

PATTERNS FOR FACILITATING ENGAGEMENT BY STUDENTS WITH COURSE CONTENT

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DIFFERENT APPROACHES

Every person obtains information differently, using different sensory modalities. Visual learners learn most effectively by watching; auditory learners by listening; and kinesthetic learners through action. Therefore, where possible, provide different approaches to the same topic. For example, ask “auditories” to paraphrase a chunk of a lecture or reading; ask “visuals” to create a mind map or other graphical representation of the content. (Sometimes, reverse the assignment to move students out of their comfort zone or un-remarked habits of mind.) Be creative in applying the notion of modalities to processing information. For example, if you are teaching music (inherently auditory), from time to time, ask students to draw, and then explain what they “see” in the structure of music. If you are teaching chemistry, ask students what a chemical reaction may actually sound like and explain their offering. Such approaches challenge students to move out of taken-for-granted ways of processing information and such approaches create a sense of playfulness and creativity in learning.

MISSION: COMPLEXITY

Often new learners arrive at an abstraction from a simplification of something they do not yet understand rather than from generalizing from deep understanding. Such improperly drawn abstractions are dangerous because they lead learners to construct simplistic solutions that do not really solve problems. Worse, the learners’ lack of experience prevents them from recognizing the shortcomings in their thinking. To facilitate complex schema, present students with problems that seem straightforward but require solutions that are more complex than what basic concepts afford. For example, if you are teaching students the physics of wave formation, they may rely on taken-for-granted popular explanations of wind blowing across water. Rather than reject the notion, you would ask probing questions about the density of the water, the depth of the water, the nature of currents, the effects of gravity, etc. Have students reflect on the questions and draw conclusions about the need to be thorough and complete in accounting for complex forces. Present a second topic and ask the students to create as many questions as possible. Your goal is to create expert habits of mind that are immediately “suspicious” of simplistic answers grounded in common perceptions or experiences.

TEST TUBE

When students encounter holes in their knowledge, they often resort to the “easy fix” of asking (or citing) an authority for the answer. Answers dispensed from authorities have their place, but often times we want the students themselves to puzzle out answers [as in Mission: Complexity]—we want students engage the process of learning by drawing inferences from systematic observation rather

than just accumulating information. For example, if you are teaching computer science, students may want to simply memorize a series of programming rules that generally work, but not always. They must learn how to “think like a programmer” so ill-formed problems that don’t fit rules or scripts can be solved. To accomplish that, try giving students exercises in which they are asked to write small programs that use the computer to answer simple questions of the form “What happens if ...?” Make these exercises frequent enough that students develop the habit of probing the machine for what it does, rather than asking a question of an authority/expert or referring to software documentation.

Increasingly, a body of “learning objects” (reusable online applets) are developing in a variety of disciplines that can be used to create mini-labs or simulations that require students to make observations and apply existing knowledge to infer new knowledge. For example, using a probability applet like the one pictured below, you may direct student to 1) figure out a systematic process for collecting data, and then 2) given the data, and their existing knowledge of probability, create an explanation for the fisherman’s results.

(To try this go to: <http://www.escot.org/resources/applets/fish2/applet.html>)

Exactly one fish is collected in each scoop and returned to the lake before the next scoop.

To scoop out fish:

1. Type in how many scoops you want in the "Number of scoops" box.
2. Press the scoop button to do the specified number of scoops.
3. Save the data from the top right boxes to the table by pressing the save_to_table button. Otherwise, press the reset button to clear the data.

| Scoops so far | | | | | |
|---------------|---|---|--------|---------|--|
| 0 | 0 | 0 | | | |
| # scoops | | | % | % | |
| 5 | 3 | 2 | 60.00% | 40.00% | |
| 7 | 5 | 2 | 71.43% | 28.57% | |
| 9 | 6 | 3 | 66.67% | 33.33% | |
| 11 | 5 | 6 | 45.45% | 54.55% | |
| 3 | 0 | 3 | 0.00% | 100.00% | |
| 2 | 1 | 1 | 50.00% | 50.00% | |
| 2 | 0 | 2 | 0.00% | 100.00% | |
| 15 | 8 | 7 | 53.33% | 46.67% | |
| 9 | 6 | 3 | 66.67% | 33.33% | |

Slow Fast

Number of scoops

scoop stop reset save_to_table clear_table

If you see the message "Java is not enabled...", click [here](#) to find out how to enable Java.

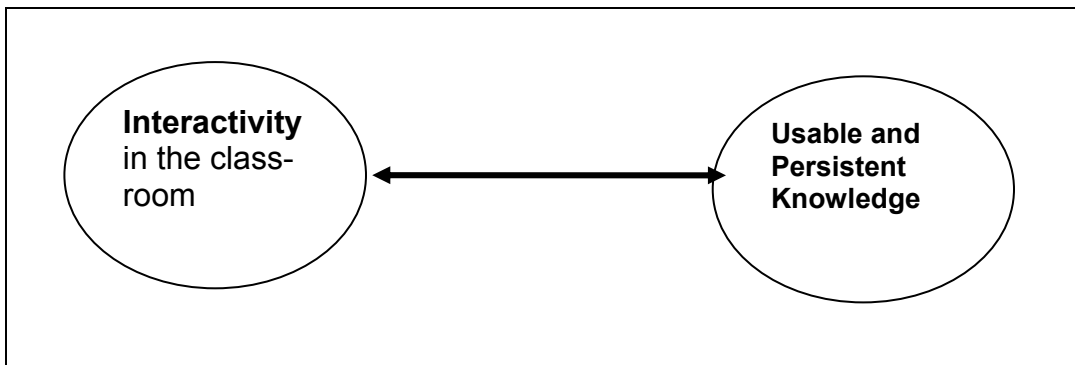
Even seemingly simple applets provide rich stimuli for analysis that can require complex explanations to account for (or raise questions about) an array of variables. Such applets are free, accessible and engaging to students.

For discipline specific repositories of learning objects, go to:
<http://www.nmc.org/projects/lo/repositories.shtml>

Student-Generated Discussions

If discussions happen in a class, the questions are designed by the instructor and presented by her and it often amounts to an oral quiz. You can engage students in discussion by having them create the questions and decide on the order in which they are treated. Your contribution is a minimum of two significant concepts relevant to your learning goals.

Once you have introduced the concepts via reading or lecture, post the concepts on the blackboard, or on poster paper or on overhead transparency like the example below.



Ask the students: **“What questions does this link suggest?”**

Give the students time to think about it—a minute or two to work with a partner may be necessary; posing a “seed” or example question to help them may be necessary. (e.g. “Is long-term memory affected by interactivity in class?”)

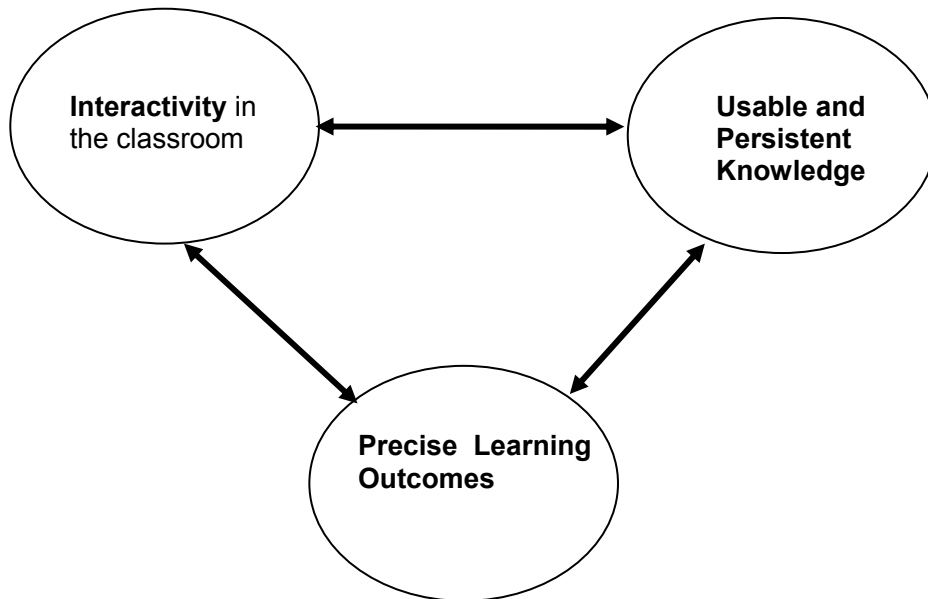
When the students are ready, record their questions on the diagram so they are visible by everyone. (Here are some optional choices you can make: Before discussing the answers you may want to have the students a) choose the question/s they feel are most significant, b) organize the questions in what they see as a logical order, c) you may need to do “a” or “b” depending on the class, topic, time, etc.)

As a class, discuss answers to the questions.

There are more ways to use this to involve students. After creating the list send the students off with the questions to answer for the next session; or direct students to select the most interesting question and answer it for next session, or post the questions to the class bulletin board and have students discuss them online.

A slightly more complicated model generates far more questions. Try adding a third concept.

What questions do each of the links suggest?



This activity is simple to construct and endlessly modifiable.

It moves students from recall and comprehension (defining terms or recalling definitions) to analysis (comparing, contrasting) to synthesis (construction of questions and answers to them) in a logical and coherent way that also models what scholars do.

EXPLORE FOR YOURSELF

A person's success is based mainly on her ability to learn new concepts efficiently and to act as a team player by sharing knowledge and insights. You want to give your students the ability to learn in the future and to communicate their wisdom, but students are often afraid of taking responsibility for their own learning. Therefore, assign topics to the students that they have to learn on their own and ask them to present the topic afterwards. This can result in boring, poorly done and time-consuming regurgitations of the textbook. To facilitate engagement, the assignment is for the student to present a new insight relative to the content. They must go a step beyond the assigned content to articulate an "ahha!" moment of new understanding. If the students had to go outside the assigned material, have them trace for others how they discovered the new material, too. The results are usually shorter, but more interesting and purposeful presentations.

ROLE PLAYING

The complexity of some concepts makes them hard to understand with only abstract explanations. Furthermore, difficulties in understanding complex

concepts may frustrate the students. You not only would like to provide a positive learning environment, so even learning complex topics might be fun, but you also want to take into account that different people learn things best using different sensory modalities. Therefore, invite your students to behave as a part of the concept involved in a role-play. This can be done even in large classes. For example, if you are teaching a class in contract law using hypothetical cases, divide the class in half with one side assigned the role of plaintiff and other assigned the role of defendant. Ask each to analyze the elements of the contract from their own perspective and prepare to present it. Choose a person from each side to stand and present. Discuss the analysis. Ask another pair to present and discuss the analyses until the necessary issues are explored.

If you were teaching a physics class, roles could be assigned, for example, for forces acting upon each other. The role-play amounts participants describing how they are acting upon or being affected by counter-forces. Encourage use of imagery and rich adjectives and adverbs to enliven the characterizations to make them memorable.

PEER FEEDBACK

Typically people assume that learning involves receiving evaluative feedback, but this approach is summative and generally limits learning. If a task is finished with no hope of change, there is little reason for students to attend to comments that are intended to justify grades assigned. This approach ignores the fact that students possess useful knowledge and perspectives that can be helpful to colleagues. Therefore, invite the students to provide feedback to colleagues that is purposeful and formative.

For example, if students are learning how to write arguments, rather than agreeing or disagreeing with colleagues, have student respondents do such things as: underline what respondents think the writer was offering as reasons for their claims; to the best of their ability, write a paraphrase of the central argument made in the paper (no judgment, good or bad, included); highlight areas that the respondent did not understand—again, no judgment, just the information about where the student respondent was confused.

The result is that the writer has descriptive, useful information that is relevant to doing the assignment more effectively. The reader has learned to read another person's work (and their own work) in constructive ways that invite positive change, not bad feelings or self-defense.

REFLECTION

Sometimes, learners believe that the instructor has to deliver all the knowledge, but the students would learn much more if they would explore problems by themselves. Furthermore, students often anticipate that an instructor will solve each and every problem for them, but the knowledge of the instructor is also limited. You want the students to uncover solutions for complex problems by

drawing on their own experience rather than just letting them accept what they have learned by listening. Therefore, provide an environment that allows discovering and not one which is limited to answering questions. It is the students' debt of delivery or of inquiry. Train students so that they are searching for solutions by exploring the problem.

Reflection on one's work is central to developing expertise. Facilitate reflection as a habit of mind by providing numerous opportunities for students to review and assess their work, be it writing a computer program or term paper; making a presentation or teaching a class; taking a case history or designing a rehabilitation program for an athlete with a torn muscle. Use the assignment objectives as a guide for topics you wish students to feature; be sure that students make clear and pointed connections between theory (course content) and their products. Value grounded judgment and self-prescription rather than personal defense or self-justification.

Adapted from: Eckstein, Jutta, Joseph Bergin and Helen Sharp. Patterns for Active Learning Submission to the PPP pattern language project, 2002.

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Mark Stoner, Instant Discussions: High Level, Student Constructed and Concept Driven. The Successful Professor, 4 (November 2005): 11-13.

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