An evaluation of the Socrative (personal response system) app for increasing student engagement and learning in an undergraduate psychology curriculum.

AN EVALUATION OF THE SOCRATIVE (PERSONAL RESPONSE SYSTEM) APP FOR INCREASING STUDENT ENGAGEMENT AND LEARNING IN AN UNDERGRADUATE PSYCHOLOGY CURRICULUM

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Introduction:
Personal response systems using hardware such as ‘clickers’ have been around for some time, however their use is often restricted to multiple choice questions (MCQs) and the app is therefore used as a summative assessment tool for the individual student. More recent innovations such as ‘Socrative’ have removed the need for specialist hardware, instead utilising web-based technology and devices common to students, such as smartphones, tablets and laptops. While improving the potential for use in larger classrooms, this also creates the opportunity to pose more engaging open-response questions to students when used in class. This poster will present two applications of the Socrative system in an undergraduate psychology curriculum which aimed to encourage interactive engagement with course content using real-time student responses and lecturer feedback.

Application 1: Revision Lecture
Socrative was used at the end of a first-year undergraduate psychology module on statistics, one month before a summative examination on the topic. 19 MCQs on course content (see Figure 1 for an example) were completed, with students (N = 73) receiving instant feedback on their responses. As well as completing MCQs on course content, students were asked to rate knowledge of the content on a 5-point Likert scale ranging from ‘not knowing nothing’ to ‘knowing everything’, before completing the MCQs, and again, after completing the questions. They were also asked to rate the usefulness of the revision session on a 4-point Likert scale, and to state any technical issues encountered while using the app (which were minimal). Descriptive statistics are presented in Table 1.

Ratings of Knowledge Change
A difference index was calculated to show the change in self-rated knowledge of content before and after completing the MCQs by subtracting pre MCQ knowledge ratings from post-MCQ ratings such that positive index values indicated higher ratings of content knowledge after completing the MCQ session. We expected students to be over-confident in their content knowledge at the pre-revision stage, and that this would be re-adj usted after encountering the MCQs. In fact, the opposite trend was evident, with more students displaying positive index values (see Figure 2). It appears that students became more confident in their knowledge after the MCQ experience, which may reflect the relatively good performance of the group on the MCQs (Figure 3). A possible explanation for this is that the MCQs were not challenging enough for students to gauge their learning, however the questions were specifically designed to rigorously test knowledge of course content.

Impact on Learning Assessment and Metacognition
A hierarchical linear regression analysis was performed to test the predictive strength of the variables on performance in the statistics examination. The initial model included MCQ performance as a single predictor, and a second model tested the effects when the variables of self-rated knowledge pre/post MCQs were added. Both models were statistically significant (p<.001), as was \( R^2 = .068, p < .001 \). The analysis is summarised in Table 2.

What is notable from the analysis is that performance on the MCQ test was the strongest predictor of exam performance, explaining 14.8% of the variance, with the knowledge rating variables explaining a further 6.8%. Surprisingly, the only pre-MCQ test knowledge ratings significantly predicted exam performance. It was expected that post-MCQ tests would have been significant predictors, assuming students used the MCQ test experience and feedback to more accurately assess their judgments of learning – using this to guide their revision for the exam. It would appear that the MCQ revision test did not contribute to a metacognitive apper value to the students. This would indicate that an intervention may be required to ensure students understand how to use the results of a practice test to guide their future revision.

Student Experience
The MCQs remained live until the statistics exam approximately one month after the revision MCQ lecture, and students were able to access it at any time. A total of 55 students revisited the MCQs in this period. It should be noted that the students evaluated the use of the Socrative App very positively, with 95.9% rating the usefulness of the revision session as ‘useful’ or ‘very useful’ (in fact, just a single student rated it negatively). Furthermore, un solicituded student evaluations of the module included numerous comments requesting more use of the Socrative system within the degree programme. This anecdotal evidence indicated it was an enjoyable experience, perhaps highlighting the potential value of Socrative in boosting engagement with course content.

Student Feedback Quote:
“The flipped lecture allowed for students to engage with the topic and communicate answers and the reasons for their answers. This was very helpful for exam preparation, but also in highlighting the types of thinking that are perhaps looked for in psychology, including more of these upon the completion of each conceptual issue may be helpful for future students.”

Table 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCQ Number Correct</td>
<td>14.1 (3.75)</td>
<td>10-17</td>
</tr>
<tr>
<td>Knowledge Rating Prior to MCQs</td>
<td>2.9 (3.71)</td>
<td>1-4</td>
</tr>
<tr>
<td>Knowledge Rating After to MCQs</td>
<td>3.3 (3.67)</td>
<td>2-5</td>
</tr>
<tr>
<td>MCQs</td>
<td>60.7 (13.42)</td>
<td>24-90</td>
</tr>
</tbody>
</table>

Impact on Learning Assessment and Metacognition

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>Std. b</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MCQ Performance</td>
<td>.44**</td>
<td>.091</td>
</tr>
<tr>
<td>2</td>
<td>Pre-MCQ Knowledge Rating</td>
<td>-.19**</td>
<td>.068</td>
</tr>
<tr>
<td></td>
<td>Post-MCQ Knowledge Rating</td>
<td>.294*</td>
<td>.068</td>
</tr>
</tbody>
</table>

Application 2: Flipped Lecture Engagement
Socrative was used at the end of a second-year undergraduate module on theoretical issues in psychology. This module involves students learning about the philosophy of science and requires them to critically reflect on conceptual issues within psychological science (e.g. the use of metacognition and the development of theories). Ratings of this module are historically low, and students often reported finding content 'boring' or 'irrelevant'. The suspected reason for this, is that unlike all other modules, which required the acquisition of specific knowledge, this module requires students to critically evaluate abstract concepts, which cannot be done by traditional rote learning.

To address this, a one-hour flipped-lecture was developed to allow students the opportunity to overtly practice their critical thinking skills. Students were asked to revise their knowledge before the start of the lecture on Freudian Theory in advance of the lecture, that they would be required to answer a series of conceptual questions based on Freudian Theory (e.g. Figure 4), and that they would receive formative feedback from the lecturer.

In large classroom environments, it is notoriously difficult to engage students to participate, due to fear of being incorrect and embarrassed in the Presence of peers. Socrative was used to pose the questions, which required free-response answers. This allowed students to respond anonymously to these questions, and that they would receive feedback on their thinking skills and understanding.

Student Preparation
The success of a flipped-lecture is dependent on the students pre-preparing for the lecture, as lack of content knowledge will inhibit any meaningful engagement with the tasks presented. Students were asked about their preparation before answering the questions and their (dis)appointing responses are summarised in Figure 5. As this was the first time these students had encountered Socrative, it may be that they hadn’t realised the benefits of participation and thus preparation. Nonetheless, incentives to ensure preparation is an important consideration for future flipped-lecture initiatives.

Student Experience
Due to time constraints, no quantitative evaluation of the session was done, but students did comment on the usefulness of the flipped-classroom in their module review feedback (see Student Feedback Quote text box for a typical example). They also suggested more use of the technology, across all lectures, rather than being confined to a single session, indicating Socrative fulfilled its purpose of improving student engagement with the module.

Lecture Experience
The flipped lecture worked very well considering quite poor attendance and a general lack of preparation within the cohort. The students who engaged with the class provided insightful answers to the questions and contributed to the structured discussion in a valuable way. There were a few inappropriate comments to begin with, but this stopped quickly when they were acknowledged and encouraged to participate meaningfully. Students rated the module as being significantly higher in terms of intellectual stimulation and challenge \( (t_{(21)} = 3.1, p = .004) \) compared to the previous year, where this flipped-lecture was not used. Future sessions will collect student evaluations and link this to examination performance.