

Engaging the “Thumb Generation” with Clickers

JOHN IMMERWAHR
Villanova University

Abstract: This article is an introduction to classroom response systems (“clickers”) for philosophy lecture courses. The article reviews how clickers can help re-engage students after their attention fades during a lecture, can provide student contributions that are completely honest and free of peer pressure, and can give faculty members a rapid understanding of student understanding of material. Several specific applications are illustrated including using clicker questions to give students an emotional investment in a topic, to stimulate discussion, to display change of attitudes, and to allow for the use of the peer instruction technique, which combines lectures and small groups.

Many colleges and universities are using classroom response systems (“clickers”) in an increasing number of courses.¹ There is a great deal of research available on the use of clickers (especially in the sciences), but they are only just now making their way into humanities courses.² In one way, clickers add nothing new. Professors have always polled their classes by asking for a show of hands (or giving a quiz) and clickers do nothing more than this. But, as with many new technologies, speed, accuracy, and graphics add enormous possibilities to an old approach. In this article I argue that clickers are, in many ways, ideal for philosophy classes, especially lecture courses. I briefly explain how the system works, discuss some general advantages and potential problems, and then describe and illustrate some specific applications.

How Does the System Work?

The general idea is surprisingly simple and familiar to anyone who has seen the “ask the audience feature” on the quiz program *Who Wants to be a Millionaire?* Students buy a clicker in the bookstore along with the other required texts for the course. A number of different vendors are now producing clickers.³ The clickers are small (about the size of a cell phone) and typically cost under \$50. There is also a market for

used clickers, and, unlike a textbook, a clicker can be used in other courses, especially as universities standardize on a specific clicker system for the campus. The technology for the instructor is also simple. The classroom needs to be set up for projection, and the instructor needs a computer with PowerPoint. The only other piece of hardware is a receiver, which is a small device (it looks sort of like a flash drive) that plugs into a USB port. The associated software package modifies PowerPoint (without changing it permanently) and adds a new tool bar. With the new tool bar the instructor can create forced-choice questions, either using preset templates such as multiple-choice, “yes-no,” or Likert “agree-disagree” questions, or by making custom designed questions. During the lecture, the instructor’s question appears as a PowerPoint slide, the students use their clickers to key in an answer to a multiple choice question, and, after the students have voted, the instructor shows a graph of the answer. None of this is especially difficult to master. See the appendix (p. 243) for some sample slides.

For those who want to experiment without making a commitment to clickers, much of what is discussed below can be done with specially designed flash cards. Monash University has a website with files for printing a very handsome and professional looking set of flashcards.⁴

General Advantages

Clickers have a number of advantages, especially in lecture classes:

1. *Students love using them.* For better or worse, today’s students (especially traditional-age students) enjoy playing with technology in general and they have earned the nickname the “thumb generation” for their fondness for texting. The student response to clickers is, perhaps not surprisingly, extremely positive.⁵ The students enjoy using the devices, registering their own opinion, and comparing what they think to the views of their classmates. Perhaps this is a symptom of what some researchers have seen as growing narcissism among young adults,⁶ but, whatever the cause, they also like seeing their own opinions become a part of the lecture.

2. *“Resetting” attention.* We also know from a variety of sources that undergraduates have rather limited attention spans, and cannot typically sustain their interest through long lectures and need some periodic intervention to reset their attention.⁷ St. Augustine, writing in the year 400, advised teachers to deal with flagging attention by reawakening the students with a remark “spiced with seemly good humor.”⁸ While jokes and stories can wake the students up, they sometimes distract from the content. Another way to break up a lecture is to introduce a different kind of learning activity, and several studies have documented

that students learn more effectively if lectures are broken up with a learning activity that changes the pace.⁹ For example, some professors punctuate a lecture with small group discussions. Clickers provide an effective way to accomplish several goals at once. They provide a change of pace, but they do so in a way that focuses attention on course content. Inserting a clicker question not only gets students doing something active (which is a good thing in itself) but it does so in a way that gets the students to think about the material being discussed, respond from their own knowledge and perspective, and then compare their own response to that of their classmates.

3. *Honest answers.* Another advantage of clickers is that students give a response that is both anonymous (in that no one knows how they voted) but also free from peer pressure (because they also don't know how other students are voting).¹⁰ No matter how open and friendly we try to be, the classroom is not always a safe place for students to express their opinion. Students spend a lot of energy asking themselves what we want to hear, or what will make them look bad to us or, often more significantly, to their peers. What seems to us to be a simple question (“Does everyone understand what I just explained?”) raises a variety of issues for a typical immature student in a large lecture. With clickers—perhaps for the first time—we actually get quick, clear, and honest answers.

An anecdote from my own institution drove this point home for me. Each year we do faculty sexual harassment training sessions. In these sessions we present the faculty members with some brief case-studies. In the past we asked participants to indicate by show of hands whether they felt these were examples of sexual harassment. The cases are so briefly sketched out that any answer is possible, depending on what context is assumed. This year, for the first time, we used clickers for the training. What was striking was that we got much more disagreement about the cases using clickers than we have ever received in previous trainings that relied on show of hands. What this suggests, of course, is that even faculty members watch to see how others vote before they raise their own hands. If faculty members are hesitant to express their views in a group, imagine how freshmen feel.

4. *Assessing student learning.* Many teachers use graded quizzes and tests as a way of assessing student learning. Several researchers have suggested that *ungraded* assessments of student learning—sometimes known as Classroom Assessment Techniques (CATS)—can be just as useful in improving student learning.¹¹ Some of the recommended techniques are “one-minute papers,” where students are asked to explain the major point being covered, or “application cards,” where students take a minute write about a real world application of the point just being discussed in class.¹² The teacher can then quickly read a few of the

responses in class, and read the rest at a later point. On the one hand, these evaluations help the student focus and engage actively with the material, and they also help the instructor understand whether students are learning the material (without the necessity of formally grading a set of quizzes). The problem is that they take up valuable time, not only as the students write their thoughts, but also waiting for the slower students to finish, collecting the papers, and reading the responses.

Clickers allow for much more rapid and efficient way to assess student background and knowledge. They give the faculty member a completely honest and accurately tabulated response in real time. With this knowledge, a faculty member can quickly modify the next part of a lecture. The approach has the added advantage of letting the students themselves understand where they stand in relation to their classmates.

Specific Applications in Philosophy Courses

I have been using clickers in my introductory philosophy class for several semesters. Some of the most interesting uses are:

1. *Helping students to have an emotional investment in an issue.* There is a problem in teaching philosophical texts, especially in introductory courses. The great philosophical texts were often written to provide an answer to a question that was immediate and important for the intended audience. When we teach our classes, we sometimes end up reversing the process. We present the answer, and then try to help our students see what the question is. It often works better, then, to begin a discussion of a text by getting the students to think for themselves about the question to which that text is the answer. This is easy to do in a seminar, but harder to do in a lecture. We can describe the question ourselves, but that is not the same as getting the students themselves to engage with it. With clickers, the instructor can begin a topic by having students register their own opinion on the issue at hand. For example, Plato's *Euthyphro* is about many things, but at least one question to which it is the answer is this: "Who is more dangerous to the state, a believer, such as Euthyphro, or one who questions stories about the gods, such as Socrates?" This was a question, literally, of life or death to Socrates and Plato, and the *Euthyphro* is Plato's attempt to answer it.

In order to get the students to engage with this question, I precede my discussion of *Euthyphro* with the following clicker questions:

- Q1. Which comes closer to your view?
 - a. Morality is closely connected to religion.
 - b. Religion has little to do with morality, they are separate issues

- Q2. People who attack religion are undermining society.
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree

Note that these are not necessarily well-formed survey questions, and, indeed, one could also spend quite a bit of time talking about the questions themselves (see below). But they are clear enough for students to give a quick answer. I typically get a majority level of agreement with the more religious options (Q1a, and Q2a or b).

Using questions such as these to establish a baseline of student opinion before a discussion has some advantages. First, the questions alert the students to some of the larger issues that we will be discussing during the class. It also gets them to think about those issues and come to their own conclusions before diving into the details of the text. Because they have thought about the issue and taken a small stand for themselves, they seem to develop a greater emotional investment in the topic.¹³ Finally, it allows the instructor to reference the students' own views during the course of the discussion. My subjective impression is that the students are much more engaged in the ideas discussed in the dialogue after they have taken the time to register their own opinions on some of the questions.

2. *Pre and post questions.* Adding another level of complexity involves using clickers to display a change in attitudes during a class or over the semester. In my *Euthyphro* class, for example, after polling the student's general attitudes on morality and religion (as described above), the students participate in a lecture-discussion of some of the arguments in *Euthyphro*. We discuss whether Euthyphro's naïve definitions of moral terms provide satisfying answers to moral questions. Students usually see that Euthyphro's definitions either give no answer to moral questions or give inconsistent answers, thus allowing Euthyphro to justify actions that (at least in Plato's own context) would seem morally questionable.

At the end of the discussion, I ask questions Q1 and Q2 a second time. Interestingly, in the second round of questions many students move away from the religiously based understanding of morality that they expressed in the beginning of the class. The change in opinion is not remarkable in itself. The students' first responses were quick and unreflective, so it is hardly surprising that they come to a more critical understanding of the issue. What is more interesting is the reaction of the students themselves to the shift in opinion. What I have observed is that when I move to the slide that shows a change in attitudes, there is an audible commotion in the room, with small side conversations and exclamations. The fact that students have changed their opinions

makes a useful point. Whereas students sometimes say that moral questions are all a matter of opinion and that rationality has nothing to do with it, the students see for themselves that philosophical discussion can, in fact, change opinions on a controversial matter. My sense is that it invests the process in their minds with greater seriousness. See the appendix for another example of pre- and post- questions on Descartes' *Meditation I*.

3. *Discussion starters.* As a variation of this technique, a set of clicker questions can be used as a discussion starter. One obvious way to do this is to pose a controversial question where students will typically have some disagreement. For example, in explaining his definition of morality, Augustine (in a sentiment made famous by former President Jimmy Carter) argues that a man who lusts after another person's wife—but does not act on his desire only out of fear—is as guilty as someone who does commit adultery with another's wife. While teaching the relevant passage in *Of Free Choice of the Will*, I pose that issue as a clicker question.¹⁴

- Q3 Which person's action is, in your view, more sinful?
- a. A person who actually commits adultery with another person's wife.
 - b. A person who wants to commit adultery but does not do so because of fear of rejection or discovery.
 - c. Both are equally sinful.

This question typically yields quite a bit of disagreement between options a) and c). In some classes I also get a few people who think b) is the most sinful; they argue that this person is both lustful and a coward.

When a question elicits some clear disagreement, the instructor can use the results to prompt the beginning of a discussion. As soon as the results are displayed, the instructor might say: "I see we have some disagreement on this question. First, let's get a few comments from some of those who voted for option a) and then we'll get some comments from those who voted for c)."

Starting a discussion with a clicker question reduces two of the most common obstacles that inhibit class discussion. One of the reasons why some students do not participate in a discussion is that they are worried that what they have to say may appear stupid. When these students see that other students in the class share their view, they may be more confident in expressing their own ideas. Another reason that some students hold back from a discussion is that they need more time to collect their thoughts before participating in a discussion. These are the students who say, "By the time I think of what to say, the discussion has moved on." Once they get used to the process, the

clicker question gives them a heads-up on both the topic and format of the discussion that will follow, and they can use the time to start to formulate their own responses.

4. *Peer Instruction*. One of the most sophisticated (and well studied) uses of clickers is a technique known as Peer Instruction (PI). This approach was pioneered in science classes, but recently a group of Australian philosophers—Sam Butchart, Toby Handfield, and Greg Restal—have done a very thorough study of this technique for philosophy courses.¹⁵ Their grant-funded research is especially impressive because they have done formal evaluations of PI along a number of dimensions, including research that shows that students do better on tests in classes that use PI compared to similar classes where PI is not used. The authors feel that while clickers are a perfectly acceptable way to do PI, they feel that PI can be done equally well with low-tech methods such as the flash-card technique described above.

A typical PI class starts with a short lecture of about 15 minutes. After the initial lecture, the instructor poses a multiple choice question to the students. The students are then asked to register their answer, either by show of hands, voting with colored cards, or with “clickers.” If the question asks for an opinion with no correct answer, the instructor can quickly see if there is disagreement on the answer. If there is significant disagreement, the instructor can use this as a discussion starter either for the whole class (as described above) or to stimulate a discussion with small groups in the class.

Often, however, the PI technique employs questions that have a correct answer that will not be obvious to students who have not read or understood the material. Here is an example that the authors give from a class on theories of knowledge:

Jones believes that his wife is having an affair on the grounds that he saw his wife with a strange man in a cafe. As it turns out, his wife is having an affair, but not with the man Jones saw her with. On which theory of knowledge would Jones know that his wife is having an affair?

- A. justified true belief
- B. causal theory of knowledge
- C. Nozick’s theory
- D. none of the above¹⁶

The students then vote on this question, and the results are displayed. If most of the students agree on the correct answer, the instructor can confirm that this is indeed the correct answer, briefly clarify misconceptions, and then move on.¹⁷ If most of the students have the wrong answer, the instructor can take some extra time to clarify the issue and possibly even ask the question again. If the students disagree

about the answer (with some having the correct answer and others exhibiting confusion) the instructor breaks the students up into small discussion groups, and then asks the students to discuss the question in their groups and to try to convince each other of their answer. The instructor then re-polls the students on the question, to see if more students now have the correct answer. If most of the students now get the correct answer, the instructor can confirm that this is so, briefly clarify the problem with the remaining wrong answers, and then move on. If the students are still confused, the instructor may need to spend additional time clarifying. Butchart and his colleagues give a number of examples of how they use this technique in various philosophy classes. There are many variations. For example, in a logic class, the instructor might show an argument, and ask the students to identify the conclusion of that argument.

This approach has documented positive effects on student learning, and is often used in science classes. Apparently the effort of exploring and discussing the question contributes significantly to how well students learn the material.

6. *Discussions about the questions themselves.* Interestingly, using clickers sometimes provokes questions about the clicker questions themselves. For example, after discussing some of the arguments in Plato's *Phaedo*, I asked the students this question:

- Q4 Focusing on material things can distract you from paying attention to higher things that give more lasting happiness
- a. Strongly agree
 - b. Somewhat agree
 - c. Somewhat disagree
 - d. Strongly disagree

One result of this question was to show that a fair number of the students agreed with Socrates' view that concern for material things prevents the soul from investigating higher things. But one student challenged the wording of the question, remarking that she agreed, but only because of the phrasing "can distract." She pointed out that she would have voted differently if the wording had been "will distract" or "usually distracts." This led to an interesting discussion as other students qualified their own views. My thinking is that having students make fine distinctions in the wording of questions is, in itself, a useful topic for an introductory philosophy class. In some cases, I have changed a question during the lecture (or told the students to read the question in a different way) and asked students to vote again, to see how their thinking changes with different formulations of the question.

7. *Quizzes, attendance, house-keeping.* There are also a number of familiar but completely mechanistic tasks that go more efficiently with

clickers. For example, even as simple a question as “How many of you were able to get the book in the bookstore?” can consume precious class time if done by show of hands. (One clicker enthusiast used the devices to take orders for a pizza party, “How many slices will you eat?” “What toppings?” “Diet or regular soda?”) The clickers are also useful for asking students questions about the course itself. In the beginning of the semester, I discuss a series of goals for our course. At regular times during the semester, I poll the students to see whether they think we have accomplished those goals. Their answers provide useful feedback for me. The questions also remind the students of the course goals and, if the students agree that the goals are being met, it gives them a greater sense that they are making progress in the course.

Other instructors have had success using clickers for quizzes with multiple choice answers (these are particularly appropriate for extremely large lecture courses). It is possible for students to register their clickers so that the responses are automatically coordinated with a classroom management system such as Blackboard/WebCT. What this means is that the quiz can be automatically graded with the results entered into the classroom management system. Professor Stephen Daniel, of the University of Texas at Austin, has a massive database of multiple choice questions.¹⁸ Of course there are some possible academic integrity abuses, for example, if a student gives a clicker to another student to enter answers. These problems are hardly likely to be greater than the existing problems with students copying pen and paper answers from other students. Minimally, the clickers can be used to automatically record attendance. Of course, if the clickers are registered there are some potential problems with student anonymity, but there are also ways to deal with this.¹⁹

*Potential Problems*²⁰

1. *Getting students to buy the clickers and bring them to class.* The bookstore manager in my institution is convinced that many students just do not buy the assigned textbooks for their courses, either at the bookstore itself or from Internet vendors. They either share the textbook with someone else or just don’t read it at all. Students who do own the assigned texts often don’t bring them to class, even if the instructor will be doing close readings of the text. So getting students to buy clickers and bring them to class is also an issue. One solution is to use the clickers for quizzes or taking mandatory attendance, so that students who don’t bring a clicker are penalized. My own practice is to ask the students to hold up their clickers so I can see them, and then ask the students who do not have one whether they will be bringing

their clicker to the next class. After awhile, all of the students bought a clicker and brought it with them.

2. *Technological problems.* As with any new technology, faculty members who introduce clickers should expect some glitches and frustrations. Some faculty members who used clickers in the past had disappointing experiences with them, partly because many of the older clickers used an unreliable infra red (IR) technology similar to the remote controls for TVs. As clicker technology has matured, most of the systems have switched over to radio frequency (RF) technology, which is much more satisfactory and does not require line-of-sight transmission.²¹ Many of the systems provide some signal on the clicker itself to let the user know that the response has been received. However, the RF systems require the students and the faculty member to be using the same channel, which can create new problems.

Of course, students still do complain that there was a technological problem such that the system did not register their attendance or their correct quiz answer (just as they claim that written or e-mailed assignments were sent but not received). My approach is to immediately accept the student's word and give him or her full credit; since these quizzes usually count for only a few points a dishonest student would not really gain much. However, the students also realize that I will be less sympathetic to a student who makes the same claim repeatedly.

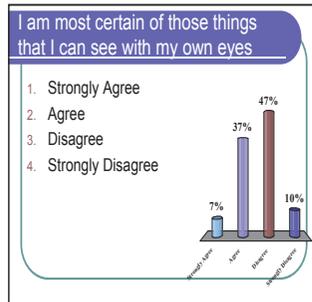
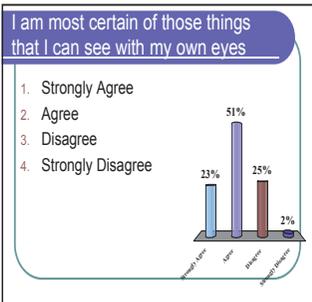
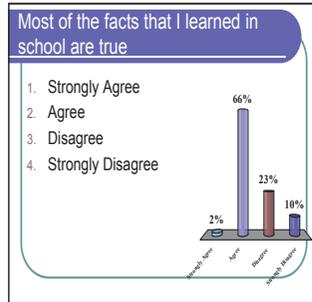
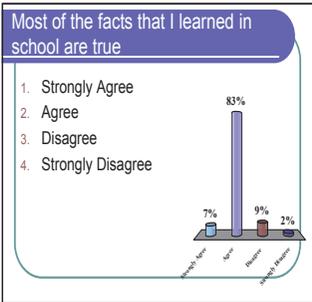
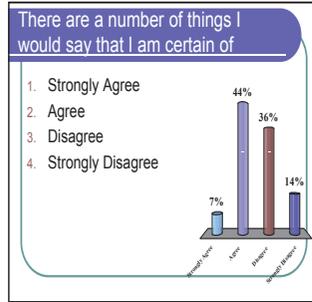
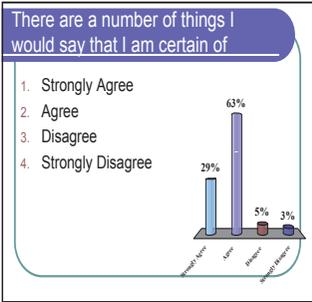
The Future of Clickers

Are clickers a passing fad? My impression is that clickers are going to play a greater and greater role in higher education in the coming years. There are hints that a new technological breakthrough may also be in the works, so that students can use their cell phones as clickers, rather than buying a specific piece of hardware. This would, of course, make using clickers even more appealing. It would also give the students something positive to do with their cell phones in class, rather than texting their friends during our lectures.

Appendix

Before discussing
Meditation I

After discussing
Meditation I



Notes

1. I am grateful to the two anonymous reviewers from *Teaching Philosophy*, for their helpful suggestions.

Many university teaching centers now have websites for their faculty who use clickers; see, for example, Ohio State University, "Clickers," <http://telr.osu.edu/clickers/> (accessed January 12, 2008).

2. For a recent discussion of clickers in the sciences, see M. K. Smith, W. B. Wood, W. K. Adams, C. Wieman, J. K. Knight, N. Guild, and T. T. Su, "Why Peer Discussion Improves Student Performance on In-Class Concept Questions," *Science Magazine* 323 (2009). For a review of research on clickers, see Jane Caldwell, "Clickers in the Large Classroom: Current Research and Best-Practice Tips," *CBE Life Sciences Education* 6 (2007). For a useful guide to getting started, including a taxonomy of clicker questions, see Derek Bruff, *Teaching with Classroom Response Systems: Creating Active Learning Involvements* (San Francisco: Jossey-Bass, 2009).

3. For a review and comparison of six different commercially available clicker systems, see Maryfran Barber and David Njus, "Clicker Evolution: Seeking Intelligent Design," *CBE Life Sciences Education* 6 (2007): 1–9. My own experience is with the system from TurningPoint (www.turningtechnologies.com). Some of what is said here may not apply directly to other systems.

4. Monash University, "Voting Mechanisms," *Peer Instruction in the Humanities*, <http://www.arts.monash.edu.au/philosophy/peer-instruction/using/voting.php> (accessed February 17, 2009).

5. University of Michigan, Center for Research on Learning and Teaching, "Student Attitudes," *Teaching with Clickers*, <http://www.crlt.umich.edu/inst/clickerattitudes.php> (accessed February 10, 2009).

6. Jim Westerman, "Motivating Generation Y in the Classroom," *Teaching Excellence* 18:5 (2006–07): 2.

7. William E. Cashin, "Improving Lectures," *Idea Papers* 14 (1985).

8. Augustine, *Instructing Beginners in Faith [De catechizandi rudibus]*, trans. Raymond Canning (Hyde Park, N.Y.: New City Press, 2006), 100 (13.19).

9. Charles C. Bonwell and James A. Eison, "Active Learning: Creating Excitement in the Classroom," *ASHE-Eric Higher Education Report*, no. 1 (Washington, D.C.: George Washington University, 1991).

10. M. Freeman and P. Blayney, "Anonymity and In-Class Learning: The Case for Electronic Response Systems," *Australasian Journal of Educational Technology* 22:4 (2006).

11. Thomas A. Angelo and K. Patricia Cross, *Classroom Assessment Techniques: A Handbook for College Teachers* (San Francisco: Jossey-Bass, 1993).

12. *Ibid.*, 29.

13. E. Wit, "Who wants to be . . . : The Use of a Personal Response System in Statistics Teaching," *MSOR Connections* 3, no. 2 (2003): 16.

14. Saint Augustine, *Of Free Choice of the Will*, trans. Anna S. Benjamin and L. H. Hackstaff (New York: Macmillan/Library of Liberal Arts, 1989): 8 (I.iii.20).

15. Sam Butchart, Toby Handfield, and Greg Restal, "Using Peer Instruction to Teach Philosophy, Logic, and Critical Thinking," *Teaching Philosophy* 32:1 (2009): 1–40. Their article is based on the work they have done at Australia's Monash University, and much of their thinking is also available on a website at Monash University, "Peer Instruction in

the Humanities,” <http://www.arts.monash.edu.au/philosophy/peer-instruction/> (accessed February 16, 2009).

16. Butchart, Handfield, and Restal, “Using Peer Instruction to Teach Philosophy,” 11.

17. *Ibid.*, 5.

18. Stephen H. Daniel, “Past Introduction to Philosophy Courses,” <http://philosophy.tamu.edu/~sdaniel/251regular.html> (accessed December 12, 2008) (scroll to bottom of page for the link to past tests).

19. My students don’t seem to care too much about whether I could potentially find out how they answered a question. However, I sometimes tell them I will reset the question after they vote (they can see this happen), or in a really extreme case, I have asked the students to switch clickers with a student near them so that there is no possible way that I could determine who said what.

20. For a more detailed discussion of technical and logistical problems, and tips on vendor selection see Bruff, *Teaching with Classroom Response Systems*, 161ff.

21. Barber and Njus, “Clicker Evolution,” 2.

John Immerwahr, Department of Philosophy, Villanova University, Villanova PA 19010; 610/519-5356; www.homepage.villanova.edu/john.immerwahr; john.immerwahr@villanova.edu

