



# Teaching Toolkit

## Clickers 2: Using Clickers

Author: Paul Surgenor

Email: [paul.surgenor@ucd.ie](mailto:paul.surgenor@ucd.ie)

Date: June 2011

## Emphasis on pedagogy, not technology

Clickers are frequently adopted as a novel way to arouse interest or attention or to make students more alert, attentive, and engaged.

In such cases it's unlikely that clickers will improve levels of interaction or student learning, since the focus is on the handset and not learning (Mayer et al., 2008; Premkumar & Coupal, 2008). A core underlying principle is that the technology should not distract from the pedagogy.

If clickers are being used to encourage greater student participation their introduction should be accompanied by a change in teaching methods, from more traditional teacher-centred methods to student-centred methods. More information on the learning theories associated with student-centred teaching (namely cognitivism and constructivism) can be found in the "Understanding How Student Learn" section of the UCD Teaching and Learning Teaching Toolkit ([click here](#)).

## Common uses

Clickers can be used in a wide variety of methods with any class size. Some of the most popular uses, as outlined by Caldwell (2007) are mentioned below.

1. Increase or manage interaction through questions that:
  - start or focus discussions (Jackson and Trees, 2003)
  - require interaction with peers (Knight and Wood, 2005)
  - collect votes after a debate (Draper, 2002)
2. Assess student preparation and ensure accountability, through:
  - questions about reading or homework (Knight and Wood, 2005)
  - prelab questions
3. Find out more about students, by:
  - surveying students' thoughts about the pace, effectiveness, style, or topic of lecture
  - polling student opinions or attitudes
  - probing students' pre-existing level of understanding
  - asking how students feel about clickers and/or active learning
  - allowing student to compare their views with those of others

## Increase interaction

Clickers can increase or manage interaction, through questions that:

- start or focus discussions (Jackson and Trees, 2003)
- require interaction with peers (Knight and Wood, 2005)
- collect votes after a debate (Draper, 2002)

## Icebreakers & Recapping

- Questions can be asked about basic demographic information to familiarise students with the software, and the info generated can be useful in better understand student experience and backgrounds.
- Used to establish student preparation and levels of understanding and retention from previous classes by asking questions about reading or homework (Knight and Wood, 2005)

## Continual learning

- Clickers prompt students to apply concepts *during* class. Course material then becomes more meaningful because they are consistently seeing how it might appear in actual problems.
- Short periods of lecture (10–12 minutes) are alternated with peer discussions of clicker questions (2–3 minutes) with an average of 3–5 conceptual application opportunities (clicker questions) per 50-minute period.

## Peer Learning

- Students discuss the questions & challenge each other to explain the reasoning behind their answers (Hoekstra, 2008)
- A histogram of student response frequencies is produced and allows both students and lecturer to confirm visually how well the students have grasped the concepts being learned

## Evaluation

- Provides information to students and instructor about where further learning or teaching needs to occur (Oerman & Gaberson, 2006); assesses students' ability to apply lecture material to a new situation; and allow students to assess their own level of understanding at the end of a class (Halloran, 1995)
- Allows lecturers to continuously monitor in real time whether students are confused (Cutts *et al.*, 2004)

## Quizzes

- Quick in-class quizzes for self-assessment for the students or to contribute to a grade (if clickers are linked to students).
- Quiz questions typically check whether students are paying attention, keeping up with homework, actively thinking, or able to recall material from previous lectures (Draper, 2002).

Figure 1. Common Uses of Clickers

4. Formative assessment, through questions that:

- assess students' understanding of material in lecture
- reveal student misunderstandings of lecture (e.g., Wood, 2004)
- determine future direction of lecture, including the level of detail needed
- test students' understanding of previous lecture notes
- assess students' ability to apply lecture material to a new situation
- determine whether students are ready to continue after working a problem (Poulis et al., 1998)
- allow students to assess their own level of understanding at the end of a class (Halloran, 1995)

5. Quizzes or tests (Draper, 2002) although reports of using clickers for summative high-stakes testing are relatively rare. Quiz questions typically check whether students are:

- paying attention
- taking good notes
- preparing for class or labs
- keeping up with homework
- actively thinking
- able to recall material from previous lectures
- exploring linkages with other topics or applying information in new settings

6. Practice problems, especially in mathematics, chemistry, engineering, or physics courses

7. Guide thinking, review, or teach, including questions used to:

- review at the end of lecture
- give prelab tutorials (Draper, 2002)
- review for a test (Jackson and Trees, 2003)
- lead students through a multistep process by asking which step should come next (Wood, 2004)
- distinguish between related ideas or show parallels or connections between ideas (Beatty, 2004)

8. Conduct experiments on or illustrate human responses (Draper et al., 2002; Simpson and Oliver, 2006)

Some less common but innovative uses include:

- using an ARS as a “clapometer” to continuously monitor in real time whether students are confused (Cutts et al., 2004)
- using an ARS for “differentiated instruction” to track the level of understanding and progress in a small class with unevenly distributed abilities (Parsons, 2005)
- using questions with multiple correct answers or only partially correct answers to prompt discussion (Burnstein and Lederman, 2001).

## Web resources

Some additional information on clickers can be found at the following websites:

<http://derekbruff.com/teachingwithcrs/>

<http://www.cmu.edu/teaching/clickers/pdfs/clickers-pedagogicalvalue.pdf>

<http://net.educause.edu/ir/library/pdf/ELI7002.pdf>

[http://www.sciencecases.org/clicker/herreid\\_clicker.asp](http://www.sciencecases.org/clicker/herreid_clicker.asp)

<http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/EnhancingStudentLearninginaGra/192963>

[http://prezi.com/gwh2\\_e5r6tme/connecting-with-participatory-culture-clickers-and-deep-learning/](http://prezi.com/gwh2_e5r6tme/connecting-with-participatory-culture-clickers-and-deep-learning/)

<http://www.facultyfocus.com/articles/effective-teaching-strategies/can-clickers-enhance-student-learning/>