

Enabling Real-Time In-class Feedback Using UniDoodle

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Class Size

24

Discipline

Electronic Engineering

Feedback Approaches

In-class feedback, real-time feedback; formative feedback; app-based student response system

Technologies

UniDoodle (unidoodle.com)

Challenge & Aim

How do we capture rich and useful information about feedback relating to how our students are solving equations, drawing circuit diagrams, annotating diagrams, etc.? These questions are of major importance in Engineering, where the main focus is on problem solving.

Student response systems (SRS) offer significant opportunities for formative feedback in the classroom. However, existing systems, such as Clickers, use multiple-choice selection as input and, thus, are not able to provide access to in-depth information regarding where and how students are making mistakes.

In response to this difficulty, I developed an app-based SRS called UniDoodle. UniDoodle involves three components: (1) a student app for the students to submit sketch-based responses; (2) a lecturer app for the lecturer to view responses and provide feedback and to prepare and post questions and (3) a cloud based service (Google App Engine) to communicate between the two apps. However, while UniDoodle has clear and obvious benefits as a SRS, it remains to be seen how effective it can be and how it can best be implemented in a classroom environment to support student learning.

This case study involves a first year Electronic Engineering module, Introduction to Systems and Control. The aim of this case study was to determine how best to utilise UniDoodle in the classroom to provide student feedback and also obtain feedback from students.

In addition, I wanted to identify what type of questions work best with UniDoodle. Two approaches are considered:

1. Use of UniDoodle in a number of tutorials
2. Use of UniDoodle in every lecture to recap on lecture material

Evidence from the Literature

Student Response Systems: Key benefits of SRS include improving active learning, improve student motivation, improve student interaction within the classroom. The use of SRS can also increase student attendance, increase student preparation for classes, and improve student satisfaction within the classroom (Caldwell, 2007, Auras & Bix, 2007, Moredich & Moore, 2007, Skiba, 2006). Nicol & MacFarlane-Dick (2006) state that, as one of its seven principles, good feedback practice “delivers high quality information to students about their learning” (Y1Feedback, 2016). UniDoodle, as a SRS, can make this truly possible for the STEM disciplines. UniDoodle should also meet several of the other principles outlined by Nicol & MacFarlane-Dick (2006). These include providing information to teachers to help them shape their teaching, encouraging positive motivational beliefs and self-esteem, and encouraging dialogue.

In-class Dialogue & Feedback: Many first-year students can feel uncomfortable contributing to the ‘bear pit’ of a large class (McArthur et al. 2011). Approaches including muddiest point, boot grit feedback, audience response systems proposed as less intimidating ways to encourage discussion and feedback both within, and beyond, the classroom, and thus may be particularly useful in the context of the first year (Y1Feedback 2016). Such activities can also potentially help to address problems or questions that could adversely impact on learning if left unresolved (Goldstein 2007, McArthur et al. 2011, Tang 2013, Wang et al. 2013 cited in (Y1Feedback 2016)).

Feedback Approach

In-class dialogue and feedback were introduced through the use of UniDoodle in all the module lectures, where the first half of the lecture introduced a new topic and the second half second involved the use of UniDoodle and a series of questions/problem tasks relating to the topic covered. Questions and problems were prepared in advance of the of class.

Typical Lecture Structure

Stage 1: Teach new topic(s).

Stage 2: Formative question/problem solving activities utilising UniDoodle. Lecturer posts pre-prepared question (or creates one there and then) and sends it to the class.

Feedback Approach

Stage 3: Individually, students complete the questions/problems using the student app.

Stage 4: Lecturer closes question and reviews responses to identify learning points and mistakes made.

Stage 5: Class discussion and teacher feedback on a selection of responses in a general manner.

Stage 6: Follow-up question to see if give students another opportunity at a similar question.

Outcomes

The case study was evaluated using student questionnaires, student focus groups and staff reflection. Overall, the use of UniDoodle on a regular basis worked extremely well. It provided insight to the students' knowledge and it allowed me to illustrate the mistakes that are so often made. It was very enjoyable - it broke up the traditional lecturing approach and encouraged significantly more interaction in class. It also allowed for numerous opportunities for discussion via feedback on the student responses.

Student Response

Students noted a number of key aspects of the in-class feedback approach that they liked including:

- **Anonymity**

"UniDoodle lets you be anonymous and you can be free and still get the feedback without anyone knowing."

- **Improved Attention**

"You want to pay more attention in class because you know" the lecturer "is going to ask questions at the end and you want to look at the board and know you got something right."

- **Formative Nature of Feedback**

"With a lot of other modules, it's part of your continuous assessment, with this it doesn't affect your grade, you're not as reluctant to put an answer down."

- **Feedback for Improvement**

One student noted that they felt like they were *"progressing easier and it gave" them "the opportunity to be wrong"*, and learn more from their mistakes.

Lecturer Reflections

The use of UniDoodle on an ongoing basis offers immediate access and a richer insight to the student's knowledge of the content being questioned. It provides students with effective, timely, and on-going feedback allowing students the opportunity to learn from their mistakes. I feel that student learning has improved with one student noting that they *"wouldn't have done nearly as well"* in their *"tests and revision."* without the on-going UniDoodle feedback activities. Regular use of the SRS, UniDoodle, is particularly suited to STEM disciplines as information relating to methodology can be visually captured. I will continue to use UniDoodle. Going forward, the opportunity of peer feedback and instruction

when using UniDoodle needs to be explored, facilitating students to collaboratively and provide feedback to each other.

Recommendations

1. Integrate UniDoodle into all lecture rather than occasional usage so that it becomes second nature to students.
2. Give careful consideration to the types of questions that work with UniDoodle for your subject area.
3. Prepare questions in advance to allow for a more efficient use of UniDoodle in class.
4. Provide full class/lecture notes in advance of class, to allow for the same content to be covered.
5. Provide spare tablets in each class for students who forget devices or for those who do not have a personal smart device.

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Contact



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