Boosting Learning with Poll Everywhere

Salman Durrani

SMIEEE SFHEA MIEAUST

Assoc. Prof.

Research School of Engineering, CECS

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Outline

1. Classroom Response Systems (CRS)
   - Echo360 ALP, Poll Everywhere, Learning Catalytics (Pearson)

2. Pedagogical Aspects
   - How to use CRS effectively
   - Combining CRS technology with educational pedagogy
   - Benefits of using CRS

3. Lessons Learnt (use in 1st and 2nd year electronics) and Conclusions

Background

- Classroom response systems (clickers) have been around for over two decades.

- Older Technology:
  - Transmitter/clicker
  - Receiver
  - Software

- New Technology:
  - Smartphone
  - Internet

Classroom Response Systems

- **Poll Everywhere**
  - Free account: 40 students
  - Instructor account: 400 students

  (USD$650/year or $350/semester)


https://www.polleverywhere.com/

- **Echo360 ALP** (available since start of 2018)

https://services.anu.edu.au/files/user-guide/Echo360%20ALP%20PollEverywhere%20Replacement%20final.pdf

- **Learning Catalytics (Pearson)**
  - Developed at Harvard University by Eric Mazur
  - Free for ANU staff using Mastering in their course

Eric Mazur

https://www.pearson.com/us/higher-education/products-services-teaching/learning-engagement-tools/learning-catalytics/features.html

Classroom Response Systems

https://https://carleton.ca/edc/faculty-and-instructors/clickers/

Instructors may wish to use other SRSs depending on their teaching needs. Some examples of popular SRSs include:

Kahoot

Pear Deck

Socrative

Quiz Socket

Mentimeter

Verso

Infuse Learning

i>Clicker (Physical Clickers)

Turning Point (Physical Clickers)

Learning Catalytics

Some of these systems are free, while others require a subscription or licensing fee to use. Details can be found on each system's website.

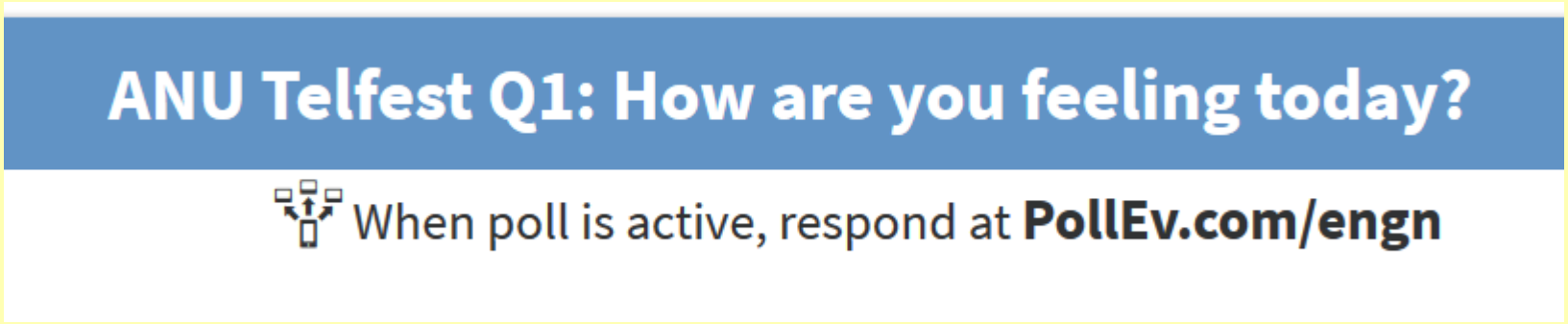
Classroom Response Systems

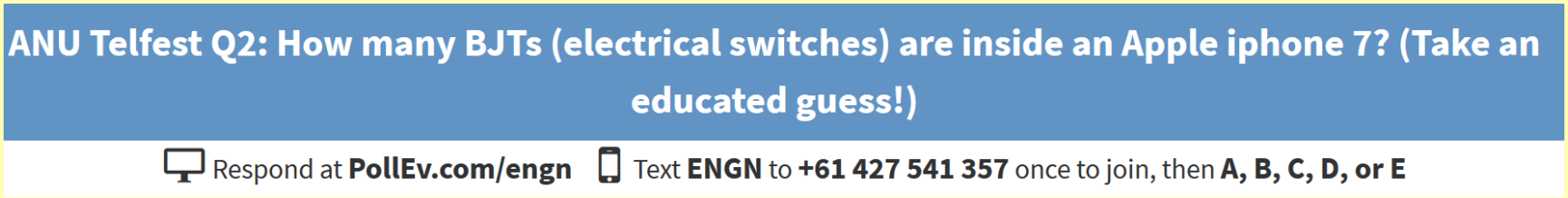
- This talk is not about comparing Echo360 ALP to Poll Everywhere.

- My view in this regard is:
  - Choose a classroom response system that suits your teaching needs.
  - Given the rapid pace of technological evolution, expect to transition to a new classroom response system in 3-5 years.
  - Be patient with yourself.

Demo

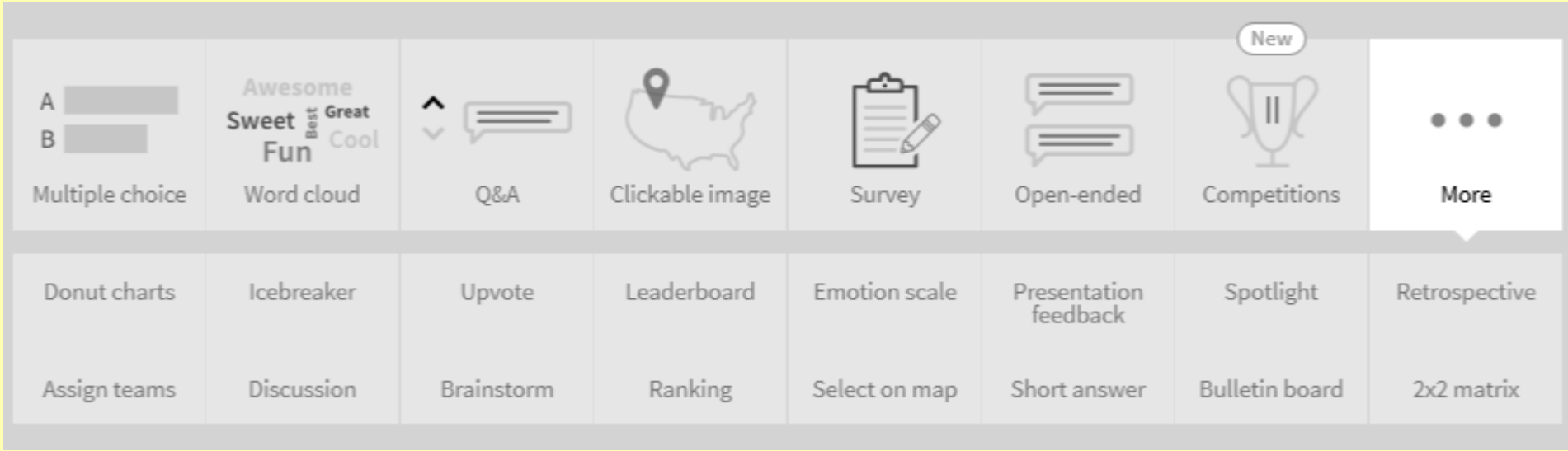
- Respond as follows:





Poll Everywhere Features

- Features:



- Can embed polls in PowerPoint/ Mac OS X.
- Supports Latex for typesetting maths.
- Students can respond via text OR internet or app.
- Latency: typically 2-5 seconds

Outline

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   - Learning Catalytics (Pearson), Echo360 ALP, Poll Everywhere

2. Pedagogical Aspects
   - How to use CRS effectively
   - Combining CRS technology with educational pedagogy
   - Benefits of using CRS

3. Lessons Learnt & Conclusion

[Known] Best Practices when using CRS

1. **Combine the use of CRS with suitable teaching pedagogy.**

https://serc.carleton.edu/sp/library/classresponse/why.html

A Classroom Response System offers many opportunities to combine the technology with other teaching pedagogies including ConcepTests, Just-In-Time Teaching, Cooperative Learning, Interactive Lectures, Classroom Experiments, and Interactive Lecture Demonstrations.

2. Explain to students why CRS is being used.

[Known] Best Practices when using CRS

1. Combine the use of CRS with suitable teaching pedagogy.
2. Explain to students why CRS is being used.
3. Use CRS regularly (2-5 questions in a 50 min lecture)
4. Ask questions that are challenging. Give 2-5 mins for discussion.
5. Strategically decide when to show the histogram of responses (before or after discussion) and use the information to decide how to continue with the lecture.

[Known] Benefits of Using CRS

1. **From a Lecturer's perspective**
   - Real-time feedback
   - Increases student participation
   - Facilitates discussion and active learning, which improves student learning

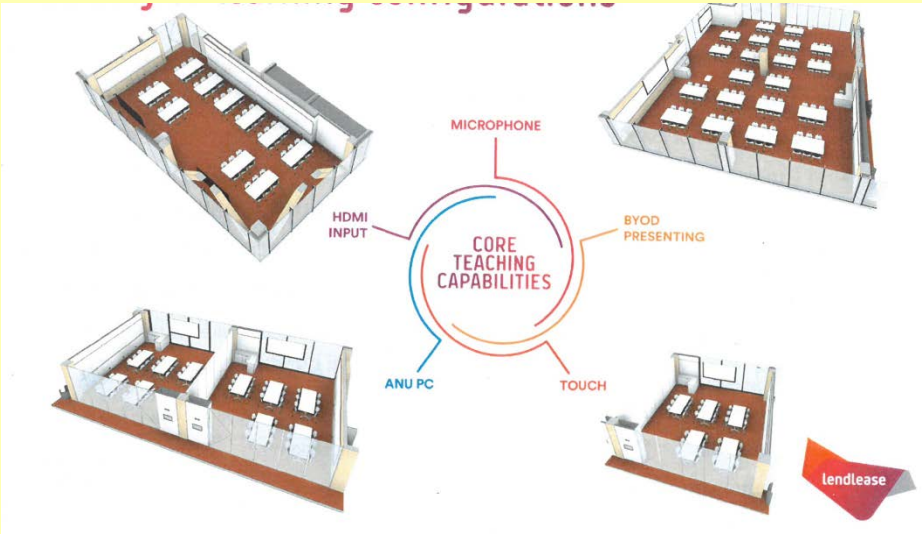
2. **From a student's perspective**
   - Confirm their understanding of a topic and identify areas of weakness.
   - Foster interactions with other students
   - Helps quiet/shy students to participate in the class (due to anonymity)

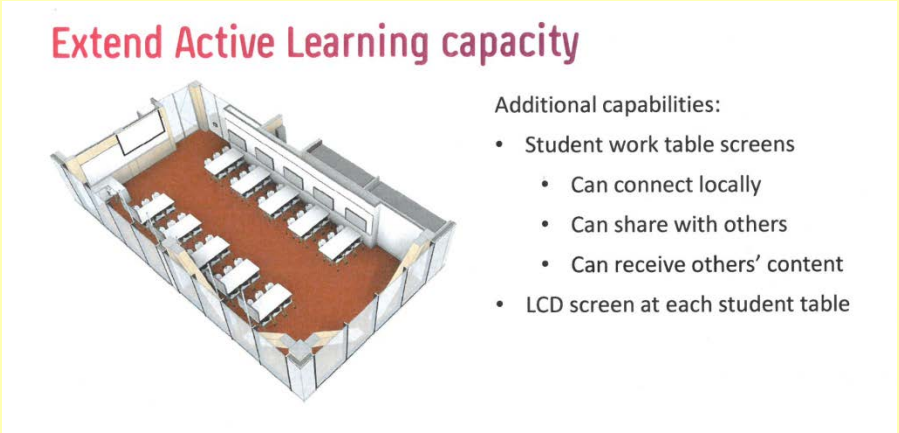
[Known] Issues with Using CRS

- Cost of clickers / license / availability.
- Increases workload of Lecturer to design meaningful quizzes
- Students need to come prepared for lectures (especially if quizzes have a nominal grade value)
- They are non-essential (even a distraction!?) and only help the “shy” students
- Is the benefit due to pedagogy or due to technology?

ANU Context

- Active learning classrooms are expected to be available in the Kambri precinct in 2019.





- My view in this regard is:

Use of CRS is essential for implementing change in pedagogy to make effective use of active learning classrooms

Outline

1. Classroom response systems
   - Echo360 ALP, Poll Everywhere, Learning Catalytics (Pearson)

2. Combining
   - Poll Everywhere (technology) with
   - Cognitive Apprenticeship Model (educational pedagogy)

3. Lessons Learnt (use in 1st and 2nd year electronics) and Conclusions

Poll Everywhere Use

Poll Everywhere used for the past 3 semesters:

- (Sem 2, 2017) ENGN1218 Introduction to Electronics [235 students]
- (Sem 1, 2018) ENGN2218 Electronic Systems & Design [200 students]
- (Sem 2, 2018) ENGN1218 Introduction to Electronics [180 students]

Cognitive Apprenticeship

- Cognitive apprenticeship is a structured model of learning with the basic goal of "**walking the students through the processes that our minds automatically go through as experts**".

Cognitive apprenticeship: Teaching the crafts of reading, writing, and mathematics

A Collins, JS Brown, SE Newman - Knowing, learning, and ..., 1989 - books.google.com

Only in the last century, and only in industrialized nations, has formal schooling emerged as a widespread method of educating the young. Before schools appeared, apprenticeship was the most common means of learning and was used to transmit the knowledge required for ...

☆ Cited by 7918 Related articles All 10 versions »

[PDF] **Cognitive apprenticeship**: Making thinking visible

A Collins, JS Brown, A Holum - American educator, 1991 - academia.edu

IN ANCIENT TIMES, teaching and learning were accomplished through apprenticeship: We taught our children how to speak, grow crops, craft cabinets, or tailor clothes by showing them how and by helping them do it. Apprenticeship was the vehicle for transmitting the ...

☆ Cited by 1832 Related articles All 9 versions »

Modeling

Coaching

Scaffolding

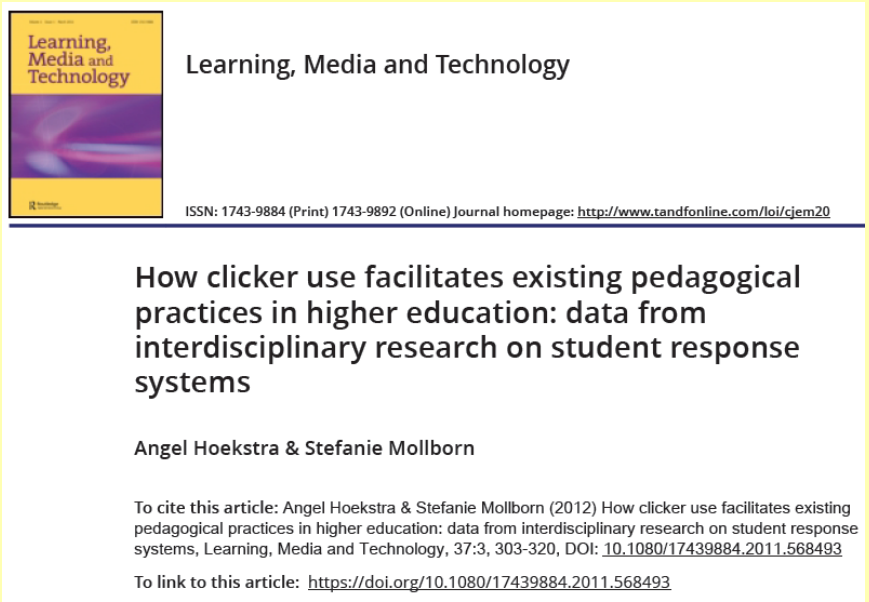
Articulation

Reflection

Exploration

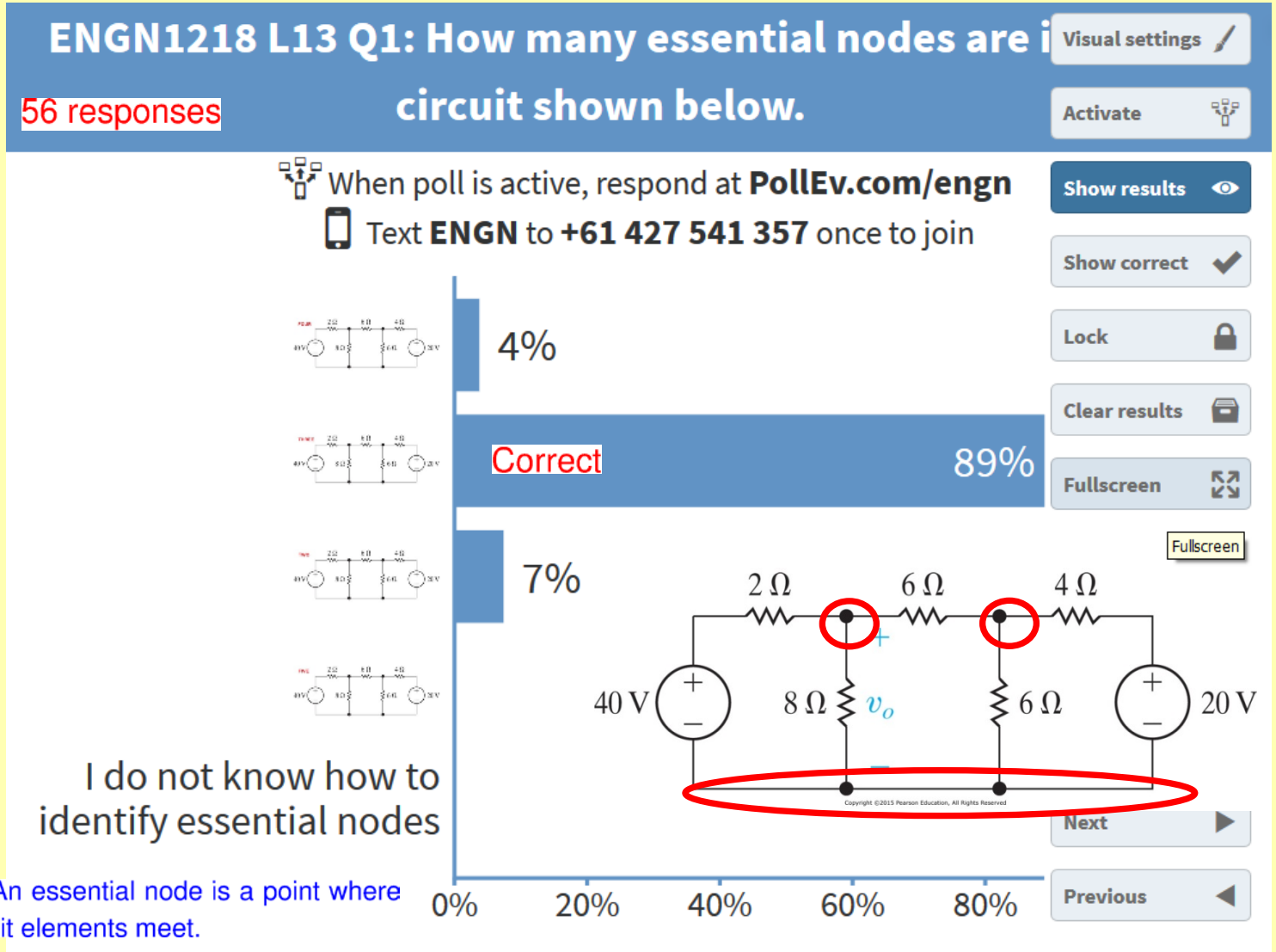
Technology & Pedagogy

- Different ways to combine technology & pedagogy
  - Practice 1: gathering student feedback to improve teaching and learning
  - **Practice 2: identifying students' assumptions or preconceptions about course material**
  - **Practice 3: supporting conceptual application and critical thinking through small- and large-group discussions**
  - Practice 4: Fostering social cohesion in the learning community
  - Practice 5: collecting data from students to support theory testing, conceptual application, and group discussion



Example: Technology & Pedagogy

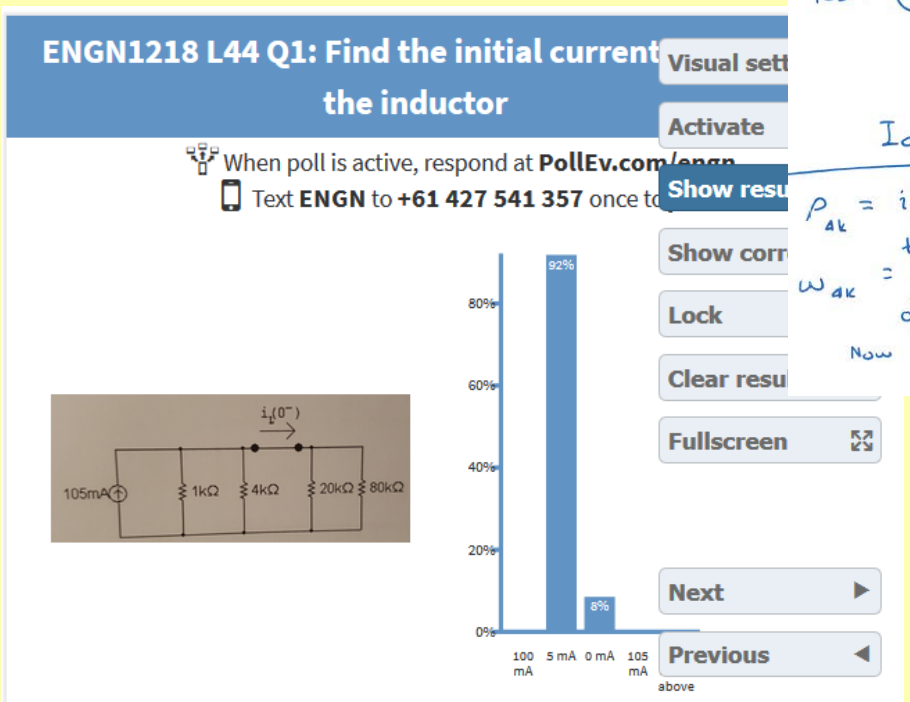
- Identifying and addressing students' misconceptions (Practice 2)

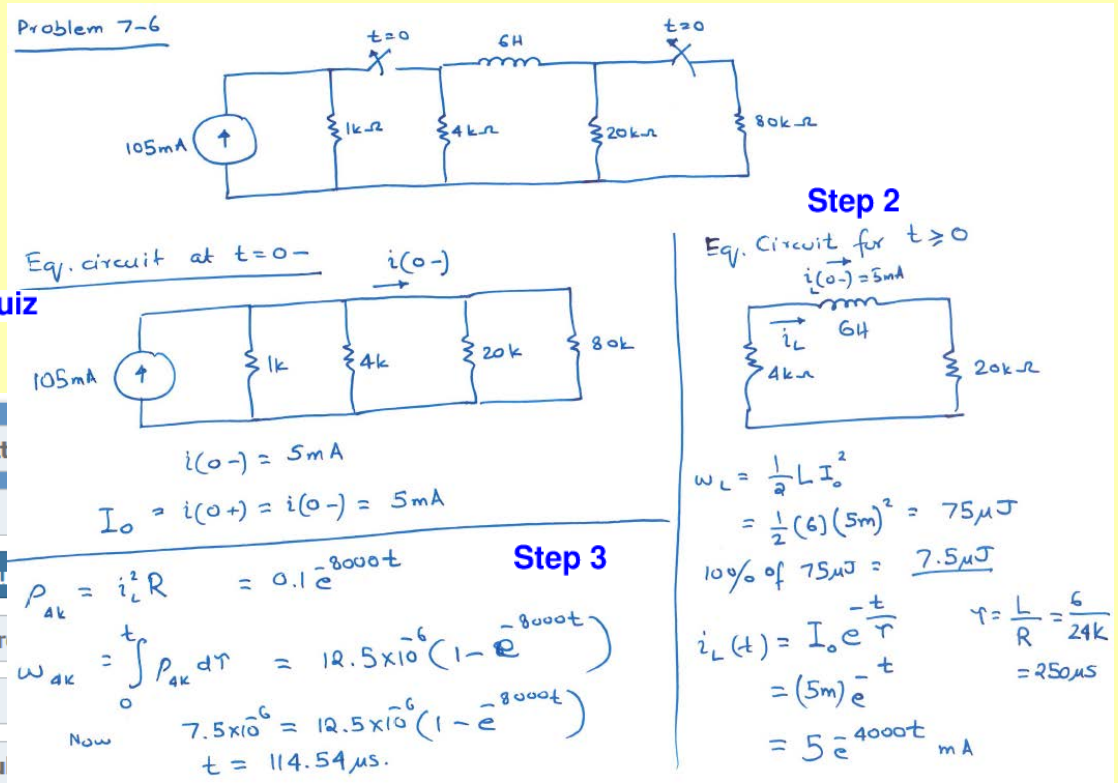


Example: Technology & Pedagogy

- Poll Everywhere to enhance problem based learning (Practice 3)

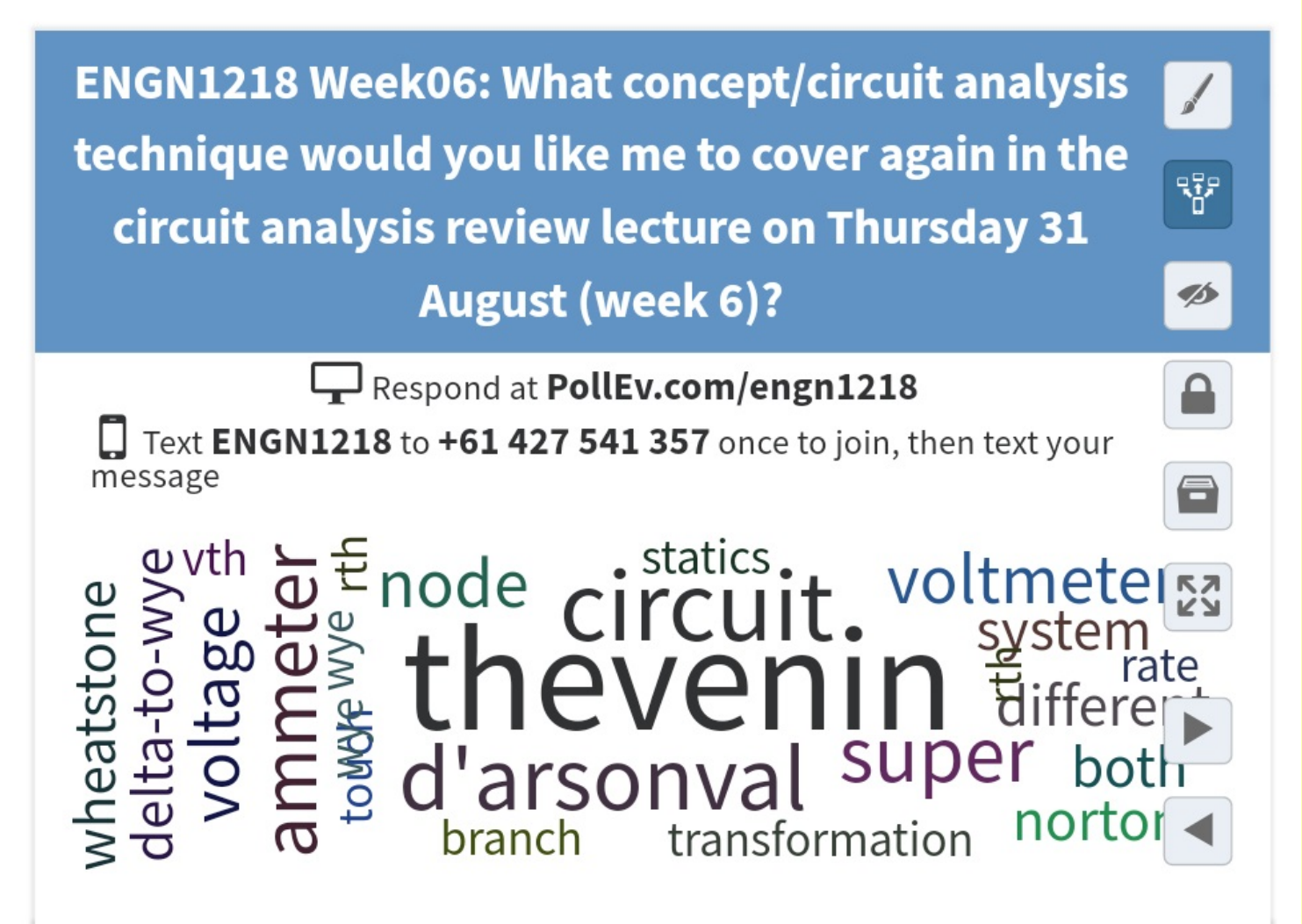
Step 1 in the problem: Poll Everywhere Quiz





Example: Technology & Pedagogy

- Collecting student feedback (Practice 1)



Lessons Learnt

1. Allow students opportunities to discuss with peers and change responses.

2. While designing quiz layout, keep in mind **students watching the lecture recordings** (e.g., figures/text used in the question must be visible in the lecture recording!)

3. Integrate use of document camera technology/PSPICE/apps in the discussion of the Poll for more detailed explanations.

Sample Student Feedback - Positives

1. "*My brain seems to work better when I am in a room full of people doing the same thing. There is also the opportunity for instant clarification if we don't understand something. I think that all of the techniques (video lectures, poll everywhere etc.) aided in furthering my understanding of the content when used in conjunction with each other*." (Sem 2, 2018)

2. "*PollEv is quite interactive and does not take much effort to open and use, and the simulation demos and use of the document camera are great for completing examples."* (Sem 1, 2018)

3. "*PollEv is a good method to test our knowledge of what we just learnt, and truly makes me think if I have comprehended the information you have presented. Even if i don't physically submit an answer i still like them as i try to at least answer and learn from them*." (Sem 1, 2018)

4. "*I found it to be a useful learning tool that not only allows for students in the lecture to help each other learn, but gives real time feedback as to what students may need more guidance with*." (Sem 2, 2017)

5. "*Was excellent. Quite fun to have these during lectures. Courses like MATH1014 have a similar thing using google doc, but if you answer the question during lecture time you get bonus marks added to your final examination. This is a good incentive to attend lectures*." (Sem 2, 2017)

Sample Student Feedback - Negatives

1. "*Was fun and engaging, but did not necessarily help me learn the content any faster. It is probably a more useful tool for the lecturer to gauge student's progress than for the students themselves*" (Sem 2, 2018)

2. *"Didn't use it as i work full time and was watching through echo360 and not attending live lectures"* (Sem 1, 2018)

3. "*All were good, the only thing was PollEv seemed to be somewhat 'childish' in times. Same could be achieved by displaying multiple choice on lecture slides but I understand PollEv allows for engagement to be tracked."* (Sem 1, 2018)

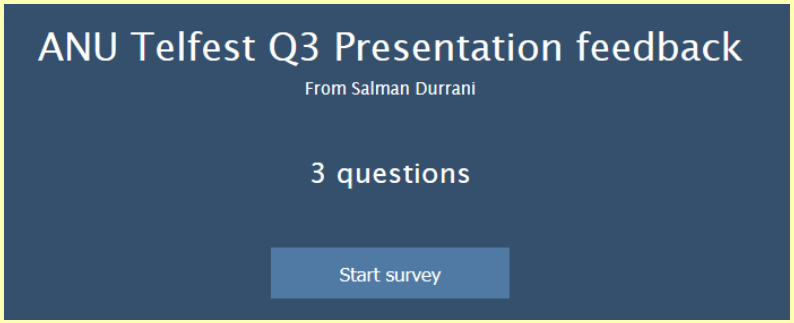
4. *"However, it's very difficult to see the options when watching the lecture recording. This is particularly the case when the options involve schematics and fine detail. I doubt it's possible, but it would be great to enlarge the pictures there."* (Sem 2, 2017)

5. "*PollEv is a bit useless to me and some kind of wasting the precious time in the lecture."* (Sem 2, 2017)

Conclusions

Using a CRS (such as Poll Everywhere) is an effective means to

- increase understanding of difficult topics (especially relevant to STEM disciplines).
- facilitate participation & feedback in large 1st year courses.
- facilitate lecturers to change/adapt/evolve their teaching pedagogy.



Thank you for your attention!

Contact Information:
salman.durrani@anu.edu.au
http://users.cecs.anu.edu.au/~Salman.Durrani/

Backup Slides

Video Resource: Clickers in Science

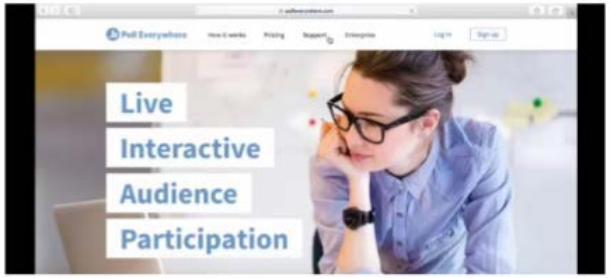
- http://www.cwsei.ubc.ca/resources/video/ClickerHowFlash.html

How to get started with Poll Everywhere

- ANU EFS news: Dec. 2017

Boosting participation with Poll Everywhere

A/Prof Salman Durrani SFHEA
Research School of Engineering, CECS



A/Prof Salman Durrani SFHEA was recently inspired by a colleague to experiment with Poll Everywhere (https://www.polleverywhere.com/), a live interactive audience participation tool.

The experiment was a fruitful one for A/Prof Durrani, who learned many valuable lessons while utilising the tool in his large, first-year engineering course. It was apparent to him that students loved being able to use the app on their smartphones to efficiently access the in-class activities. He found that especially designed quizzes around common well-known misconceptions helped to bring such issues to the forefront in active class discussions, and the appropriate use of Poll Everywhere, in conjunction with detailed in-class engagement with the document camera, was effective at promoting deep learning.

A/Prof Durrani found Poll Everywhere to be simple and efficient to use, with the extra workload associated with learning and creating in-class activities using the app to be minimal. To get started, he watched a three-minute online tutorial created by ANU Online: https://youtu.be/hJ-wKbIzkZ0

ANU has a site licence for Poll Everywhere, making it suitable for large classes, and students are able to access Poll Everywhere activities directly, without having to first log into Wattle. For further information or a demonstration, please contact salman.durrani@anu.edu.au

Resources: Cognitive Apprenticeship

- Dr. Jon Debs “Think like a Physicist” (2017)

- Dr. Salman Durrani “Think like an Electronic Engineer” (2012)