CETL-MSOR Annual Conference, Coventry
Sept 2013

Enhancing Student Engagement in the Classroom

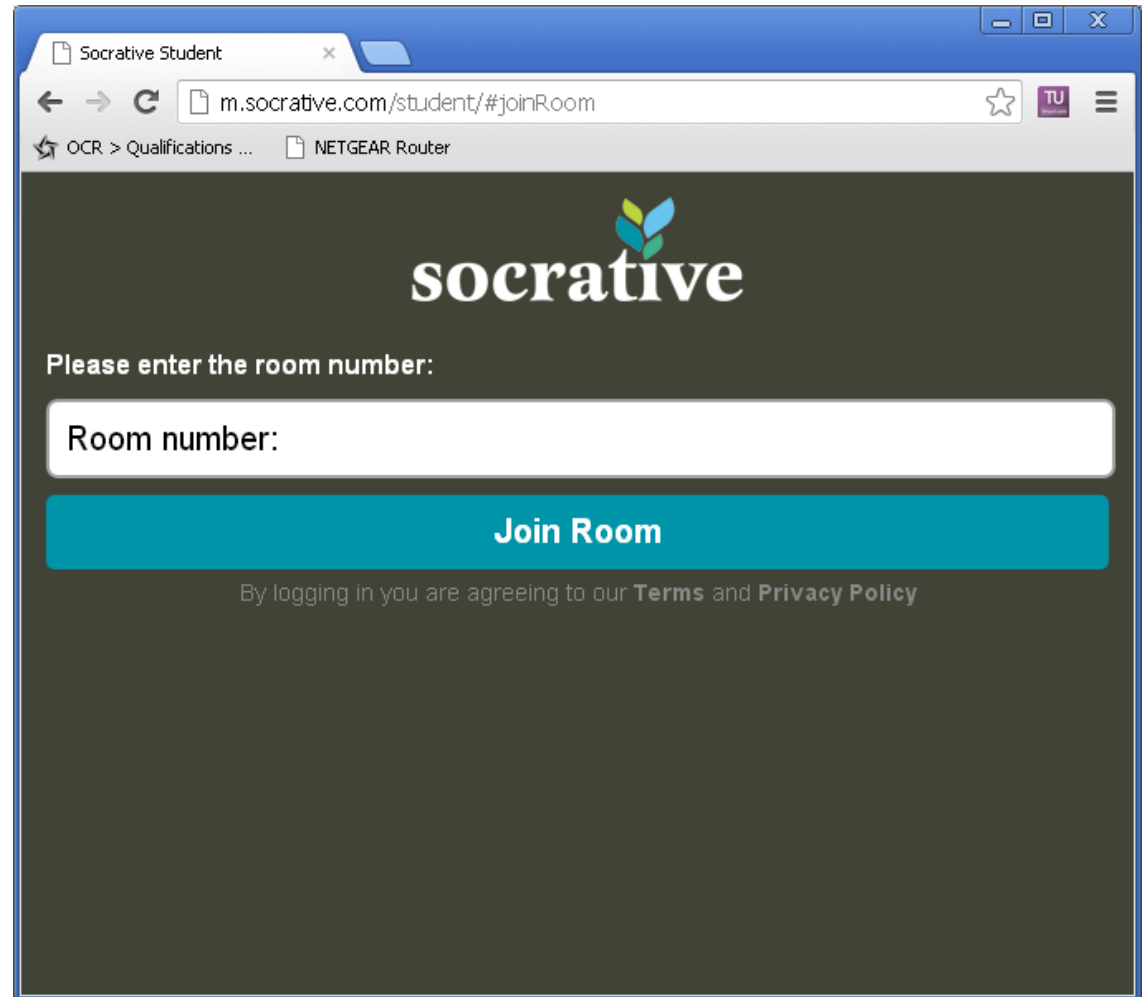**Jeff Waldock** (j.waldock@shu.ac.uk)   **Ros Porter** (r.porter@shu.ac.uk)

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Socrative Student

http://m.socrative.com

join room **jw**
(lower case)

Historic problems with group tutorial sessions

- These are common – but student engagement with the course material at them is frequently very poor.

- Productive use is rarely made of the full hour

Socrative - a freely available CRS tool - allows any web-enabled device to respond to either ad-hoc or prepared tests.

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In-Class Response Systems (CRS) can promote cooperative learning with "***students becoming active participants in the learning process***" (Beatty, 2006).

"***Question-driven instruction***"

1. Question
2. Peer group discussion
3. Peer group response
4. Class discussion
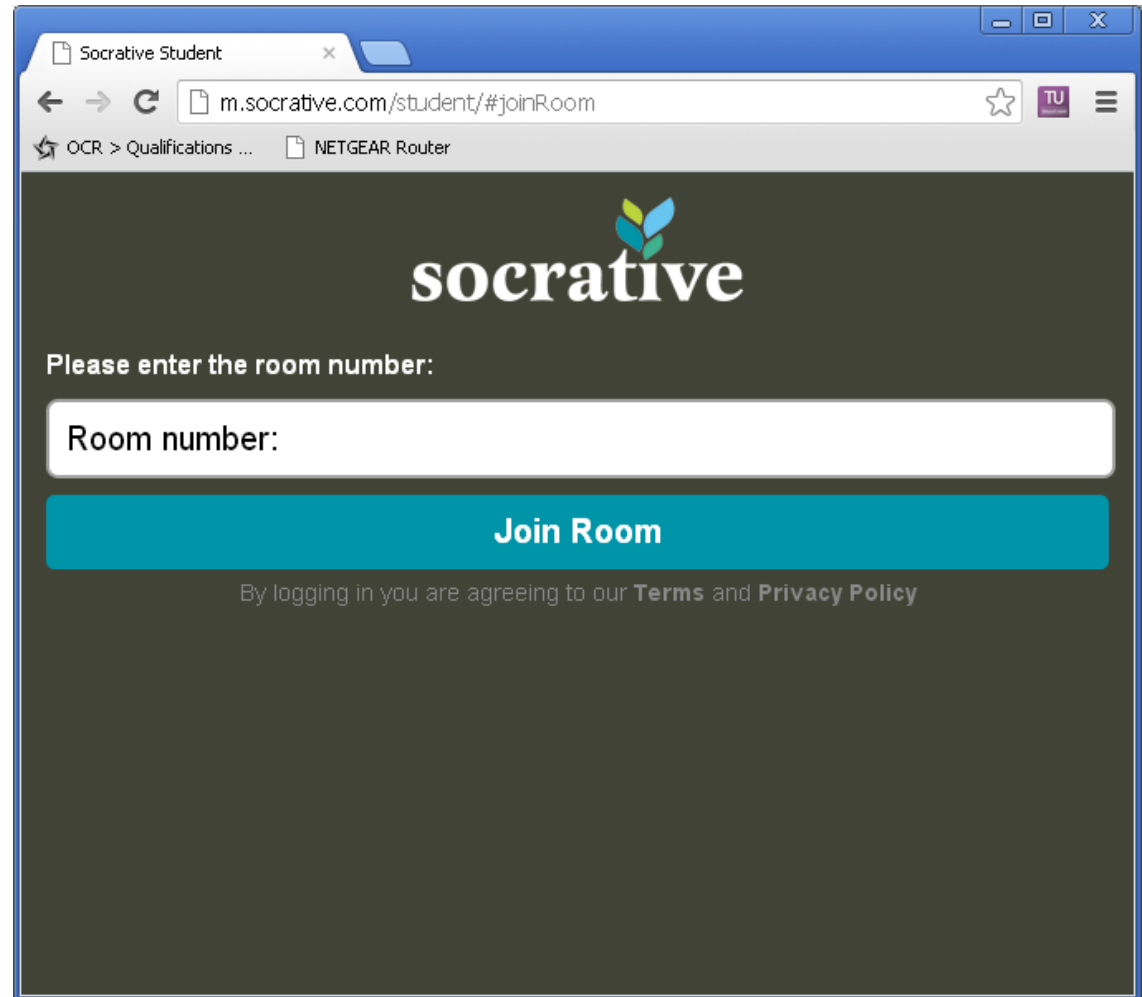5. General observations / micro-lecture
6. 'Closure'

Beatty, I.D. et. al., "Designing Effective Questions for Classroom Response System Teaching", Am. J Phys., 74, pp31-39, 2006.

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Trialled in 2012/13 with two groups:

(1) PC Lab tutorial group

- BSc Maths, final year module (Digital Signal Processing)
- 40 students (2 groups of 20)
- Trialling the use of CRS in PC lab classes to stimulate engagement

(2) Lecture group

- BSc Maths, first year module (Mathematical Technology)
- Up to 100 students
- Trialling the use of CRS in lectures to generate interaction, stimulate interest and focus discussion

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1. Final year PC lab sessions

- Used CRS weekly throughout the Autumn term, 2012.

- Transformative – student engagement & professional practice.

- The student group included as active partners in the process, explaining the purpose for delivering the material this way.

- Group discussion evaluated each session, to inform the next week's delivery

- Students closely involved in the design and delivery of their own programme.

20-6554: Digital Signal Processing - Test 8 (Chapter 4)

1. **[Phase Test, January 2012, Q13]**

A particular transfer function $H(z)$ represents a digital filter. With reference to its pole-zero diagram, which one of the following statements is **true**?

(a) Zeros outside the unit circle means that filter is unstable.

(b) A complex pole pair at $r = 0.95$ and $\theta = 60°$ together with a complex zero pair at $r = 1$ and $\theta = 60°$ represents a band stop filter.

(c) A single real positive pole represents a high pass filter.

(d) Adding zeros at the origin affects the frequency response of $H(z)$.

(e) A single real negative pole represents a band pass filter.

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Comments received from final years:

*"**It helped me to learn the material better** as looking at all of the possible choices helped me to think about not only the correct [answer] but also what the question would have to ask for the other answers to be correct."*

*"It's good to be able to have rapid feedback on the questions without putting yourself on the line by putting your hand up to give an answer. It meant **I put more of an effort in** to answer questions instead of waiting to see what others got."*

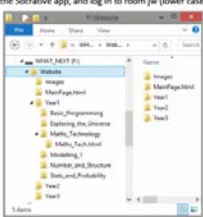**Sheffield Hallam University**

2. First year lectures

- Used CRS for one-off sessions.

- Intended for in-class formative assessment.

- Students paired up, to include peer group discussion element

- Questions were focussed on common errors

- Feedback positive

Year 1 Socrative task

Comments received from first years (unsolicited):

"I really enjoyed this way of interaction and I hope Jeff can find ways to implement it more often for next year's students"

"I thought was a good idea not only to say what you thought but to be able to see that other people thought as well"

"I think it is a good way to be interactive in lessons!"

"I felt this was a good way to get people to respond as it can be quite awkward putting your hand up to answer"

"It helps because due to the anonymous nature of the tool, I feel able to answer without feeling self conscious within the group"

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In summary

in-class response systems can:

- foster teamwork and collaboration

- improve engagement and stimulate interest

- provide interactive elements in lectures

- provide a focus for discussion

- provide small elements of competition

….. and can be **very** simple to implement!

Benefits of Interactive Lectures

- "learners arrive at meaning by **actively selecting**, and cumulatively **constructing**, their own knowledge, through both **individual and social** activity." Biggs, 1996

Other methods of interaction

- Technology not always available

- Socrative limited to 50 users may wish to encourage individual thinking

- Currently no mathematical text ability for student responses

- Can't illustrate their response

Interactive lectures

- **First year -** Modelling 1 - variety of topics
  - To add variety
  - To foster groups
  - Formative assessment

- **Second year -** Modelling case study on epidemics
  - Increase engagement and understanding
  - Encourage development of own ideas
  - Formative assessment

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Interactive lectures

Second year Modelling

- Encourage own thinking/interpretation
    - **By** showing them model outputs and asking students to make own interpretations before discussing

- Encourage own development
    - **By** giving students key factors of disease and asking them to make own model. Suggesting steps;

        What assumptions? What variables do we need? Diagram? Equations?

How well has it worked?

Pros

- Good way to guide students through the model development process – they get to have a go at the same time as seeing it done

- Students have to be active participants

- Immediate feedback on their efforts

- Peer encouragement

- Good opportunity to ask questions either from myself or peers

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How well has it worked?

Pros

- Students enjoyed it

    "I am really finding the stuff we have done in the lectures are helping, and making it easier for me to model myself"

    "I enjoyed today's lecture because ... we had time in the lecture to discuss the models and how we form the equations"

    "it gave us all a chance to speak"

How well has it worked?

Cons

- Not all talk is on topic

- Difficult to pace for all students
    - add in extensions for those that finish?

- Not always easiest seating arrangements in a lecture

- Attendance rate not improved as much as hoped for

- Cannot cover as much content - but deeper understanding of what is covered

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How well has it worked?

Summary

- Encourages student to participate in lectures

- Needs good planning (can help to email students beforehand)

- Management needed in room; adapt questions, flexible timings, float around room, keep on task etc.

Future Work

- Perform evaluation and find out why some students still not attending

- What in particular do they like? not like?

- How could it be improved?

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