Quick-thinks: The Interactive Lecture

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Many instructors feel pressured to cover a great deal of information in their courses. For the class sessions that are especially content dense and seem to call for a traditional-lecture format, there is an active-learning strategy that provides a viable alternative to more time-consuming group tasks. We have named the strategy Quick-thinks and they are designed to be easily inserted into lectures so that students are given an opportunity to think about important content as the lesson unfolds. When students are asked to participate instead of passively receive information, they stay more focused, they can check their own understanding, and they are cued to content that has been selected for emphasis.

The research support for incorporating active-thinking opportunities into classroom or televised lectures is impressive and spans many years. In his classic text, Democracy and Education, John Dewey noted that learning is "something an individual does when he studies. It is an active, personally conducted affair." Since Dewey's work in the early part of the twentieth century, there has been a large body of theoretical and empirical work to support his assertion.

Theoretical Arguments for Active Learning

The influential cognitive psychologist Jean Piaget stressed the importance of assimilation and accommodation, two processes that he asserted all people use in order to develop beyond primitive stages of cognitive development. These interactive processes of introducing new information into existing cognitive structures and changing those structures to adapt to new information, underscore Piaget's view of people as active, intellectually-engaged learners who are striving to bring meaning to the world. Other theorists concerned with both pre-collegiate and adult learners, such as Vygotsky, Perry and Belenkey, support Piaget's general approach, suggesting that for cognitive development to occur, students must be engaged in a series of intellectually meaningful tasks of appropriate difficulty. All of these theorists decry a view of the learner as an essentially empty vessel to be filled with "received knowledge" presented by the lecture method or other techniques, which foster little involvement of the learner.

Empirical Arguments for Active Learning

The research documenting the power of active learning in fostering students' cognitive and affective (attitudinal) growth is substantial. Research on undergraduate and medical students exposed to lectures indicates that they were attentive and readily assimilated lecture material during the first 10-20 minutes, but that attention and note-taking dropped dramatically thereafter. A study by Ruhl, Hughes and Schloss (1987) compared lectures presented without pauses with lectures where, every 12-18 minutes students paused for two minutes and discussed and reworked their notes (without interaction with the teacher). Students in the latter group performed better on free-recall quizzes and on a comprehension test. In fact, the differences were so large that they would have raised the performance of the experimental students' one-two letter grades (depending on grading scales used).

In large classes, research indicates that "teacher-talk" about academic content (essentially lecturing) accounts for 88% of class time, silence accounts for 6% and student talk for 5% (Lewis and Woodward, 1984). Small wonder that students retain only 45% of lecture material three-four days after lectures and 24% eight weeks after lectures (Menges, 1988). Dissatisfaction with the lecture method caused six
The research on both class size and televised instructional indicates that it is the method of instructional presentation, not the class size or medium of instruction that is most predictive of positive student learning and attitudinal outcomes. Over thirty years of qualitative and quantitative research point to active learning as among the most powerful methods for influencing higher-order thinking skills, general academic achievement, student attrition, liking for the subject matter and a host of other outcomes. We believe that use of the active-learning strategy described below is a relatively low-risk instructional intervention that has the power to transform the classroom from a passive to an engaging learning environment.

Active-learning Strategies

The following Quick-thinks were designed for application to a wide range of content areas:
1. SELECT THE BEST RESPONSE
2. CORRECT THE ERROR
3. COMPLETE A SENTENCE STARTER
4. COMPARE OR CONTRAST
5. SUPPORT A STATEMENT
6. REORDER THE STEPS
7. REACH A CONCLUSION
8. PARAPHRASE THE IDEA

One approach to piloting some of these techniques might be to select one course on which to focus. Review the main topics and list the most essential content to be learned at each class session-those concepts, skills, principles, or facts that have the highest priority. One way to think about this is to consider which "big ideas" you would like students to remember one year after they complete your course.

Then match each of these content focal points with a Quick-think task that seems to best fit. For example, if you are going to teach a procedural skill, task #6 (REORDER THE STEPS) might be a good choice so that students can gain familiarity with that procedure. If you are going to teach an abstract concept that has a complex definition, you might want to choose # 8 (PARAPHRASE THE IDEA) so that students can translate technical language into their own words and test their own understanding.

Using the lecture notes or outlines that you have on file for each lesson, use arrows to mark the places where you could insert a Quick-think task. Referring to the corresponding examples described below, create the tasks you need using the specific content from your target lesson. Then transfer each task to a blank overhead transparency with a fine point overhead transparency pen or a computer printer.

At the first class meeting in which you plan to use Quick-thinks, you will need to explain to your students how you will be using this strategy and how it will positively affect their learning. There is no set formula for how often to stop and ask students to think about the content being explained. Our experience and some quantitative evidence suggest that every fifteen minutes or so results in increased attention, interest, and learning. Participation options vary: students can record their responses individually and then explain their answers to a neighbor, they can verbally generate an answer with a neighbor, or they can be asked to silently think about a possible response. The instructor then needs to provide feedback so that students can hear or share correct or possible answers. Following are specific descriptions of eight Quick-thinks.

1. Select the Best Response
   This task is most similar to the traditional multiple-choice test item. Students are presented with a question or scenario and then asked to consider which one of several alternatives best answers it. This task can simply require the recall of information just covered in the lecture or the application of that information.
   
   The original question or scenario can be:
   * an incomplete sentence that is completed by the selection of one response.
   * an incomplete sentence containing an internal blank line to be filled in by the correct answer.
   * a complete sentence followed by several; possible answers.

   Example
While Professor Woods was going through a painful divorce, he tended to create unnecessarily difficult tests and gave his students unusually low grades. A psychoanalyst would be most likely to view the professor's treatment of his students as an example of
   a. repression
   b. projection
   c. displacement
(Correct answer: c. displacement)

2. Correct the Error
For this task, the instructor creates an intentional error based on important content just discussed. Students are then asked to correct that mistake. This active-thinking task requires a basic level of comprehension and some immediate processing of content just heard or observed.

The intentional error can contain:
* inaccurate or illogical statements, conclusions, predictions, or implications
* weak arguments
* unlikely quotations

Example
Course: Teaching Methods
Content to be learned: Learning outcomes Format selected: Inaccurate Statement

A learning outcome in a lesson plan describes how the teacher will present the new content.
(Correct answer: A learning outcome is a description of what the students will do to demonstrate their understanding.)

3. Complete a Sentence Starter
For this task, instructors create a sentence stem that needs completion to reflect an accurate statement. In order to complete the statement accurately, students need to understand the information that was just explained, discussed or read. The content described can be presented in a way that requires only a rote level of understanding where students simply recall information just described by the instructor. In order to elicit a deeper level of understanding, the sentence starter would require reflection that goes beyond recall to levels of application, analysis or evaluation.

The sentence starter can focus on:
* a definition
* a cause/effect relationship
* an implication
* a rationale
* a controversy

Example
Course: Criminal Justice
Content to be learned: California's "three-strikes" sentencing policy Format selected: Cause/effect
Relationship 'The 'three strikes' mandatory sentencing laws might result in
__________________________________.'
(Correct answer might include: prison overcrowding, increased pressure on judges to make exceptions,
increased employment opportunities in prisons, new prisons built, and/or reduced crime rates.)

4. Compare or Contrast
For this task, instructors identify two important parallel elements from the lesson. As students are asked
to focus on similarities or differences, they must think about the content at a deep level. This strategy is
most effective if the instructor has not already provided a comparison, but has simply presented the two
elements separately in some depth.

The items being compared or contrasted can be:
* theories, methods, or models
* examples of writing, music, art . problems or solutions
* aspects of historical or current events.. authentic or mythical scenarios

Example
Course: Art History
Content to be learned: Twentieth-century painting Format selected: Examples of Art

After viewing the 1933 Joan Miro painting entitled Composition and the 1950 Jackson Pollock painting
entitled One, record one similarity between the two paintings. (Correct answer might include: fluidity of
design, non-realistic content, or impression of movement.)

5. Support a Statement
For this task, instructors create a statement for which students must locate support from their
immediate lecture notes or from the homework reading or they can be asked to generate their own
reasons or data to support the statement. Rather than passively accept information given by the
instructor, students are asked to think about why a statement might be justified.

The statements requiring support can be:
* conclusions
* inferences
* theories
* opinions
* descriptions

Example
Course: Geography
Content to be learned: Negative impact of political decisions on ecology Format selected: Conclusion

"Warfare has historically had a devastating impact on the earth's resources. Give three pieces of
evidence to support this statement." (Correct answer might include: the systematic scorching of the
earth by retreating armies, tank exercises that destroyed animal and vegetative life in the southern
California desert, hydrogen bomb testing that rendered some Pacific islands uninhabitable.)

6. Re-order the Steps
For this task, instructors present a series of steps in a mixed order and students are asked to re-order the items into the correct sequence. This task can be used either as a motivational technique where students are asked to anticipate the order and make a logical guess before learning the information or as a method to allow students to review the content that they have just learned.

Steps needing to be re-ordered can belong to a:
* procedure
* sequence
* method
* plan
* strategy
* technique

Example
Course: English
Content to be learned: Using the American Psychological Association (APA) format to write in-text citations when paraphrasing someone else’s work in a written essay or research paper
Format selected: Procedure

These steps need re-ordering:
1 - write your paragraph or sentence
2 - place an ending period
3 - write the author’s full name and the year of publication
4 - enclose with parentheses
(Correct answer: Step 1, 3, 4, 2)

7. Reach a Conclusion
This task requires students to make a logical inference about the implications of facts, concepts, or principles they just learned. A conclusion can be drawn from: data, opinions, events, or solutions. The statements provided to students may result in multiple responses that can all be logically derived from the content provided.

The inferred conclusions can be:
* probable results
* probable causes
* negative and/or positive outcomes

Example
Course: Earth Science
Content to be learned: Testing for hardness using common objects equivalent to minerals on Moh's Hardness Scale
Format selected: Probable Results

"If you can scratch the smooth surface of a mineral with a tempered-steel file but not with a piece of glass, you could conclude that _______________
"

(Correct answer might include: The mineral cannot be quartz, topaz, corundum, or diamond. The mineral has a hardness between 6 and 10 on Moh's scale.)
8. Paraphrase the Idea
This task requires students to rephrase an idea using their own words. When students engage in this kind of translation process, they are forced to check their own understanding of what they think they just heard. It is often helpful to have students target their paraphrase toward a specific audience, such as: a novice, a colleague, or a client.

The content to be paraphrased can be:
* a definition
* a theory
* a statement
* a procedure
* a description

Example
Course: Health
Content to be learned: The body’s adaptation to stress
Format selected: A Statement

Paraphrase this statement so that a member of your family would understand what is specifically happening to his body during a stressful event: When an individual perceives a stressor, the body automatically responds with a three-stage process known as the General Adaptation Syndrome.