

# Personal Response Systems

## clickers



93% of staff using clickers found them *useful* as an aid to *teaching*

"Brilliant – kept you *involved!*", Biology student

"Tried and tested tool to *enhance* engagement." Dr Simon Bates, Physics



### 1. INTRODUCTION      2. BENEFITS OF CLICKERS/ STAFF PERCEPTION      3. BENEFITS OF CLICKERS/ STUDENT PERCEPTION      4. CHALLENGES OF CLICKERS      5. INNOVATIVE USE AND FUTURE PLANS

#### Clickers

- Aka Personal Response Systems, Electronic Voting Systems, Audience Response Systems
- Handheld devices, which function as remote controls. Lecturer can ask multiple choice questions and students respond using their clickers. Results are aggregated on the spot and shown in class (anonymously).
- Currently University of Edinburgh uses PRS Interwrite IR technology. The College of Science and Engineering (CSE) is the main user with approximately 2000 handsets.

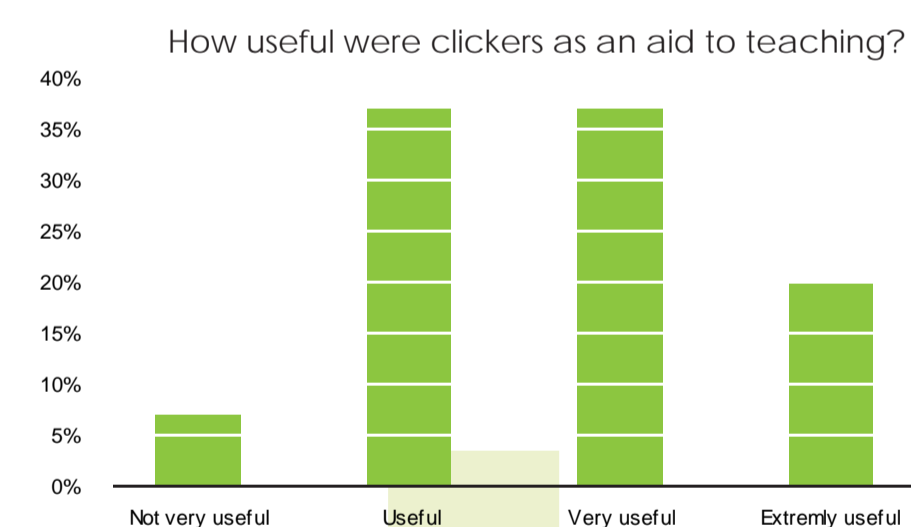
#### Clickers at the CSE

- 2004/2005:** First pilots run in the School of Biological Sciences and Physics funded by Principal's eLearning Fund.
- 2006/2007:** Major push through CSE Learning and Teaching Strategy Project. Acquisition of additional clickers. Six First Year courses in Engineering and Electronics, Informatics, Biology, Physics and Chemistry use clickers.
- 2007/2008:** GeoSciences joins in. Roll out to Second Year courses in Engineering and Electronics, Informatics and Physics. App. 60 lecturers are using clickers.

#### Evaluation

- Staff perception:** study run in 2007/2008 with CSE academics who had expressed interest in using clickers, sample n=57, completed questionnaires: n=33, response rate 58%.
- Student perception:** questionnaire data collected in PHY1A (since 05/06), PHY1B (since 05/06), MAC (Molecules and Cells) (since 04/05), GGA (Genes and Gene Action) (since 04/05), Engineering first and second year (since 07/08), completed questionnaires: n= 1156, focus groups with Physics and Biology students.

#### 2. BENEFITS OF CLICKERS/ STAFF PERCEPTION



#### Staff's ranking of clicker benefits:

- increase interaction between lecturers and students
- get feedback on students' understanding of content
- reveal common misconceptions amongst students
- help students understand difficult concepts better
- help students practice content
- keep students awake
- keep students entertained

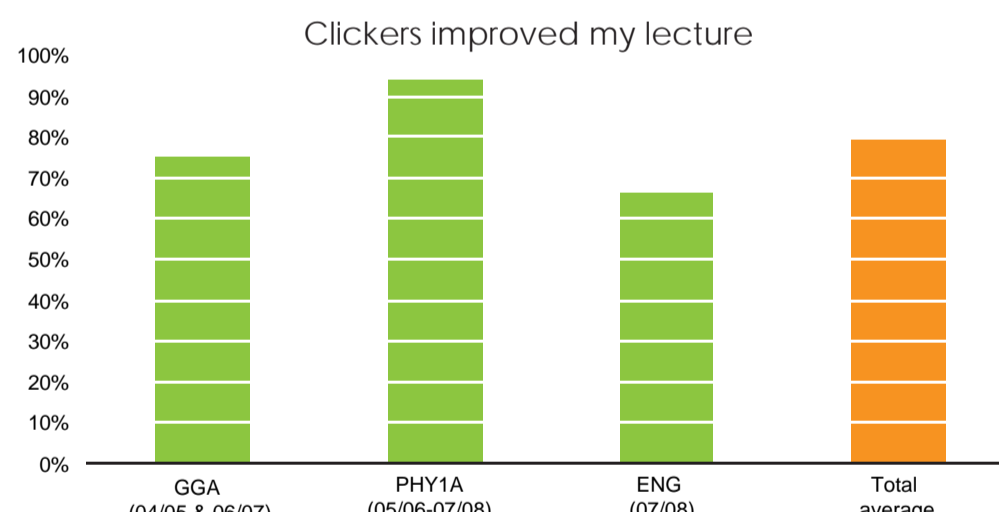
"Students engage better with material if challenged to answer. They then learn the perception of the rest of the class as does the lecturer who can judge whether the issue has been learned or needs reinforced." Dr Heather McQueen, Biology

"Engagement is the biggest problem I have with some students. The first clicker question I used demonstrated that they hadn't been engaging, but as we progressed through the material, the students took it seriously and really followed along with what was being said." Dr Dave Laurensen, Engineering and Electronics

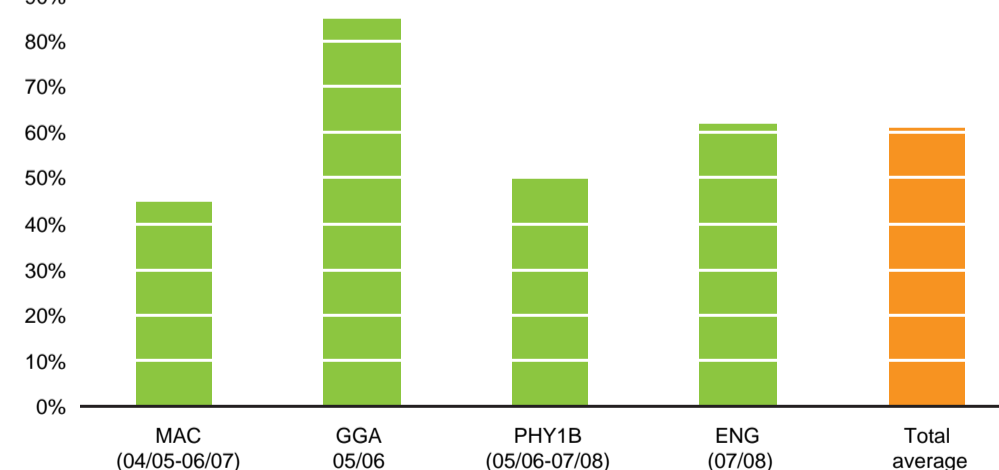
"I think [clickers] encourage students to pay attention, to think, etc in lectures. They allow you to flesh out what you are doing. They encourage engagement. They encourage discussion about physics between students. They enthuse just from the use of such gizmos. They break the monotony. They make me, as a lecturer, think a bit more about what I'm doing. All good." Dr Alex Murphy, Physics

#### 3. BENEFITS OF CLICKERS/ STUDENT PERCEPTION

#### Students' feedback varies depending on course:



#### Clickers are a really valuable tool



#### Students' ranking of clicker benefits (average across all courses)

- feedback to lecturers about students' understanding (73%)
- clickers break up lectures (72%)
- possibility of comparing yourself with others students (72%)
- improving own (students') understanding (59%)

"I still think that they are really useful, they let you know when you haven't quite grasped a certain concept and help to keep me more alert in the lectures!" (Physics student)

#### 4. CHALLENGES OF CLICKERS

#### Technical issues

- Students are very sensitive to perceived wasting of time: "A lot of time spend trying to fix technical difficulties, instead of proceeding with lecture". (Biology student)

#### Importance of explaining answers properly

- Students feel it is important for lecturers to spend time explaining every possible answer, including the incorrect one.

"Clickers could have been really useful, but I don't think the lecturers responded optimally to the results. Questions weren't gone through if a majority got the right answer. This isn't ideal for those getting it wrong - or getting it right by elimination rather than thorough understanding." (Physics student)

"The correct answer was often merely stated or rushed through at the end of the lecture, so we had not time for improving our understanding and thus the clickers were rendered useless." (Physics student)

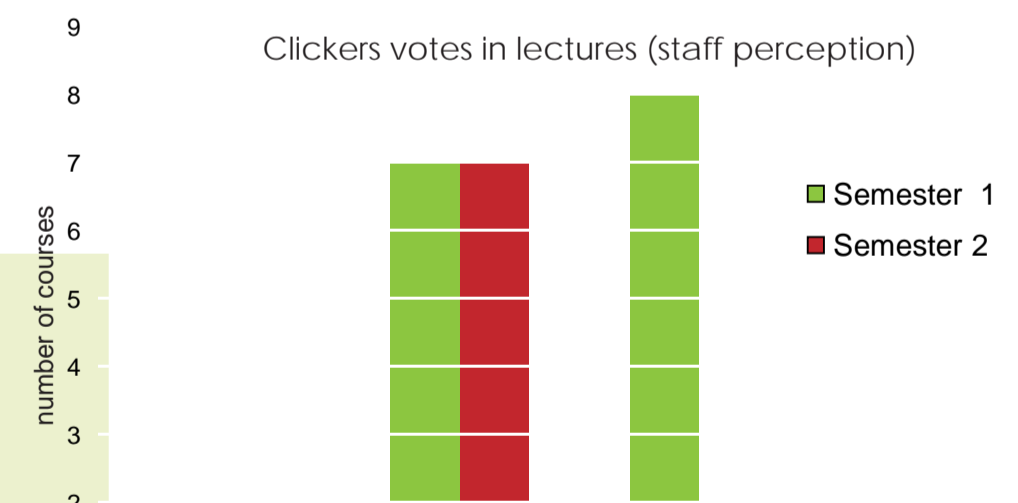
#### Consistent use

- Clickers only work when used consistently over the course of a semester and by the whole course team.

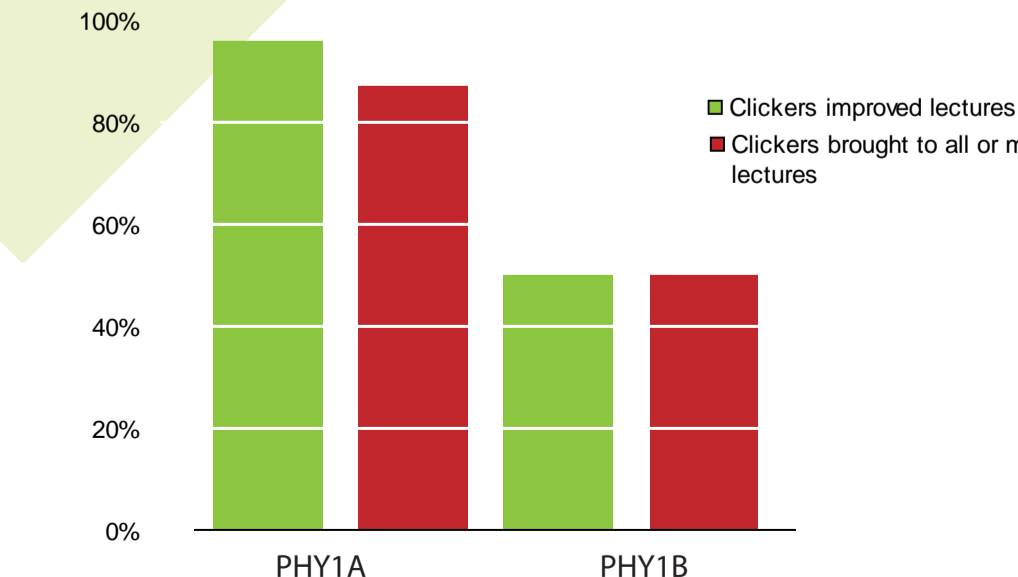
"Clickers were not used often in the first part of the course, which meant that it was easy to get out of the habit of bringing them to lectures. Having used them before, I can tell that clickers can be very useful." (Physics student)

#### Low response rates

- There is some evidence that students start to disengage with clickers with time, especially in Semester 2 courses.



Student perception (strong correlation of clickers brought to lectures with perceived usefulness of clickers)



#### 5. INNOVATIVE USE AND FUTURE PLANS

#### Innovative use of clickers

- 41% of lecturers use clickers for revision (either of previous lectures or before exams)
- 41% of lecturers ask student to re-vote on a question, after either having explained a concept in more detail or after asking students to discuss problem with their peers
- 19% of lecturers use peer-instruction (discussing and voting in pairs)
- 11% of lecturers do a "Pub style" quiz
- 7% of lecturers ask students to use high and low confidence buttons (to show students' level of confidence that the chosen answer is correct)

"Possibly the most productive application, however, and the one with the largest body of existing research, is in using the equipment to initiate a discussion." (Steven Draper, Glasgow University)

#### Future Plans

- 2008/2009 University-wide upgrade to RadioFrequency system
- Benefits: simple installation with a single USB wireless receiver, no line of sight issues, students receive confirmation that their response has been logged (2-way communication)

