

## **Thought Questions: A New Approach to Using Clickers**

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Developing a good clicker question with reasonable answer choices and distracters is not an easy task. It is difficult to develop clicker questions that provide an appropriate intellectual challenge. A new approach to clicker questions, called “thought questions,” can facilitate this process. Faculty only need to develop the question while the students will do the rest! Thought questions are higher-level, open-ended questions that a faculty member poses to the students. After a brief discussion of the question, one group of students is asked to answer the question and provide a rationale for the class. Subsequently, the entire class uses their clickers to vote on whether or not they agree with the answer and rationale. If the majority of students do not agree, another group attempts to answer the questions and the process continues until the class agrees.

Pei-San Tsai first implemented this method of clickers in the Endocrinology course this past spring, and the student feedback was overwhelmingly positive! Thought questions were subsequently been tested in Immunology and Introduction to Human Physiology during the summer, and the students again approved the approach.

### **Steps for developing and implementing thought questions**

- 1.) **Start by choosing a learning goal to assess.**
- 2.) **Develop an open-ended thought question for the goal.** An application-type question where the students have to predict the outcome works best for creating thought questions. (See example thought questions below.)
- 3.) **After presenting the thought question in lecture, organize the students up into groups of 3-4 and allow 5-7 minutes for discussion.**
- 4.) **Choose one group to present an answer and rationale to the class.** The instructor may need to repeat the group’s rationale so that all students understand the explanation.
- 5.) **The class uses clickers to vote on the answer and rationale.** (Clicker question: Do you agree with the answer and rationale? A. Agree, B. Disagree, C. Don’t know)
- 6.) **If the majority of the class disagrees, ask another group to explain their rationale to the class.**
- 7.) **Repeat the clicker voting until the majority of the group agrees.**

### **Sample thought questions**

#### **Endocrinology (IPHY 4440):**

- *If you put a plate between the median eminence and the adenohypophysis to cut off the portal system, what do you think would happen to the secretion of tropic hormones?*
- *When you inject epinephrine directly into the hypothalamus of an animal, the secretion of several tropic hormones is changed. How is this possible since epinephrine is not a releasing hormone?*
- *What would you predict would happen to the ovulatory frequency if one ovary were removed?*

#### **Immunology (IPHY 4600):**

- *Given that all blood cell types derive from the pluripotent hemopoietic stem cell, why are there so many different types of cells in the immune system?*
- *What would be the consequence of a bioterrorist attack that released smallpox virus into a city?*
- *From an immunological viewpoint, why would it be inadvisable for a mother who has recently given birth to move with her newborn to a foreign country where there are endemic diseases not prevalent in her homeland?*

### Tips for successfully implementing thought questions in the classroom

- 1.) **Start early and start simple.** It is important to set the tone early in the semester. On the first day of lecture, ask 1-2 easy-to-moderately challenging thought questions. This will send a clear message to the students that they need to be active participants in the classroom. The more challenging thought questions should be saved for later when the students have more confidence.
- 2.) **Be consistent and ask 2-3 thought questions per lecture.** As for traditional clicker questions or any other in-class activities, consistency is important. Although you will cover less material during the semester with this approach, students will be more engaged and will learn more.
- 3.) **Personalize the questions by using real-life scenarios, clinical examples, or case studies.** This will reinforce the importance of the material you are presenting.
- 4.) **Listen carefully for common misconceptions.** As the students are generating the answer choices for the thought questions, this is a perfect opportunity for you to address student thinking and misconceptions. You can even create future thought questions to address these misconceptions.
- 5.) **Given the open-ended structure of thought questions, exams must include a short-answer component.** There must be a match between in-class expectations and the format of the exams.

### Student feedback on thought questions SEI end-of-term survey n=56 (Spring 2010)

