	3	7 %
Because I feel it is mandatory to use TopHat	4	9 %
I don't like TopHat	4	9 %
No change in my participation levels, regardless of TopHat	6	14 %
Sonstige	1	2 %

For this reason we think it might be the best idea to let the students themselves decide whether they want to participate through a platform like TopHat or whether they prefer to participate orally. Professors should try to create a classroom environment that welcomes multiple forms of participation including oral and classroom response systems, so that students may participate in a manner that they are comfortable with. This prohibits to exclude students by unwelcoming a certain form of participation. An extract from a Classroom Technology Journal shows that this type of combination can work quite well:

" . . . we were allowed to use TopHat contribute something, but we didn't have to (we are also allowed to rise or hands and say what we wanted to say) . . . I really liked this combination. On the one hand, shy people could participate through TopHat (which many people did) and the others could just raise their hand." (Classroom Technology Journal; October, 16, 2014).

Despite these benefits we came to the conclusion, that classroom response systems should not be used for evaluation at this time.

3.1.2. Reasons why CRSs should not (yet) be used as a form of evaluation.

The reason why we are not recommend to use CRSs as a form of evaluation is that eleven out of 39 students in the studied class have already lost marks due to an issue with a response system program. The reasons for this were very similar: some students accidentally chose the wrong answer on a TopHat Quiz and could no longer change their answer, others lost a response to a test question and had to retype it in a short amount of time, thus their answer was not as complete as it would have been, and others just couldn't access the Internet, for example due to forgetting the password. Also in the Classroom Technology Journals were some problems with the software TopHat during an evaluation mentioned:
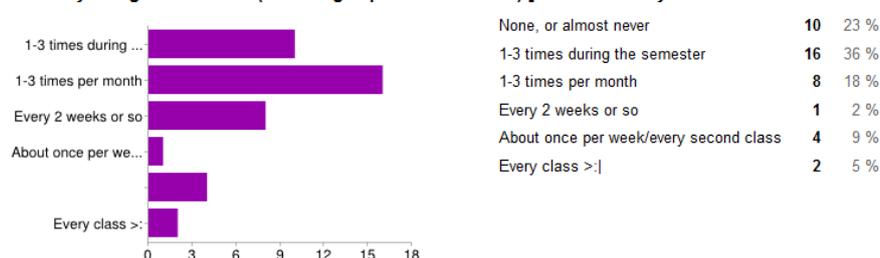
"I just don't like to rely on technology in serious situations." (Classroom Technology Journal; September, 25, 2014).

"I hated taking the quiz on Tophat; I felt distracted, disorganized and unable to concentrate like I normally would for an evaluation. On top of that, the system malfunctioned just as I was about to submit my answer for the final question and I had to rewrite it again which made me more flustered. I definitely prefer paper exams." (Classroom Technology Journal; September, 23, 2014)

Therefore we recommend to use classroom response systems as teaching aid, but not (yet) as a form of evaluation.

3.2 Findings for the second recommendation: *Organize an in-class "how-to" workshop for the program being used at the beginning of each semester.*

Difficulty using the software (including Top Hat connection) [Rate how many times instances of the following effected your learning in tech heavy or hybrid classes:]

None, or almost never	10	23 %
1-3 times during the semester	16	36 %
1-3 times per month	8	18 %
Every 2 weeks or so	1	2 %
About once per week/every second class	4	9 %
Every class >:|	2	5 %

Our second recommendation addresses the instructors as well. From our point of view, an in-class-workshop to introduce the CRS to the students would be very desirable, because many students in our class had problems with the software (see graph above). Moreover in our survey it was 11 times mentioned, that the biggest (felt) barriers of using TopHat were problems with the software itself. Statements were for example "Nervous that it may not work that day we use it to participate", "Answers coming different then the one I selected/meant to select. Could have been human error, but didn't think it was.", and "Trouble logging in and issues with internet/TopHat program itself". We can hypothesize that since TopHat is a relatively new participation platform (launched in 2010), over time these user interface issues will be sorted out. If all these problems with the platform itself will be sorted out, teachers can also think about using TopHat as a form of evaluations, which, at this moment, we would not recommend because of the experienced issues. Anyway we recommend to offer a workshop to even proficiency which is a requirement for even participation.

3.3 Findings for the third recommendation: *For subscription based classroom response systems, set up a sign up system through the University bookstore.*
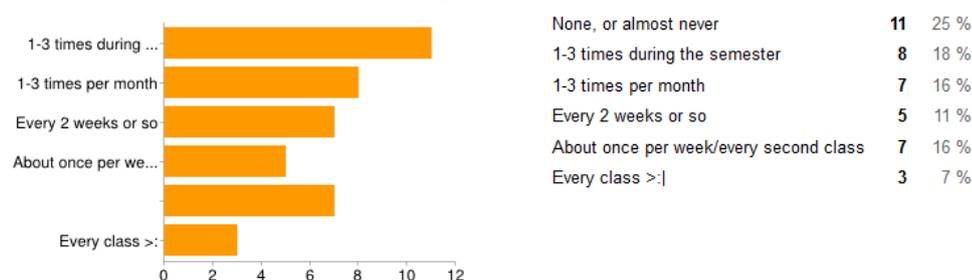
This recommendation refers to technological problems which might occur, if students are supposed to use classroom response systems like TopHat: it should be possible for every student to pay the fees for the classroom response system without owning a certain credit card or the like. Otherwise there is not

the same possibility for every student to participate in class through the classroom response system. In our survey two students mentioned that their biggest barrier was to pay the fees. This is why we recommend that for subscription based classroom response systems, the administration should set up a sign up system through MUN bookstore so that those who cannot pay via online can do so through registering at a kiosk and pay via cash or debit. This way no students are excluded based on payment options.

3.4 Findings for the fourth recommendation: *Improve WiFi on campus and improve awareness of on-campus technical support.*
Besides setting up a sign up system through the MUN bookstore, the administration should make sure that the Wifi on campus works without any problems *before* instructors are using classroom response systems in class. In our survey many students indicated that they had problems with the wireless connection on campus (see two graphs below). Furthermore six students mentioned that their biggest barrier of using TopHat was the problematic wireless connection on campus. This has of course a huge impact on their degree of participation and thus leads to uneven participation through classroom response systems in class.

Wireless connection on computer weak/fails [Rate how many times instances of the following effected your learning in tech heavy or hybrid classes:

None, or almost never	11	25 %
1-3 times during the semester	8	18 %
1-3 times per month	7	16 %
Every 2 weeks or so	5	11 %
About once per week/every second class	7	16 %
Every class >:|	3	7 %

Wireless connection on phone weak/fails [Rate how many times instances of the following effected your learning in tech heavy or hybrid classes:

None, or almost never	9	20 %
1-3 times during the semester	10	23 %
1-3 times per month	5	11 %
Every 2 weeks or so	7	16 %
About once per week/every second class	5	11 %
Every class >:|	5	11 %

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