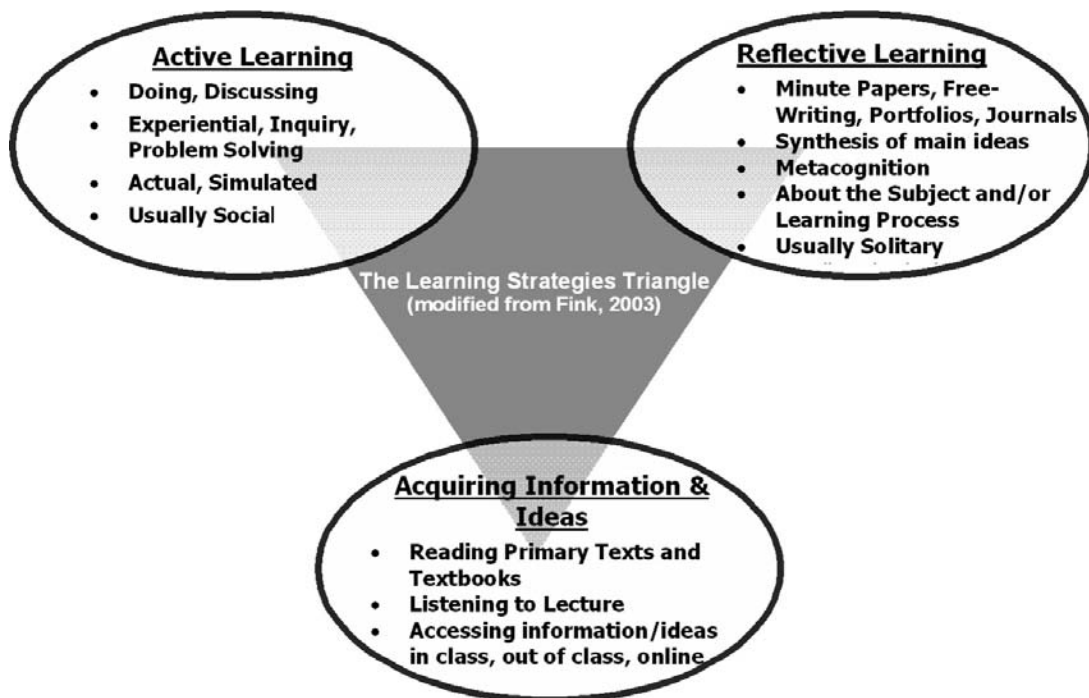


The Learning Strategies Triangle

When designing the learning opportunities for a course it is useful to keep in mind the triangle of learning strategies diagrammed below. Information and ideas are the foundational content of the course and are typically conveyed in a passive fashion through reading, listening to lectures, or both. In one sense, all other learning techniques, by contrast, can be thought of as being active, although a distinction is made here between active and reflective learning. The goals of the two strategies may be similar but they appeal to two different types of learners. Active learners prefer to actively do something (experiment, discuss, explain to others) and tend to like group work. Reflective learners prefer to think about the subject quietly before trying to make sense of it and prefer working alone. Most learners are not strongly predisposed to learn in one way or the other, so integrating active and reflective learning is usually most effective for all students.



Acquiring information and ideas is essential to most types of learning. The task for the instructor is to determine the best venue for students to acquire foundational knowledge. In many classrooms, the instructor lectures over informational and conceptual content that is also found in the reading assigned for the course. One can argue that this produces a wasteful redundancy because class time could be used more effectively for most students by engagement with active or reflective learning strategies and interaction with the expert instructor rather than passive listening. Despite the hesitancy of many instructors to trust student learning from reading, this is an essential lifelong learning skill that students must develop, including with guidance from the instructor. After all, in the professional environment most learning is not accomplished by listening to lectures. It is also notable that surveyed students are willing to make first contact with content prior to class in order to tackle more cognitively demanding applications and analysis using content in class, where they benefit from peer and instructor interaction. Many concepts may be difficult for students to grasp from reading alone, and this content is appropriate for brief lectures, combined with active learning in class and possibly reflective learning afterwards.

Active learning includes all class activities where students do something and think about what they are doing. When students undertake active learning they are not simply learning subject matter but they apply concepts and explore relationships between concepts, facts, and contrasting points of view. Through these activities, students construct knowledge for themselves, rather than simply receive knowledge from the instructor.

Active learning approaches that involve students working with each other during class feature three essential elements for student learning:

- Active learning engages students in their learning
- Active learning increases their time on task to construct knowledge
- Active learning takes advantage of peer influence.

Active learning is most effective when it promotes students to work with one another. The terms cooperative and collaborative learning describe these strategies. The terms are synonymous for some educators but take on very different meanings for others. Given the lack of consistent definitions for cooperative and collaborative learning, we will lump them here to mean any form of active learning where students work together in small groups.

A small-group exercise can range considerably in scale and expectations. It can be a highly-structured group project that occupies many weeks of a course, or it can simply be a few tens of minutes spent during class time where students complete a questionnaire or worksheet while benefiting from discussion with peers and the instructor. In some cases the instructor may assign the teams of students who will work together throughout the course, perhaps with assigned duties within the team; in other cases groups may form informally on the occasion of each assignment. The resulting work may or may not be graded, groups may be formally assigned or self selected, and participants may be assessed as a group or individually.

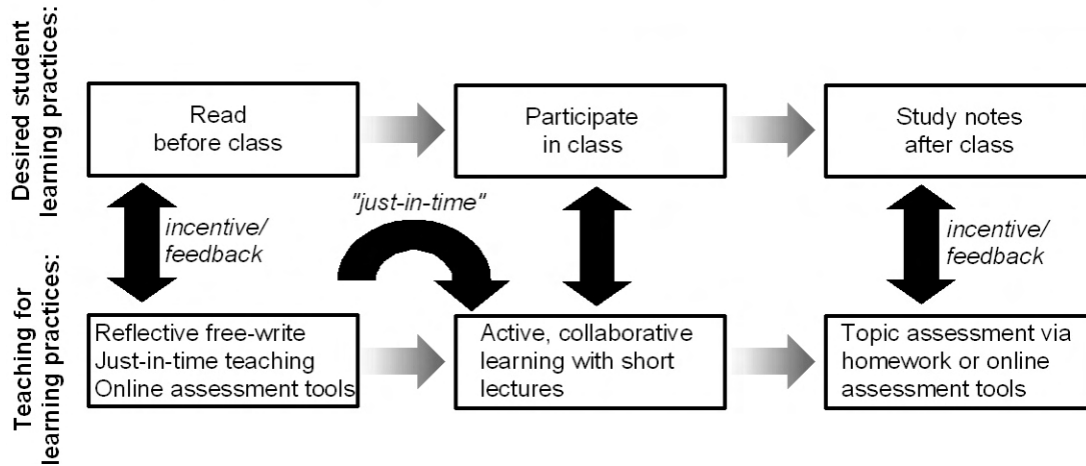
Group work can take place in classes of any size. Even in large lecture halls, students can readily work together in groups of 2 to 6. Worksheets or simple written assignments can replace a lecture or break up a lecture period. In one scenario, a lecture over key concepts can be followed by a group exercise where students apply the concepts or integrate them with previously learned material or a reading assignment.

Students also need opportunities to make connections between the things that they are learning, relate these newly learned concepts to prior experience and perception, and to gauge what they understand or do not understand about the new content and concepts they are encountering. Many students, even those who thrive on active learning opportunities, require time on their own to put the pieces together in a way that assures deep learning. Therefore, reflective learning is a thinking activity that is done alone either inside or outside of the classroom. Reflective learning ahead of class time allows students to sort out how well they understand key concepts prior to attending class; class time can then be used to enhance understanding through active learning with peers and guidance from the expert instructor. Reflective learning after class focuses student studying and connection of concepts to induce deep learning, rather than the surficial, nonretentive learning that typically takes place when cramming for exams. When learning reflectively, the learner should be answering some or all of these four questions:

- *What* am I learning?
- Of what *value* is this learning?
- *How* did I learn... best, most comfortably, with difficulty, etc.?
- *What else* do I need to learn?

The three components of the learning strategies triangle can also be viewed in terms of learning venues inside and outside of the classroom. The most effective learning takes place through a sequence of activities before, during, and after class, as illustrated in this schematic diagram.

Learning Activity Sequence



Active and reflective learning strategies are most effective for the student when they are implemented in a systematic, rather than ad hoc fashion, by the instructor. The learning-activity sequence can serve as a framework for designing active and reflective learning opportunities inside and outside of class. The diagram above shows the connections between learning and teaching practices that can occur when conscious decisions are made to integrate out-of-class learning, in-class learning, and assessment.

Students get the most from textbook reading when they are asked to work with the content before coming to class. Common approaches are just-in-time teaching (JITT) assignments completed online, reflective free writing completed online or turned in during class, or online reading quizzes or preparatory homework assignments. These are reflective-learning opportunities that serve two purposes. First, they motivate and focus mastery of information and ideas (content) that are necessary for successful completion of more cognitively challenging in-class active learning. Students have incentives to complete these assignments because the assignments receive low-stakes grades, or develop knowledge that is necessary for successful completion of in-class activities that may be graded. Second, when completed ahead of class time, these assignments assess student learning from reading, with feedback not only to the student but also to the instructor. This means that short lectures can target the specific areas of student misunderstanding or misconception.

A short homework assignment or an online assessment administered in the course-management system provides focused reflective learning after class. The questions in these follow-up assessments emphasize to students the key concepts and thinking skills they were expected to develop from combination of pre-class reading and in-class activity.

Instructors who structure acquisition of information, active learning, and reflective learning provide a framework of the learning activity sequence for students. The ternary diagram below illustrates where the learning strategies might fit within the three venues of the learning activity sequence. Traditional, positivist, lecture-dominated courses place acquisition of information

and ideas at the in-class-learning corner, whereas instructors who focus on students constructing their knowledge move the acquisition strategy toward the before-class corner and reserve in-class time for active learning with lesser amounts of information acquisition and reflective learning.

