

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
1	95%	
2	5%	

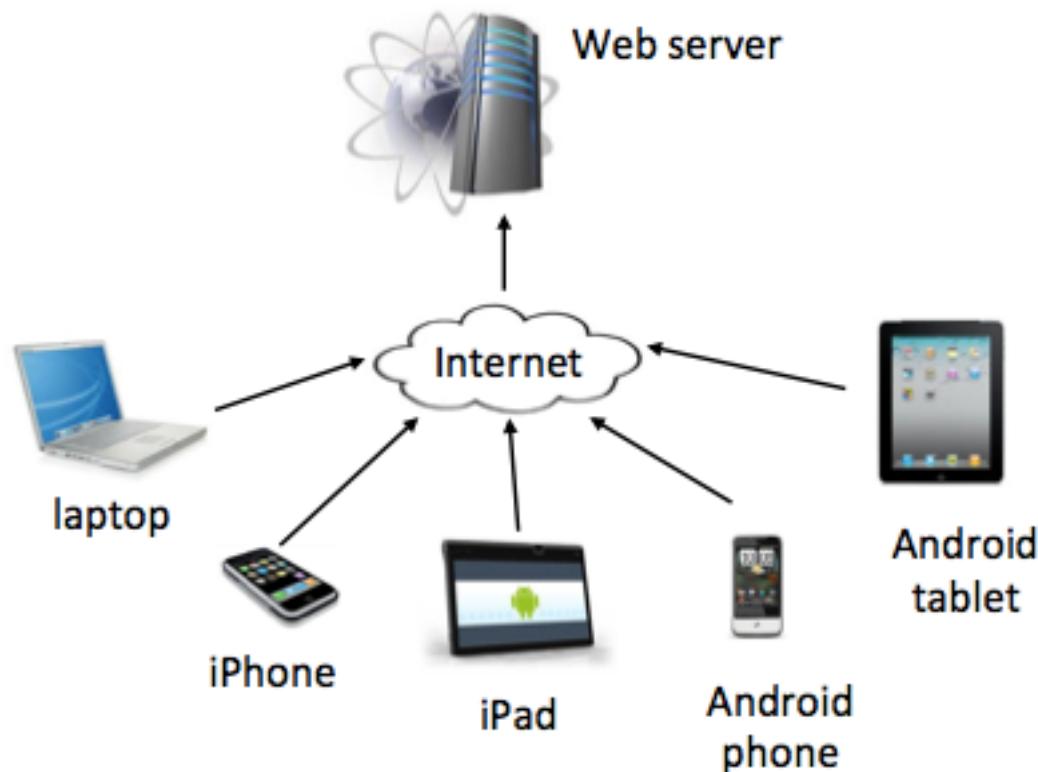
Question 12: Does the voting help you learn?

Answer Number	Text	Votes
1	Yes	19
2	No	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
1	100%	
2	0%	

Overall architecture for VCV system

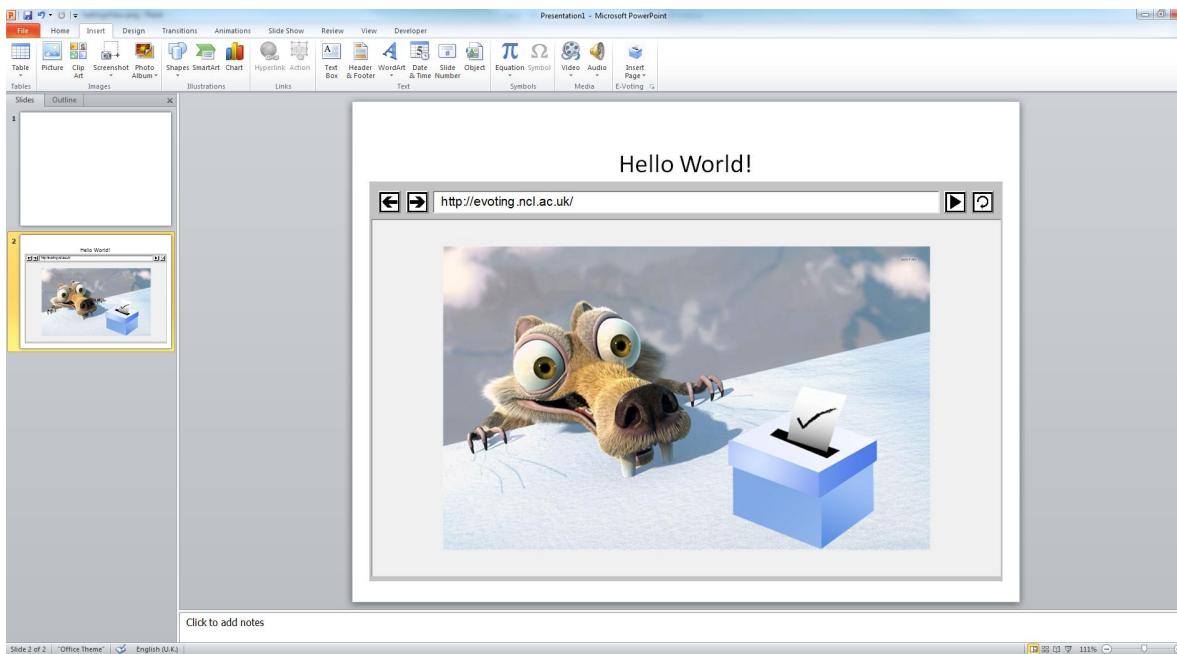


Summary of key features

- **Public verifiability**
 - Voting results can be externally 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/>



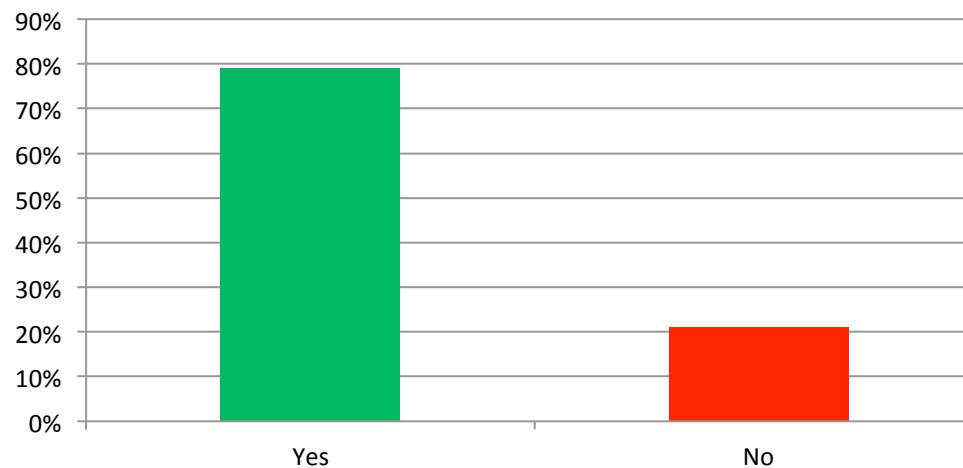
Demo

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