

USING PERSONAL RESPONSE SYSTEMS (CLICKERS) TO ENCOURAGE CRITICAL THINKING IN THE CLASSROOM

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WORKSHOP OBJECTIVES

As a result of this workshop you will be able to...

- explain how learning involves being able to think critically, not just memorizing
- differentiate between active and passive teaching & learning techniques
- evaluate what your role as a teacher is in the classroom
- create an exercise to use while teaching that utilizes clickers to encourage deeper level learning & critical thinking skills
- use polling/clicker devices during class to assess student learning
- compare the advantages and disadvantages of using polling/clicker devices while teaching

QUESTION:

Think of something you know how to do REALLY well (you are REALLY good at)...

Question: How did you become good at this?

- A. Apprenticeship (modeling someone else)
- B. Reading about it
- C. Trial and Error
- D. Listening to lecture(s) on it
- E. Practicing

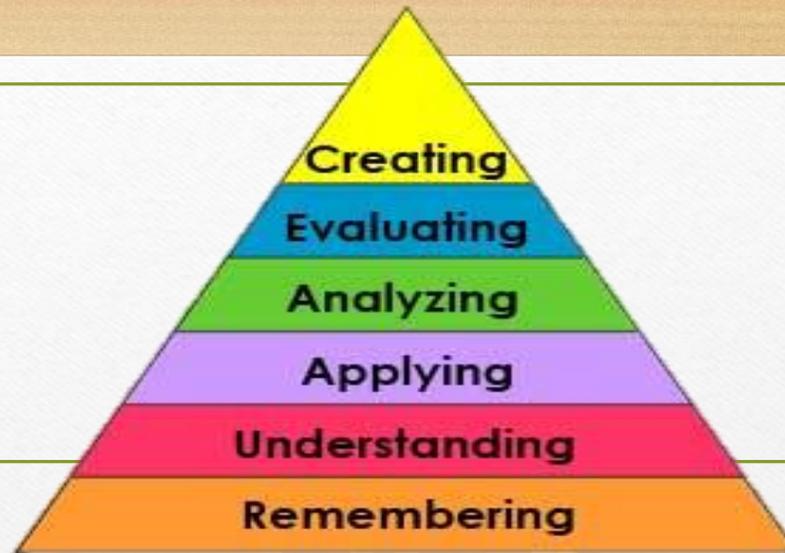
TYPICAL CLASSROOM



HOW SHOULD YOU TEACH IN THE CLASSROOM?

- **2 steps to education/learning:**
 1. Transfer of Information (memorization)
 2. Making Sense out of this information (must use reasoning/critical thinking skills—upper levels of Blooms Taxonomy)

Bloom's Taxonomy



Remembering: can the student recall or remember the information?	define, duplicate, list, memorize, recall, repeat, reproduce state
Understanding: can the student explain ideas or concepts?	classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase
Applying: can the student use the information in a new way?	choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write.
Analyzing: can the student distinguish between the different parts?	appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.
Evaluating: can the student justify a stand or decision?	appraise, argue, defend, judge, select, support, value, evaluate
Creating: can the student create new product or point of view?	assemble, construct, create, design, develop, formulate, write.

TEACHING METHODOLOGY

Question



Based on common misconception

Think



Students individually

Poll



Students individually – **commit** to an answer

Discuss



Find classmate with different answer-try to convince them you are right-he/she is wrong!

Repoll



Student individually – can keep or change answer

Explain



Instructor or a student

EXAMPLE 1: HOW TO DECIDE WHAT THE RIGHT ACTION IS USING UTILITARIANISM?

Utilitarianism: The morally right act = that which produces the greatest amount of happiness for the greatest number of people....

Factors involved in calculating the greatest amount of happiness:

1. Count every person equally
2. Calculate the net (overall) amount of pleasure/happiness
3. Intensity of happiness
4. Duration of happiness
5. Fruitfulness (long-term results/effects)
6. Likelihood (what are the chances of an act's consequences successfully occurring)
7. Quality of happiness

TEST YOUR KNOWLEDGE ABOUT UTILITARIANISM:

- **Consider the following two cases:**

1. While lying by a lake, Lance sees a child drowning in the water. Normally, Lance would be too preoccupied with getting a tan to care about rescuing the child. In this case, however, he notices that an attractive woman, apparently unable to swim herself, is shouting for someone to help the child. Hoping to impress the woman, Lance jumps into the water and saves the drowning child.

2. While lying by a lake, John sees a child drowning in the water. Although he is a poor swimmer, John is terrified by the prospect of the child drowning. With the welfare of the child being his top concern, John jumps into the water and saves the child.

Question: According to Utilitarianism, which ONE of the following is true:

- A. Lance does the morally right thing
- B. John does the morally right thing
- C. Both do the morally right thing
- D. Neither do the morally right thing

TEACHING METHODOLOGY:

Question



Teach by questioning - Socratic approach! Create a question that aims at higher levels of Bloom's taxonomy

Think



Student uses reasoning to arrive at answer (critical thinking – i.e., applying concepts to new problem given in question)

Poll



Student self-assessment of understanding

Discuss



Focus is on peer teaching of reasons that led to the answer - critical thinking skills at work!!

Repoll



Students assess their own level of understanding –did they misunderstand at first?

Explain



Focus on explanation (teaching to rest of class)– again, critical thinking skills at work!

Break Time!



SO, WHAT WAS THE CORRECT ANSWER?

Do you care?...

Why?

DEBRIEF

Advantages?

- Student buy-in
- Allows instructor to assess student understanding
- Allows student to assess own understanding (without penalties)
- Stresses active learning, not passive
- Personalized instruction (even in large classes)
- Focus is on reasoning that leads to answer (critical thinking skills being used)
- Fellow student is more likely to reach another than a Professor (peer teaching)

DEBRIEF (CONTINUED)

Disadvantages?

- Cost?
- Time
 - Prep
 - In class
- Technology issues

OTHER FUNCTION/USE OF PERSONAL RESPONSE SYSTEMS

- Register clickers to individual students
 - Take attendance
 - Easy grading (Assign scores – participation, score based response, etc.)
 - Integrate with Blackboard—synch to gradebook
- Formative assessment in the classroom
 - Check student achievement
 - Diagnose misconceptions
 - Provide instant feedback
 - Use the information to adjust future teaching

OPTIONS FOR USING PERSONAL RESPONSE SYSTEMS

- Poll Everywhere
- Turning Technologies
- i>Clicker
- Chart of Different Devices
 - <https://docs.google.com/spreadsheets/d/1dFcDfsurFlbb-9IjkmyYpRyULFf8L4J50iXHDK4dRWE/edit?pli=1#gid=0>

ADDITIONAL RESOURCES

■ Inquiry Based Learning

- [What is inquiry based learning?](#)
- [Introduction to Inquiry Based Learning](#)

■ Formative Assessment

- Briggs, C. L. & Keyek-Franssen, D. "[Clickers and CATs: Using Learner Response Systems for Formative Assessments in the Classroom.](#)" EDUCAUSE review. (2002)
- Carol Boston, "[The Concept of Formative Assessment,](#)" *Practical Assessment, Research & Evaluation*, vol. 8, no. 9 (2002).
- David J. Nicol and Debra Macfarlane-Dick, "[Formative Assessment and Self-Regulated Learning: A Model and Seven Principles of Good Feedback Practice,](#)" *Studies in Higher Education*, vol. 31, no. 2 (2006), pp. 199–218.

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QUESTIONS?

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QUICK GUIDE

- Create a question: clickers can be used to encourage deeper level learning/critical thinking IN the classroom
- Things to stress:
- When teaching, should focus on the following:
 - Providing students with opportunities to learn IN CLASS
 - Students learn by doing (active learning)
 - Start by asking questions (levels of Blooms Taxonomy)
 - Formative assessment during class – students get to test their level of understanding during class without penalties (anonymity of clickers)
 - Focus is on reasoning skills being used to arrive at answer (CT skills that can be applied to other questions!)
 - Retention of information