WORKING PAPER:
ENGAGING AND ACTIVATING STUDENTS THROUGH THE USE OF AN ONLINE STUDENT RESPONSE SYSTEM

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ABSTRACT

This paper report on the author's own experiences with the use of an online student response system, *Socrative*, in a BA-course at the Department of Political Science, University of Copenhagen. The paper shows different ways in which such an online student response system can be used, and it offers some reflections on advantages and disadvantages. Furthermore, student evaluations of the use *Socrative* are highly positive, across different personality types and levels of academic skills.

INTRODUCTION: WHY USE AN ONLINE STUDENT RESPONSE SYSTEM?

During the last decade or so, a wide array of different technological tools that can be used to engage students actively have become widely available to teachers at universities and other educational institutions. This paper reports on the author's experiences and findings regarding the use of one of these tools, *Socrative,* in a BA-level course on political science.

Socrative is a browser-based piece of software that allows the teacher to pose closed- and open-ended questions during lectures (or at other times), which the students can then answer instantly, either by choosing among multiple choices or by writing short answers. Students' answers, which can be anonymous, can then be summarized and shown instantly to the class. This software has traditionally not been used at the Department of Political Science, University of Copenhagen. Based on the findings from educational psychology, and the author's previous experiences there were, however, several factors speaking in favor experimenting with this software: at the most general level, the motivation for using an online student response system is the well-established finding that efficient learning is, to a very large degree, the same as *active learning*, i.e., instructional methods that engages students in the learning process (Prince, 2004). As noted by John Dewey almost 80 years ago, students *"learn what they do, and not what we tell them"*(Dewey, 1938). While the benefits of active learning are obvious, it is often less obvious as a teacher *how* to active students. Traditionally, much of the teaching at the department tries to activate the students by asking questions orally during lectures. While this may, to some degree, be seen as an approach fostering active learning, this use of oral questions have, in the author's own experience, some significant drawbacks:

One of the major drawbacks is that a large share of students will be reluctant to answer questions orally. This reluctance is problematic, first, because their reluctance to speak up may make them less actively involved. In other words, for a large part of the students, asking questions orally may not function as a way of active learning. Second, the students' reluctance to answer questions is difficult to interpret as a lecturer since student reluctance may be caused by a number of very different factors, e.g., general lack of motivation, shyness, questions that are too difficult or questions that are too easy.

Furthermore, the minority of students that *do* answer questions orally are in all likelihood not a representative sample of the entire class. Hence, even when given answers to a question, the lecturer still cannot infer from this answer whether the rest of the class has the same knowledge, whether others could have provided a better answer or whether the silent majority is completely ignorant on the issues being taught. As argued by Bonwell (1999), *"Whatever the technique, the instructor should actively and frequently determine if students understand the material*

that has been presented" (Bonwell, 1999), but oral questions is simply not a very efficient feedback mechanism, at least not compared to an online response system.

Online response systems such as *Socrative* can to a large degree be regarded as the second generation of "clickers." In the first generation, clickers were small, handheld devices, that students were distributed or expected to buy themselves (For examples of such devices, see Damron & Mott, 2005). Besides these handheld "clickers," many of these first-generation systems also required special receivers, software etc. In contrast, *Socrative* is simply a piece of browser-based software that can be used by lecturers and as students as long as they have a laptop, smartphone, tablet, or another gadget with internet access. The software is available, free of charge, at www.socrative.com. Evaluations of different clicker systems have generally, shown good results: use of clickers seem to increase student involvement and, thereby also increase learning, and students are generally quite positive when evaluating the use of clicker technology (Caldwell, 2007; Damron & Mott, 2005; Trees & Jackson, 2007).[1]

The aim of the project described in this paper was twofold

1. The first aim of the project was to explore the potential of *Socrative* in a specific course, *"Theories and Approaches to Politics,"* taught at the second semester of the BA. Hence, in a relatively exploratory approach, the project aimed to investigate;
    a. *How* Socrative could be used in this course, e.g., what kind of questions could be posed?
    b. *W*hether there were *technical issues* that made the use of Socrative problematic
    c. Whether student in the course would *evaluate* the use of Socrative positively.
2. The second aim was to move beyond the current literature on clickers, by investigating whether the students' evaluations of *Socrative* were contingent on personal traits of the students. Specifically, the project aimed to investigate whether students that were low on extraversion would be more positive towards the use of *Socrative* than students high on extraversion. While previous studies on clicker technology have observed that traditional oral questions may appeal more to extroverts (Damron & Mott, 2005), none of the studies have investigated whether this means that introverts are relatively more positive about being given the chance to answer questions online. Hence, this project investigated whether evaluation was contingent on the students' self-placement on an intraversion-extraversion scale. As a supplementary analysis, the project also investigated whether evaluation of *Socrative* was contingent on the students' general academic skill level (measured as high school GPA).

[1] Other examples of online student response systems are Shakespeak (www.shakespeak.com) and AnswerGarden (www.answergarden.ch)

THE CONTEXT: TEACHING THE BASICS OF POLITICAL SCIENCE

The course *"Theories and Approaches to Politics"* is a mandatory course taken by the BA students at the Department of Political Science during their second semester. The course is taught in classes of approximately 45 students, two hours each week for twelve weeks (furthermore, there are weekly lectures for all the 275 students taking the course, but *Socrative* was not used in these lectures). The author taught two different classes throughout the entire semester

The aim of the course is to introduce the students to political science "fundamentals." It deals with political processes, structures, actors and norms in Denmark and in other countries. The course focuses particularly on issues, concepts and theories regarding political power, democracy, separation of powers (legislative, executive and judicial), interest groups, voting behavior, political participation, political identity, social classes and political mediatization. The course is, in other words, to a large degree, focused on what Meyer and Land (2005) have termed *"threshold concepts,"* i.e. concepts that are necessary to any student aspiring to master a given subject (Cousin, 2006), in this case, political science.

EXPERIENCES AND LESSONS: HOW CAN *SOCRATIVE* BE USED IN POLITICAL SCIENCE?

During the semester, I used *Socrative* in a number of different ways. In this section, I describe different uses of *Socrative* and provide my own observations and reflections on the advantages and disadvantages to the specific types of questions:

1. ***Evaluating student retention***

   In some instances, multiple-choice questions were used to perform a check on the students' retention of specific information for certain texts. For example, students were asked the following question on factors supporting democracy:

> ***What factors are NOT seen as essential to the development and preservation of democracy according to Dahl (1989)?***
> ***□ The values of the political actors***
> ***□ The climate of the state***
> ***□ The military***
> ***□ Modernity***
> ***□ Christianity***

In order to increase the degree of difficulty, similar questions were sometimes asked as open-ended question. In general, however, it was, however, my own experience that these questions did not necessarily do much to active the students. Students did answer the questions, and thereby provided information on their retention of knowledge, but generally, such question did not necessarily lead to much additional student activity

2. ***Asking students about gaps in knowledge and understanding***

At the end of a lecture, students were sometimes queried about their self-perceived gaps in knowledge and understanding. For example:

> ***Do you have any questions regarding Dahl (1989) that have not been addressed in today's class?***

And:

> ***Is there anything from today's class that you did not understand or that you would like to have elaborated?***

Similar to question type 1, these types of question worked as feedback to the teacher, but they were posed at the end of classes. However, a disadvantage to such questions was that some students would write quite elaborate comments, including references to several other theories, texts etc. In many instances, it was not possible to answer all these questions in the following class, which may frustrate students asking questions that are left unanswered.

3. ***Evaluating students' ability to apply and discuss concepts***

Mostly, *Socrative* was used with open-ended question in which the students were asked to apply specific concepts. For example:

> ***Provide an example of a situation where an actor's actions are guided by a "logic of appropriateness" rather than personal interests/gains***

And:

> ***Provide an example of how the existence or particular design of a specific institution can be explained by "path dependency"***

In general, students' were given 2-5 minutes to discuss these answers in small groups (2-3 students), before answering on *Socrative*. Subsequently, the answers given by the different students were discussed by the entire class with the lecturer as moderator. My personal

experience was that these questions worked very well in activating the students: the student discussions that preceded their answering on *Socrative* were focused, and the subsequent class based discussions also tended to involve a very large share of the students. These positive experiences lead to the use of *Socrative* as a pure "discussion starter" as described below:

4. *Using Socrative as a discussion starter*

In some instances, students were asked to provide a yes-or-no answer to a specific question without prior discussions, for example:

> ***Does the "Urban-Rural cleavage" play a role in extant Danish politics?***
> ***□ Yes***
> ***□ No***

There is no obvious correct answer to this question. Arguments can be made for both answers, and one might therefore question the wisdom of posing such a simplistic question on *Socrative*. However, the intent behind such simplistic questions was to active the students in two ways: First, by forcing students to take a position and thereby engage more actively with the question/literature. Second, showing students that both answers ("yes" and "no") had been used by a substantial share of their class mates, students should become less nervous about arguing for the "wrong" answer. In other words, posing simplistic questions to which there were not necessarily a correct or simple answer, should make it easier for students to engage actively in a class-based discussion. It is, of course, difficult to perform a systematic evaluation of the effect of such question, but the general impression was that the questions served their purpose very well (also, see student evaluations below).

5. *Preparing students to prepare*

A vital part of student activity is the students own preparation before classes. In order to support this preparation, an potentially fruitful approach is spend the last part of a lecture by introducing the subject of next week's lecture (Müllen, 2010) . This was sometimes done by posing a question on *Socrative* related to the following weeks reading. For example prior to classes on theories about rational choice, students were asked the following question, which can be used to illustrate a number of point regarding bounded rationality, strategic behavior etc. (Øvlisen, 2009)

> ***Pick the number between zero and 100 (both these numbers are allowed picks) that you think will be closest to two thirds of the mean of the numbers picked by all players. Your number does not need to be an integer. If several people pick the winning number, the price will be split among them.***

Student were extremely curious about the answer to this question and the subsequent class, in which the winning answer was revealed, was marked by an extreme degree of student involvement in discussion – and downright excitement about questions regarding the subject.

STUDENT EVALUATIONS: SOCRATIVE WORKS!

During the last class of the semester, the students were given an anonymous survey on the use of *Socrative*. The questions were generally meant to tap the student's own assessments of the effect of *Socrative*. While this setup naturally does not allow for at strict causal test on the effects of *Socrative*, it does arguably provide us with some indications (The course was also taught by other lecturers, but comparing learning outcomes across classes would not really tell us anything about the effect of *Socrative*, as lecturers and students, of course, differ on a host of, partly unobservable, characteristics that may affect learning outcomes). The questions in the survey were inspired by previous surveys on the use of clickers (Caldwell, 2007; Damron & Mott, 2005; Evans, 2012; Satheesh, Saylor-Boles, Rapley, Liu, & Gadbury-Amyot, 2013; Velasco & Çavdar, 2013). All questions were answered on five-point Likert-scales, ranging from "Strongly disagree" to "Strongly agree." In the table below, "strongly disagree" is given the value of 1, while "strongly agree" has the value of 5.

Question [Danish original in brackets]	***Mean***	***SD***	***Min***	***Median***	***Max***
The use of Socrative meant that I participated more actively than I would have done otherwise *[Brugen af Socrative betød, at jeg deltog mere aktivt i undervisningen end jeg ellers ville have gjort]*	3.9	0.9	1.0	4.0	5.0
Answering questions on Socrative is a good way to start a discussion in class *[Besvarelser af spørgsmål på Socrative er en god måde at indlede en diskussion på holdet]*	4.5	0.5	4.0	4.5	5.0
Knowing that other students have given the same answer as me on Socrative makes is easier to participate in subsequent class discussions *[Når jeg ved, at andre har svaret det samme som mig på Socrative, har jeg nemmere ved at deltage i en efterfølgende diskussion på holdet]*	3.2	0.9	1.0	3.0	5.0
The use of Socrative makes the course more interesting *[Brugen af Socrative gør undervisningen mere interessant]*	4.1	0.7	2.0	4.0	5.0
The questions on Socrative helped me understand the literature *[Spørgsmålene på Socrative hjalp mig med at forstå den litteratur som vi gennemgik]*	3.4	0.7	2.0	3.0	5.0
The questions on Socrative was a good way of using the theories and concepts we were taught *[Spørgsmålene på Socrative var en god måde at anvende de teorier og begreber, som vi lærte om]*	4.0	0.6	2.0	4.0	5.0
We have spent too much time on Socrative in class *[Vi har brugt for meget tid i undervisningen på Socrative]*	1.9	0.6	1.0	2.0	4.0
I think that Socrative should be used for other courses *[Jeg synes, at Socrative skal bruges i andre fag]*	3.9	0.7	2.0	4.0	5.0
Overall, the use of Socrative has worked really well *[Generelt synes jeg, at brugen af Socrative har fungeret godt]*	4.4	0.5	3.0	4.0	5.0
It is cumbersome to use Socrative *[Det er besværligt at bruge Socrative]*	1.4	0.5	1.0	1.0	2.0
I think that the use of Socrative has had the effect that I have learned more in the class than I would have otherwise *[Jeg tror, at brugen af Socrative betyder, at jeg har lært mere i faget end jeg ellers ville have gjort]*	3.3	0.8	1.0	3.0	5.0

n=60-62

As shown in the table above, the students were generally very positive toward the use of *Socrative*. The students generally agreed that the use of *Socrative* had made them more active, made the course more interesting, helped them understand theories and concepts, and overall worked really well. Open-ended comments in the survey also indicated general satisfaction with the use of *Socrative*

Open-ended Comments in Evaluation:
Super fun feature. Keeps you alert
It has been a good way to start discussions in the buzz groups.
A very effective and easy platform for brief class discussions :)
Cool way to activate everyone!
It is fun
Works well to get a discussion going, but bad for a test tool or something where you have to explain a theory. Especially good for complex and personal attitudes
I think the program works really well and that we can successfully transfer it to other subjects. However, I have a hard time seeing it used in economics.
A good way to get different perspectives / attitudes
Socrative work well when it is a question where you can offer a lot of different answers (so you save time on a long Q&A session and discuss the most interesting answers). It does not work as well when the yes / no questions are asked
I think that it works well, in part because you manage to use it in an exciting way. Can easily see that it could also work in other subjects, with the proper adjustments

Furthermore, the students generally *disagreed* with statements saying that we had spent too much time on *Socrative* and that *Socrative* was cumbersome to use. Finally, most students agreed with the statement "*I think that Socrative should be used for other courses"*

As stated in the introduction, student evaluations of Socrative could potentially be contingent on individual traits of the students. Hence, the next section looks at whether student evaluations were correlated with the personality trait extraversion and the students' general academic level.

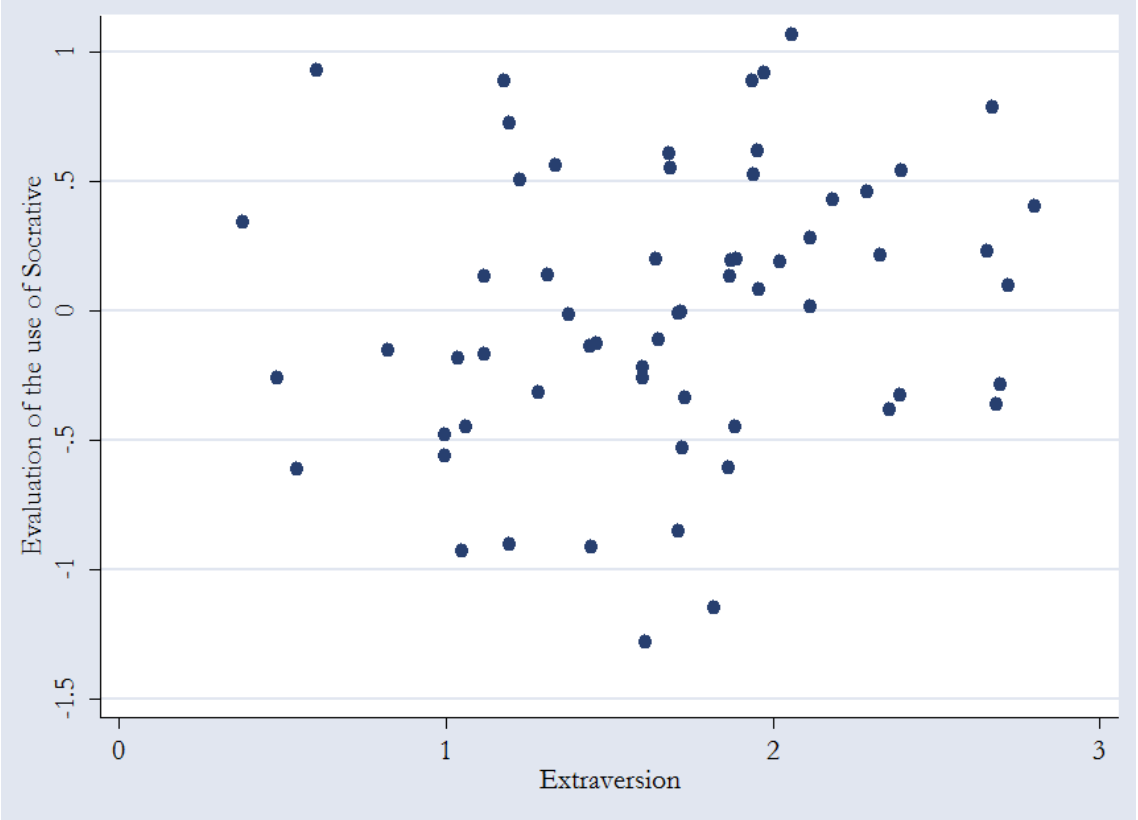
WHOM DOES SOCRATIVE WORK FOR?

Extraversion, is one of the five personality traits in the "Big Five Model" of personality that is often used in psychology and related fields. Individuals high on extraversion are people who have "a tendency to seek the company of others, external stimulation, a high level of activities, and enjoys being emotionally expressive." (Brandstätter & Opp, 2013). Individuals low on extraversion, i.e., introverts, may be more reluctant to, e.g., speak up in class, and these individuals might therefore evaluate the use of *Socrative* more positively. The surveyed therefor included six items measuring extraversion, which together formed an internally reliable scale (Cronbach's α=.77). The 11 items used to evaluate the use of *Socrative* (shown in the table above) were also added together to form an overall evaluation scale (Cronbach's α=.77).

The figure below shows the relationship between the Extraversion and evaluation of Socrative. The figure reveals no clear relationship between the two variables: evaluation does not seem to be

contingent on a student's level of extraversion. A simple OLS-regression also shows a non-significant relationship between extraversion and evaluation of Socrative.[2]

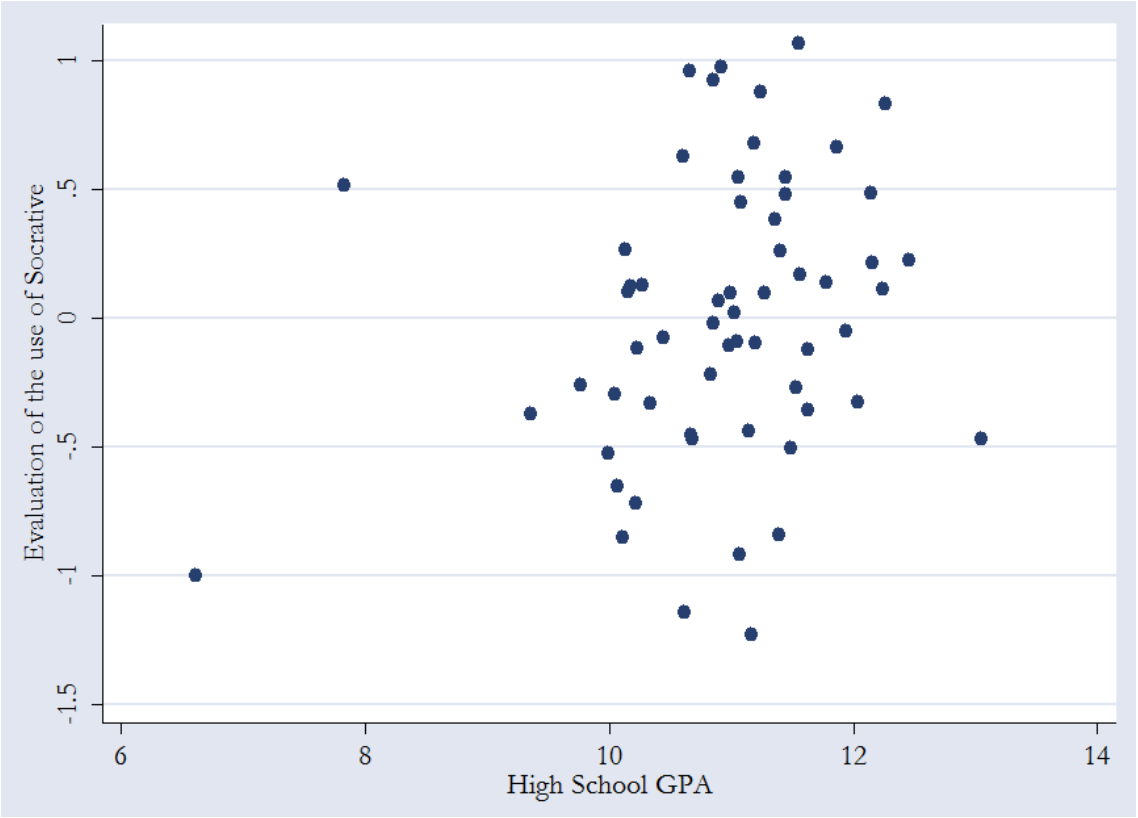
Figure 1: Extraversion and Evaluation of *Socrative*



Finally, the evaluation of the use of *Socrative* could potentially be contingent on the general academic skills of the students. It might be, for example, that Socrative were evaluated less highly by the best and brightest, and that Socrative therefore should be considered an aid for relatively weaker students. To investigate this, students were also asked about their high-school GPA. The figure below shows relations between high school GPA and evaluation of *Socrative*. Contrary to expectations, the correlation between high school GPA and evaluation seemed to be positive; students with a high GPA tended to be more positive use of Socrative than students with lower GPA. However, the relationship was only marginally significant (p=.065) and generally not very robust when class id and extraversion was added as control variables.[3]

[2] Detailed results are available from the author upon request
[3] Detailed results are available from the author upon request

Figure 2: Academic Skills and *Socrative*



CONCLUSION: SOCRATIVE IS HELPFUL - AND NOT DEPENDENT ON STUDENT CHARACTERISTICS

This paper has shown how the online student response system *Socrative* can be used when teaching introductory courses in political science. The paper has shown that *Socrative* can be used in a number of different ways, even when there are no simple answers to the questions posed. Furthermore, students evaluate the use of the system quite positively. An analysis shows no significant correlation between student personality and evaluation of *Socrative*, and there is no clear relationship between evaluations and general level of academic skills (high school GPA). The lack of correlations may very well be due to small sample sizes and lack of variation, and future studies might want to investigate the relationship in larger, more heterogeneous student samples. However, previous studies have also found that the student perceptions of clickers do not differ significantly with respect to students' gender, major, year in college or ethnicity/race (Velasco & Çavdar, 2013).

For now, however, the lack of correlation indicates that use of Socrative does not entail a tradeoff vis-à-vis different groups of students. Students evaluate Socrative, regardless of their personality traits and their academic skills.

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