FACULTY CENTER FOR TEACHING & LEARNING

(Please contact fctl@mercy.edu for more information)
Introduction

- Introduction
- History of i-clickers
- Benefits
Clickers, also known as classroom response systems or audience response systems

- Are instructional technologies that enable instructors to rapidly collect and analyze students' responses to questions during class
- Can be used to poll an audience or group on any desired content
How does it work?

- Students use a "clicker" - portable, handheld device that allows students to vote.
- Instructors use a receiver that collects votes sent by students’ clickers (powered through any computer’s USB port).

Instructors present a question and enable polling.
- Each student responds by “clicking” the appropriate button for his or her choice.
- A wireless signal is sent immediately from each responding clicker to the receiver.
- The receiver stores the data of each individual student.
- The instructor can then display voting results in a graph, to the audience.
- The results are also available for later analysis.
Hardware
Remote
Base
Hardware Setup

There is no installation needed for hardware or software.

1. Plug receiver/base into your computer’s USB port.
2. Plug flash drive into the computer’s USB port.
Software Setup

1. Look in “My Computer” to locate the flash drive
2. Please note that your computer will not detect the base, so you will not see it listed in “My Computer.” Only the flash drive will be recognized as a “Removable Disk.”
Software Setup

This is what you will see on the removable disk (flash drive).

The MyCoursePC and MyCourseMac folders contain the application software for i>clicker.
User the “MyCourse” folder corresponding to the platform you are using (generic template exists)

Are you teaching multiple sections or courses using i>clicker?

If so, you will need to make copies of the software folder for each separate section/course.*

*A good way to remember this: You will need a separate folder for each class with a different roster.
To make separate copies, simply copy and paste the MyCourse folder to create exact copies for each class section in which you intend to use i>clicker.

So if you will use i>clicker for three sections of Intro Psych and one section of Bio Psych, you will need four copies of the MyCourse folder, each titled so that you will recognize them as corresponding to that course.

Repeat the process for each section in which you will use i>clicker.

Rename your folder accordingly.
Software Setup

From the MyCourse PC folder, launch the iclicker.exe file.

You will see the i>clicker start-up screen.
iClicker Remote

- Turn on the clicker by pressing the bottom “On/Off” button.

- A blue “Power” light will appear at the top of the remote.
When a question is asked (Instructor will start the timer), select A, B, C, D, or E as your vote.
Check your “Vote Status” Light:

- **Green light** = your vote was sent AND received.
- **Red flashing light** = you need to vote again.

**Not sure you saw the light? Just vote again.**

**Want to change your vote? You can vote again as long as the timer is still going.**
Using i-Clickers to increase student participation

Preparing to use i-Clickers

- Faculty training
  - Practice with i-clickers before using
- Have students assigned to specific i-Clickers
- Schedule for use of i-Clickers
- Student training
  - Tell students why you are using i-clickers
  - Explain that their responses are anonymous in class, but can be viewed by faculty later
My first impression of clickers is:

A. Please, no more technology
B. Yes, another new toy
C. What is Dr. Fenderson up to now?
D. We are here to learn, not play games
Using i-clickers

What are the benefits of using i-clickers?

A. Engages students in active learning

B. Improves instructor understanding of students’ comprehension of curriculum

C. Make learning fun (for faculty and students)

D. All of the above
Benefits of i-clickers

A. Engage students in active learning
   ○ All students have an opportunity to answer questions
   ○ Forces students to remain actively involved in session.
   ○ Allow anonymous submission of responses (in class)
   ○ Increases the comfort zone of quiet students
   ○ Weaker students realize they are not the only ones who ‘don’t get it;’ may encourage them to ask more questions
Benefits of i-clickers

- Restarting the attention clock
  - Average human attention span: 20 minutes
  - Recall of information decreases after 15-20 minutes
  - At maximum 20-25% of material presented in standard lecture is retained
- Increase student’s retention of what you teach
- Improve student attitudes (!)
“By the way, the I-click teaching system is very helpful. I realized that I was more active and participated more in the classroom by using I-click. As I also wrote down some questions, it was very helpful for me to practice it again for the exam. It also enhances my critical thinking.”
Benefits of i-clickers

A. Engage students in active learning
   - Provides students with immediate feedback about accuracy of their understanding
   - Helps students identify what they do/don’t know
   - Can be used with any class size
   - Can be used to obtain student demographic info
Demographic information

What is your age?
A. 18 – 29
B. 30 - 39
C. 40 - 49
D. 49 +
E. That’s too personal
Demographic information

How comfortable are you with using new technology?

A. As good as Bill Gates
B. Very comfortable
C. Comfortable
D. Not very comfortable
E. I still use a rotary dial phone
Tell students how clickers can help them

- You can compare your understanding of the topic with your classmates.
- You can voice your opinion anonymously.
- The immediate feedback can help you identify the concepts you need to study further.
- It helps the instructor know what you need help with and what you already know.
- You’re involved, so you will learn better.
Benefits of i-clickers

B. Improve instructor’s understanding of student comprehension of curriculum
   - Measure students’ attitudes
   - Determine knowledge of all students, not just “hand-raisers” (strong students or those that like to talk)
   - Assess segments of teaching in real-time
   - Determine what topics might need more emphasis
Benefits of i-clickers

B. Improve instructor’s understanding of student comprehension of curriculum

- Assessment
  - Pre-assessment
    - Do they have expected pre-requisite knowledge?
    - Have they done the assigned reading?
  - Mid-assessment – are they grasping the concepts?
  - Post-assessment
    - Have you achieved your objectives?
Benefits of i-clickers

B. After class review of students’ responses:

- Can provide information about where a particular student is having difficulty
- Can facilitate faculty reflection and course modification
- Can be used to assess the quality of questions asked and the time it takes to answer them
Benefits of i-clickers

C. Edutainment: Education + Entertainment

- Teaching should not be a spectator sport
  - Make learning fun
  - Keep audience engaged (awake)
Determine the use of i-clickers

- To increasing student participation in class
- To grading for attendance/participation
- As a pretesting tool
- For testing
- For evaluation – particular class, course, faculty
Let $Z$ be a standard normal random variable. Which of the following probabilities is smallest?

1. $P(0 < Z < 2.07)$
2. $P(-0.65 < Z < -0.11)$
3. $P(Z > -1.06)$
4. $P(Z < -0.88)$
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Preparation for using i-clickers

Before class

- Prepare several clicker questions in each class session

- Clearly note i-clicker questions on PowerPoint slides
  - Asterisk in corner of slide, symbol, etc.
Preparation for using i-clickers

- Different types of clicker questions that are useful
  - Background knowledge questions prior to discussing a topic
  - Definition & factual questions
  - Questions about applying concepts in real world situations
  - Opinion questions about sensitive topics
  - Typical exam questions to test students’ knowledge
Questions

- Multiple choice
- True-false/yes-no
- Opinions
- Likert-type scale
Integration of i-clickers & teaching strategies

- Pre-testing provides students’ base of knowledge
  - Can structure lecture based on responses
    - Shorten coverage of material if students well versed
    - Concentrate on topics where a gap in knowledge exists
  - Allow extra time to review concept if many students respond incorrectly
Integration of i-clickers & teaching strategies

- Use students' responses as the basis for class discussion. Students can:
  - Explain rationale
  - Debate answers or issues
  - Engage in peer instruction
Debate the answer / Peer instruction

Time Started: 9:57:54 AM
Number of Responses: 24
Number Missing: 0

Correct Answer:
Maximum Score: 0
Class Average: 0.00

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If someone is having a seizure, you should:

A. Insert something in their mouth so they do not swallow their tongue
B. Call 911
C. Turn them on their side
D. Perform CPR
Opinions used to facilitate discussion

- How much do you think cultural factors explain the differences we see between men and women?

A. Not much at all
B. A little
C. They are sometimes useful
D. They explain most of what we see
E. Don’t know/other
Global warming could lead to the shutdown of the North Atlantic’s ocean circulation pattern causing global cooling.

A. Strongly agree
B. Agree
C. Unsure
D. Disagree
E. Strongly disagree
Testing knowledge - Cognitive Domain
Apply Bloom’s Taxonomy

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation
Bloom’s Taxonomy

6. Evaluation: think critically about and defend a position - Judge, justify, defend, criticize
5. Synthesis: transform, combine ideas to create something new - develop, create, propose, design
4. Analysis: break down concepts into parts - Compare, contrast, distinguish
3. Application: apply comprehension to unfamiliar situations - Apply, use, compute, solve, predict
2. Comprehension: demonstrate understanding of ideas, concepts - Explain, interpret, describe
1. Factual knowledge: remember and recall factual information - Define, list, state, name
Knowledge

- Remembering previously learned material, recalling facts, terms, and basic concepts from stated text.
Knowledge
Who is NOT on Mt. Rushmore?

A. Jefferson
B. FDR
C. T. Roosevelt
D. Washington
Comprehension

- Demonstrate understanding of ideas, concepts - State, explain, summarize, interpret, describe
In the sentence, “She called him a jerk,” “jerk” is a(n)...
How many phosphodiester bonds does this compound contain?

A. None  
B. 1  
C. 2  
D. 3
Application

- Apply comprehension to unfamiliar situations - Apply, use, compute, solve, predict
A race car can be slowed with a deceleration of \(-11 \text{ m/s}^2\). If its initial velocity is 55 m/s, what distance will it take to bring it to a stop?

A. 150 m  
B. 140 m  
C. 110 m  
D. None of the above.  
E. Did not finish the problem.
Estimate your share of the national debt. The total debt is about $8.5 trillion. ($8.5 \times 10^{12})$. You may assume everyone in the US has an equal share.

A. $100
B. $1000
C. $5000
D. $10000
E. $30000
Analysis

- Break down concepts into parts
- Compare, contrast, distinguish
- Recognize unstated assumptions and logical fallacies in reasoning
- Distinguish between facts and inferences
Mitochondria are the powerhouses of the cell because they make energy available for cellular metabolism. Which of the following observations is most cogent in supporting this concept of mitochondrial function?

A. ATP occurs in the mitochondria
B. Mitochondria have a double membrane
C. The enzymes of the Krebs cycle, and molecules required for terminal respiration, are found in mitochondria
D. Mitochondria are found in almost all kinds of plant and animal cells
E. Mitochondria abound in muscle tissue
44-year-old smoker presents to the ER with sudden onset shortness of breath. The chest X-ray shows:

A. Pneumonia

B. Pleural effusion

C. Tuberculosis.

D. Severe asthma.

E. Tension pneumothorax
Transform, combine ideas to create something new - develop, create, propose, design
Synthesis

If Homer wrote *The Iliad* today, Stanley Fish and Harold Bloom would argue, respectively, whether the work should be classified as:

A. Existential vs. romantic
B. Postmodern vs. classical
C. Modern vs. romantic
D. Postcolonial vs. modern
E. Preliterate vs. postliterate

• Requires knowledge of *The Iliad* and critical theories of Stanley Fish and Harold Bloom.
Evaluation

- Evaluation: think critically about and defend a position
- Judge, justify, defend, criticize
Which of these lines of research is likely to provide us with the most valid and direct evidence as to evolutionary relations among different species?

A. Analysis of the chemistry of stored food in female gametes
B. Analysis of the form of the Krebs cycle
C. Observation of the form and arrangement of the endoplasmic reticulum
D. Comparison of details of the molecular structure of DNA
E. Determination of the total protein in the cell
A person with Sickle Cell Disease should **avoid** participation in which of the following lab activities?

A. Dr. Campo’s demonstration of hot packs  
B. Dr. Hansen’s cardiovascular workout  
C. Dr. Fenderson’s lab on relaxation  
D. Prof. Hyland’s massage lab

Need to integrate knowledge of pathology of Sickle Cell disease; and various conditions that can affect the cells
Question Quality

- Questions should have explicit pedagogic goal
  - Direct students’ attention
  - Stimulate specific cognitive processes
  - Communicate information to the instructor and students

A charged non-magnetic particle is moving in a magnetic field. What would NOT affect the magnetic force on the particle?

A. The strength of the magnetic field
B. The magnitude of the charge on the particle
C. The velocity component perpendicular to the magnetic field direction
D. The velocity component parallel to the magnetic field direction
Mitochondrial diseases (diseases due to malfunction of mitochondria) can be:

A. inherited maternally
B. transmitted through chromosomal inheritance
C. arise spontaneously
D. A and C
E. A, B and C
1. The use of clickers helped me master the material in the course more easily than in a class where they were not used.

   A. Strongly Disagree
   B. Disagree
   C. Undecided
   D. Agree
   E. Strongly Agree

   Correct Answer:
   Maximum Score: 0
   Class Average: 0.00
2. The use of clickers made learning more interesting and exciting than in a class where they were not used.

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3. The use of clickers encouraged me to participate in class discussions more than in classes where they were not used.

A. **Strongly Disagree**
B. Disagree
C. Undecided
D. Agree
E. Strongly Agree
4. The use of clickers caused me to interact with other students more than in a class where they were not used

A. Strongly Disagree
B. Disagree
C. Undecided
D. Agree
E. Strongly Agree
5. The use of clickers in class helped me perform better on exams than I would have without their use in class.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree
6. I do not feel that the use of clickers made any significant difference in my learning as compared to a class where they were not used.

A. Strongly Disagree
B. Disagree
C. Undecided
D. Agree
E. Strongly Agree
7. I think the use of clickers should be integrated into as many courses as possible.

A. Strongly Disagree
B. Disagree
C. Undecided
D. Agree
E. Strongly Agree
8. I found the use of clickers to be distracting and unhelpful.

A. **Strongly Disagree**
B. **Disagree**
C. **Undecided**
D. **Agree**
E. **Strongly Agree**
9. I think that the clicker questions took time away from the lecture that would have been better used for presenting information.
   A. Strongly Disagree
   B. Disagree
   C. Undecided
   D. Agree
   E. Strongly Agree
Cons to using i-clicker

- Need initial investment in software and hardware
- Training and buy-in from faculty
- Willingness to participate by students
- Using i-clickers decreases time for actual delivery of material during the course of lecture
Preparation for using i-clickers

Practical Issues

- Bring 3 extra AAA batteries to class
- Have a sign-in/sign-out sheet to be sure all i-clickers have been returned