

Enhancing Teaching and Learning with Electronic Voting

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Electronic Voting

- Large-scale e-voting
 - National elections
 - ERC Starting Grant on “Self-enforcing e-voting: trustworthy elections in the presence of corrupt authorities” (€1.5m, 2013-2018)
- Small-scale e-voting
 - Classroom voting (this talk)
 - Based on the self-enforcing e-voting technology

Pump-priming by UTLSEC

- £5,000 to fund a student project in 2012
- We decided to build a Verifiable Classroom Voting (VCV) system
- Motivated by two observations:
 1. TurningPoint voting systems are not verifiable
 2. Maintenance of voting devices is problematic

A working prototype

- A prototype completed in 2012 summer
- The interface later extended to whole campus
 - <http://evoting.ncl.ac.uk>
 - Need a campus account to create election
- Trialled in real classroom teaching
 - Positive student feedback

An example of student feedback

Question 11: Does the voting make the lecture more fun?

Answer Number	Text	Votes
1	Yes	18
2	No	1

A horizontal bar chart showing the percentage distribution of votes for Question 11. Answer 1 (Yes) is represented by a red bar at 95%, and Answer 2 (No) is represented by a green bar at 5%.

1	95%
2	5%

Question 12: Does the voting help you learn?

Answer Number	Text	Votes
1	Yes	19
2	No	0

A horizontal bar chart showing the percentage distribution of votes for Question 12. Answer 1 (Yes) is represented by a red bar at 100%, and Answer 2 (No) is represented by a green bar at 0%.

1	100%
2	0%

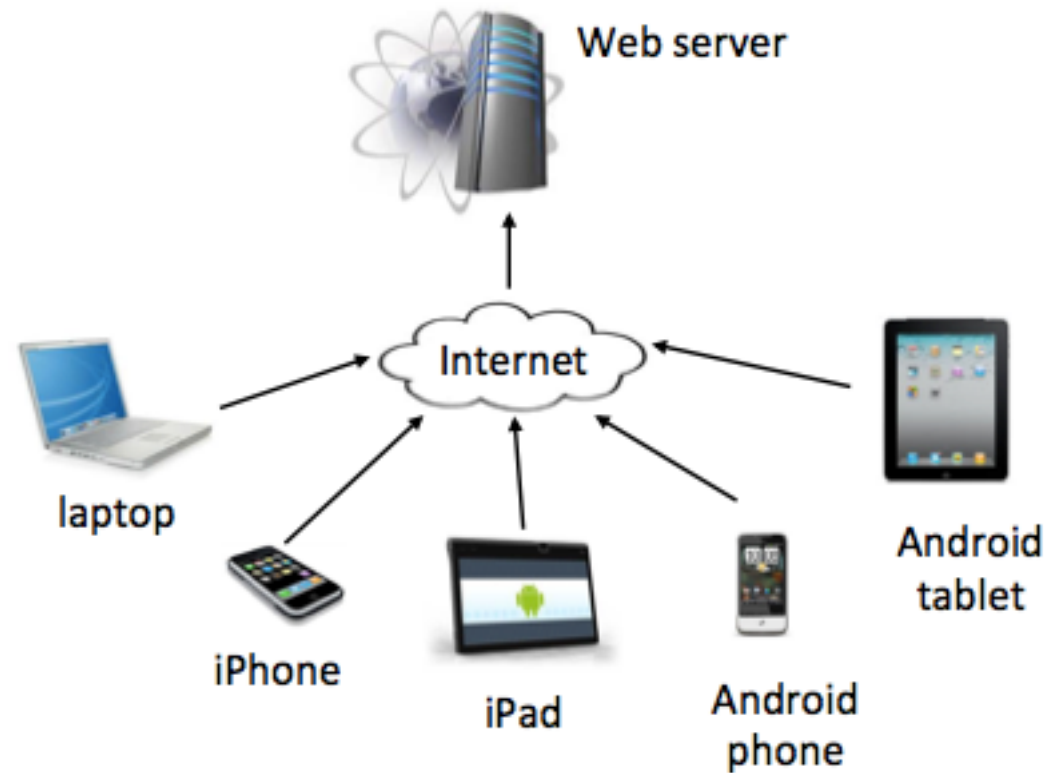
Question 15: Do you recommend classroom voting for teaching the same module next year?

Answer Number	Text	Votes
1	Yes	15
2	No	0

A horizontal bar chart showing the percentage distribution of votes for Question 15. Answer 1 (Yes) is represented by a red bar at 100%, and Answer 2 (No) is represented by a green bar at 0%.

1	100%
2	0%

Overall architecture for VCV system

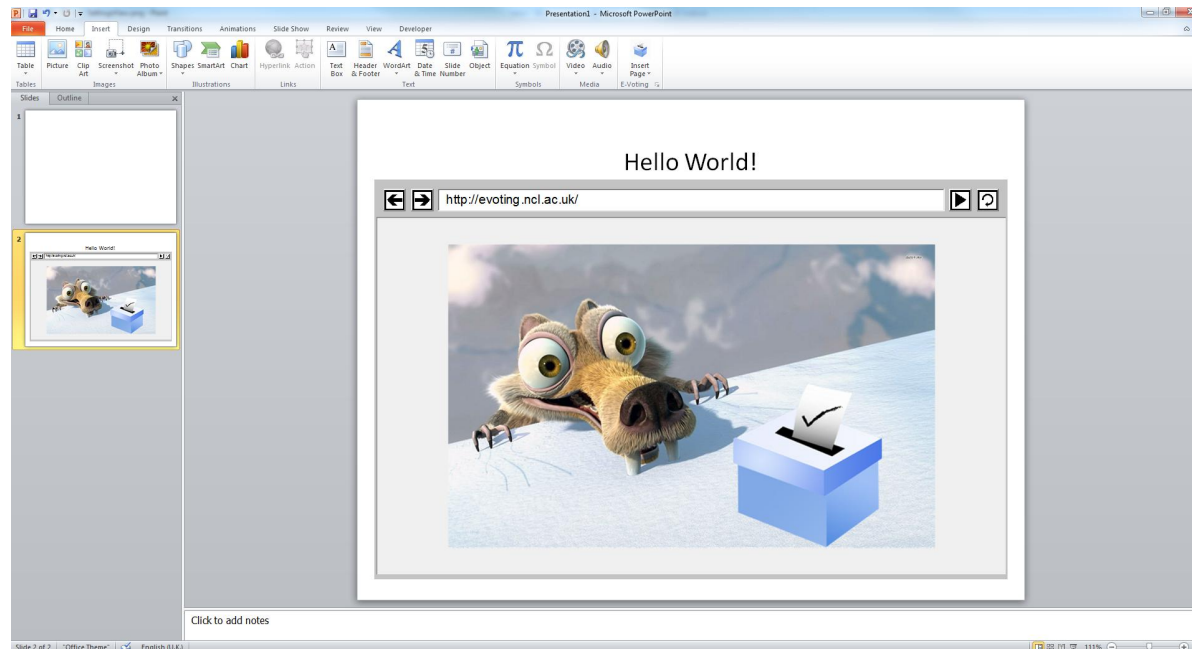


Summary of key features

- Public verifiability
 - Voting results can be external audited
- Anonymity
 - Voting is anonymous (we don't track students' answers)
- Flexible authentication options
 - Group password (suitable for classroom voting) or individual passwords
- Zero-maintenance on voting devices
 - Students maintain their own smart phones
- A range of voting options
 - Android app, iPhone app and Web interface
- A range of supported questions
 - Single, multi-choice, free numeric, free text
- Fail-safe
 - Backend PDF for voting questions
- Re-create election
 - Quickly reusing voting questions created in previous academic year

Powerpoint Plug-in

- Developed by a CS student in 2013 summer project
- Freely available at: <http://sourceforge.net/projects/evotingplugin/>



Demo

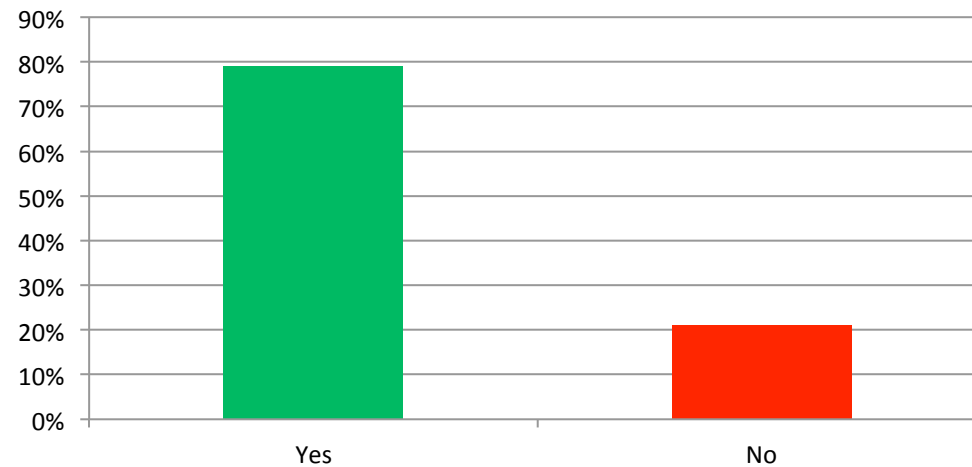
Visit: <http://evoting.ncl.ac.uk>

– Election ID: **425**

– Passcode: **1256**

TurningPoint Demo

- “Should school uniform be compulsory in the 6th form?”
 - 6th Students were asked to voted their answers using TurningPoint during a visit to University of Surrey



(Curtsey of Prof Steve Schneider)

Actually the instructor swapped the answers,
but no one was able to tell.

Our preliminary trial experience

- When to have classroom voting?
 - First 10 min in a lecture is good
- What type of questions?
 - Spontaneous questions are good
- What kind of discussion is needed?
 - Peer discussion before sending answers
- What's the most important in classroom voting?
 - Keep it **fun** for students to participate

Conclusion

- Newcastle E-Voting <https://evoting.ncl.ac.uk>
 - Available to anyone with a campus account
- Preliminary trials in real classroom teaching
 - Positive student feedback
- Future plan
 - Upgrading the backend server (done by Aug, 2014)
 - Form a special-interest group on classroom voting
 - If you wish to join, contact feng.hao@ncl.ac.uk