Learning is the heart of what universities do. While research has been happening on how learning works for some time, in the past five to ten years there is a growth of information on cognition and learning.

When we come to understand how the brain works, we can use this information to adjust our teaching strategies and the design of learning experiences for students. This section contains research-based principles and information about student learning.

**Seven Theory and Research-Based Principles of Learning**

The following list presents basic principles that underlie effective learning.

1. **Students' prior knowledge can help or hinder learning.**

   Students arrive in our classes with knowledge, beliefs, and attitudes gained in other courses and also obtained through daily life. This prior knowledge influences how they filter and interpret what they are learning. If students’ prior knowledge is robust, accurate and activated at the appropriate time, it provides a strong foundation for building new knowledge. However, when knowledge is inert, insufficient for the task, activated inappropriately, or inaccurate, it can interfere with or impede new learning. Pre-assessing students’ prior knowledge (including misconceptions) goes a long way in ensuring courses and lessons are designed appropriately and allow students to build upon their learning.
2. **How students organize knowledge influences how they learn and apply what they know.**

To learn best requires one to develop rich connections between facts, concepts, processes, principles and relationships. Students naturally make connections between pieces of knowledge. Expert learners often subconsciously make knowledge networks that are dense and connected in meaningful ways. They also see information in coherent chunks. When those connections form knowledge structures that are accurately and meaningfully organized, students are better able to retrieve and apply their knowledge effectively and efficiently. In contrast, when knowledge is connected in inaccurate or random ways, students can fail to retrieve or apply it appropriately. Novice learners tend to process information in small bits of information and don’t see relationships and connections that easily.

3. **Students’ motivation determines, directs, and sustains what they do to learn.**

As students enter post-secondary institutions and gain greater autonomy over what, when, and how they study and learn, motivation plays a critical role in guiding the direction, intensity, persistence, and quality of the learning behaviors in which they engage. When students find positive value in a learning goal or activity, they are likely to be strongly motivated to learn. Students who have learning goals and focus on the intrinsic value of learning the material are generally the most motivated students.

4. **To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned.**

Students must develop not only the component skills and knowledge necessary to perform complex tasks, they must also practice combining and integrating them to develop greater fluency and automatic learning structures. Students need to learn when and how to apply the skills and knowledge they learn not just to the task at hand but also to situations outside of the learning context. Students must also realize that multi-tasking degrades performance because the brain is experiencing “overload”.

5. **Goal-directed practice coupled with targeted feedback enhances the quality of students’ learning.**

Learning and performance are best fostered when students engage in practice that focuses on a specific goal or criterion, targets an appropriate level of challenge, and is of sufficient quantity and frequency to meet the performance criteria. Practice must be coupled with feedback that explicitly communicates about some aspect(s) of students’ performance relative to specific target criteria, provides information to help students progress in meeting those criteria, and is given at a time and frequency that allows it to be useful.

6. **Students’ current level of development interacts with the social, emotional, and intellectual climate of the course to impact learning.**

Students are not only intellectual but also social and emotional beings, and they are still developing the full range of intellectual, social, and emotional skills. While we cannot control the developmental process, we can shape the intellectual, social, emotional, and physical aspects of classroom climate in developmentally appropriate ways. In fact, many studies have shown that the climate we create has implications for our students. A negative climate may impede learning and performance, but a positive climate can energize students’ learning.

7. **To become self-directed learners, students must learn to monitor and adjust their approaches to learning.**

Learners may engage in a variety of metacognitive processes to monitor and control their learning—assessing the task at hand, evaluating their own strengths and weaknesses, planning their approach, applying and monitoring various strategies, and reflecting on the degree to which their current approach is working. Unfortunately, students tend not to engage in these processes naturally. When students develop the skills to engage these processes, they gain intellectual habits that not only improve their performance but also their effectiveness as learners.

Metacognition and Deep Learning: How Students Learn

How Students Learn and Study
By Noel Entwistle

A coherent set of concepts has been established from research on student learning to describe important differences in the ways in which students learn. These concepts have subsequently been used to show how teaching, and a whole range of other influences, affect the ways in which students go about their academic work. Moreover, it is now clear that these differing ways of studying substantially influence the quality of the learning achieved.

Students enter higher education with established beliefs about what it takes to learn, derived from their previous experiences within the educational system. The main distinction between these ideas has been described in terms of conceptions of learning. Some students see learning as the acquisition of facts and, even in higher education, believe they are expected simply to reproduce the information and ideas provided by their teachers. In contrast, others believe learning to require making sense of what is presented in a personally meaningful way. These beliefs about learning translate into different ways of carrying out academic tasks.

The earliest studies in this field looked at how students went about reading an academic article. It was found that some students believed they were expected to scan the material, spotting the information most likely to be tested: this was described as a surface approach. In marked contrast were students who tried to make sense of the author’s meaning for themselves, interacting vigorously with the ideas being presented - a deep approach. The main distinction in these contrasting approaches to studying is the intention of the students, either to reproduce or to understand the information presented to them.

To read rest of the article, access it freely online at:
http://www.academia.edu/3427492/How_students_learn_and_study

Deep Learning vs. Surface Learning: Getting Students to Understand the Difference
by Maryellen Weimer in the Teaching Professor Blog

Sometimes our understanding of deep learning isn’t all that deep. Typically, it’s defined by what it is not. It’s not memorizing only to forget and it’s not reciting or regurgitating what really isn’t understood and can’t be applied. The essence of deep learning is understanding—true knowing. That’s a good start but it doesn’t do much to help students see the difference between deep and surface learning or to help persuade them that one is preferable to the other.

Those differences are further obscured and rendered unimportant when teachers use superficial measures (e.g. multiple-choice questions that test recall) to assess understanding. Why do
students memorize isolated facts that they don’t really understand? Because, in many courses, that approach has rewarded them with good or at least decent grades. Until teachers stop relying on questions that can be answered with details plucked from short-term memory, there isn’t much chance that students will opt for the deep learning approaches.

Most teachers recognize that test formats directly affect the choice of study strategies. We are committed to preparing questions that require higher level thinking skills. Our students discover they can’t answer those questions with the easy information bits they’ve memorized and so they start studying differently. The problem is that without teacher guidance, students end up selecting deep learning strategies more by accident and less by design. That challenge is answered by knowing what constitutes a deep learning strategy.

To read the rest of the article, access it freely online at: http://www.facultyfocus.com/articles/teaching-professor-blog/deep-learning-vs-surface-learning-getting-students-to-understand-the-difference/#sthash.EW4eMxuQ.dpuf

Ten Metacognitive Teaching Strategies to Help Students Learn How to Learn

**Definition**

meta = ‘about’ and cognition = thinking

**Metacognition:** Purposefully thinking about one’s own thinking strategies – when people are able to “learn to think” and “think to learn”

*Metacognition is the regulatory system people use to understand and control own cognitive (brain) performance. It involves people being very aware of how they learn, what strategies meet their needs, evaluating the effectiveness of strategies and then implementing the best plan of action to optimally learn.*

**Learners with Strong Metacognitive Skills**

- Know the limits of their own memory for a task and elicit help where required
- Do frequent self-assessments of their knowledge to ensure they can figure out how well they are learning something
- Self-monitor frequently and use a variety of strategies to learn
- Undertake careful rehearsal of a skill in order to gain confidence and competence
- Plan effectively at many levels and see the big picture of learning

The following ten metacognitive teaching strategies come from a few sources that were used including: Promoting Student Metacognition (K. Tanner, 2012), Creating Self-Regulated Learners: Strategies to Strengthen Students’ Self-Awareness and Learning Skills (L. Nilson, 2013), Metacognition (Putting Metacognition into Practice) website by Nancy Chick, Centre for Teaching Assistant Director (Vanderbilt University), Classroom Assessment Techniques (by T. Angelo and P Cross, 1993), Centre for Research on Learning and Instruction (University of Edinburgh) and Peter Arthur, Director, Centre for Teaching and Learning, University of British Columbia Okanagan.

1. Metacognitive Awareness Inventory
There are two processes going on around learning how to learn.

1. Knowledge of Cognition (Declarative, Procedural, and Conditional)
   a. Awareness of factors that influence your own learning
   b. Knowing a collection of strategies to use for learning
   c. Choosing the appropriate strategy for the specific learning situation

2. Regulation of Cognition
   a. Setting goals and planning
   b. Monitoring and controlling learning
   c. Evaluating own regulation (assessing if the strategy you are using is working or not, making adjustments and trying something new)

In 1994, Schraw and Dennison created the Metacognitive Awareness Inventory (MAI) specifically for adult learners to bring awareness of metacognitive knowledge and metacognitive regulation (which they referred to “Knowledge of Cognition Factor” and “Regulation of Cognition Factor” respectively). (You can find the Metacognitive Awareness Inventory on our website at: https://ciel.viu.ca/sites/default/files/ten_metacognitive_teaching_strategies.docx )

Recent research has uncovered a significant correlation between the MAI and some measures of academic achievement (e.g., GPA, end of course grades etc.)

‘Knowledge of Cognition’ is more easily acquired and improved. ‘Regulation of Cognition’ strategies are not that easy to acquire and most often students won’t improve over time in their Regulation scores – because they need to learn the strategies and have chances to practice in
and out of classroom experiences. They need their instructors to use teaching to help them build their strategies around regulation of learning.

2. **Pre-assessment (Self-Assessment) of Content**
   A simple activity such as finding out what students already know about a topic can help students begin to think about how learning works.

   1. Create a few key questions about the content/topic a week prior to the class. Questions should ask students what they know already about the topic, challenges or successes they have had with the topic, exploration into past experiences or applications of the content/topic.

      These questions may be in the form of a homework assignment, a set of clicker questions for in class voting, a short reflective writing piece done in class and handed in.

   2. Have the students individually hand in their responses anonymously. Skim through the answers after class. Possibly categorize/summarize all responses by themes.

   3. Share responses with students the next class either verbally or a summary of themes.

   4. Have a discussion with students about how asking these questions can help them in thoughtful planning of how they might approach a new idea or topic or how they will approach course content and associated studying/learning strategies.

3. **Self-Assessment of Self-Regulated Learning Skills**
   Students aren’t going to learn how to be good learners unless we engage them in activities and discussions about how they perceive themselves as learners – and to see what approaches are working and not working for their learning.

   Here are 21 statements you could pose to students to start them thinking about how they think and think about how they learn.

   **Surface Approach to Learning Questions**

   1. I find I have to concentrate on just memorizing a good deal of what I have to learn.
   2. I am not really sure what’s important in lectures, so I try to get down all I can.
   3. I tend to read very little beyond what is actually required to pass.
   4. I concentrate on learning just those bits of information that I have to know to pass.
   5. I like to be told precisely what to do in essays or other assignments.
   6. I often seem to panic if I get behind in my work.
   7. Often I find myself wondering whether the work I am doing here is really worthwhile.
Strategic Approach to Learning Questions
1. I think I am quite systematic and organized when it comes to studying for exams.
2. I am pretty good at getting down to work whenever I need to.
3. I organize my study time carefully to make the best use of it.
4. Before starting work on an assignment or exam question, I think first how best to tackle it.
5. I look carefully at my instructor’s comments on course work to see how to get higher marks the next time.
6. I put a lot of effort into studying because I am determined to do well.
7. When I have finished a piece of work, I check it through to see if it really meets requirements.

Deep Approach to Learning Questions
1. When I am reading I stop from time to time to reflect on what I am trying to learn from it.
2. When I am working on a new topic, I try to see in my own mind how all the ideas fit together.
3. Often I find myself questioning things I hear in lectures or read in books.
4. Some of the ideas I come across on the course I find really gripping.
5. I usually set out to understand for myself the meaning of what we have to learn.
6. I like to play around with ideas of my own even if they don’t get me far.
7. It is important for me to be able to follow the argument, or to see the reason behind things.

All items are to be responded by choosing from “strongly agree”, “somewhat agree”, “somewhat disagree” or “strongly disagree”.

(These items come from ASSIST (Approaches and Study Skills Inventory for Students, Centre for Research on Learning and Instruction, University of Edinburgh).

4. Think Alouds for Metacognition
As the instructor, you are an expert in your field. It can be almost impossible to remember a time when you did not think ‘the way you currently do about your discipline’. As researchers and reflective practitioners we are thinking metacognitively all the time (thinking about your own questions, how your thinking has evolved, how you incorporate new knowledge into your practice etc.)

Anytime you can talk out loud (‘think aloud’) about how you view a document or a picture or think about a book, or share your thinking processes with students you are helping them become more metacognitive in their own approaches to the subject.
Once you have modelled for them how you would solve a problem or interpret a piece of writing, have students work in pairs to talk out loud as to how they are thinking about an assignment piece of homework or an assignment.

1. One student talks out loud while the partner records what they are saying (the strategy going to be used to complete the homework or do the assignment). The partner also guides them to think through all the steps.

2. Students switch roles and do the same for each other.

3. Now students have thought out the process for completing the assignment or homework, received some feedback from their partner and possibly have a plan written down as to how they are going to undertake the task. Debrief briefly with class as to lessons learned etc.

“[I]t is terribly important that in explicit and concerted ways we make students aware of themselves as learners. We must regularly ask, not only ‘What are you learning?’ but ‘How are you learning?’ We must confront them with the effectiveness (more often ineffectiveness) of their approaches. We must offer alternatives and then challenge students to test the efficacy of those approaches.” (Weimer, 2012)

5. Concept Mapping and Visual Study Tools

A concept map is a way of representing relationships between ideas, images or words. Concept maps are a way to develop logical thinking and study skills by revealing connections to the big ideas or the key concepts you are trying to teach. Concept maps will also help students see how individual ideas relate to the larger whole or the bigger picture.

It is best that the instructor demonstrate how to design a concept map of a class or course before students are asked to do so. Design a brief or detailed concept map of the course or sub-components of the course and share with students. Then later on in course students can form small groups and build a concept map as a review activity before a mid-term or as a review of a portion of the course. Students can do it for homework or they can do it in class and share with each other explaining the interrelationships between each component.
Example Concept Map: Based on Novak’s concept map of meaningful learning

6. Classroom Assessment Tools
There are many short activities you can do during class time that will help promote metacognitive thinking in your students.

Sometimes these little activities are called “Classroom Assessment Tools – CATS” (term coined by Angelo and Cross).

See the chapter on Formative Feedback for some examples of CATs.

7. Metacognitive Note Taking Skills
Provide students with guidance and models for how to take good notes during a class. Here is a suggestion for a format you can replicate or draw on the board and discuss with students.
**Beginning of Class (Plan + Connect)**
Encourage students to prepare their notes in an organized fashion. Stop the class and have them complete the connections questions in their notes. This will help them start thinking about how this class fits in with what they already know or want to know more about.

Date:  
Course Name:  
Class Learning Outcomes:

Connections:
- What do I already know about this topic?
- How do I feel about this topic? (excited, anxious, curious, nervous)
- How does this topic relate to something I already know?
- What questions do I have already about this topic?

**Middle of Class (Monitoring Learning)**
Encourage students to create 2 columns in their notes. In the left column ask students to record insights, ‘ah-ha’ moments, questions students have about the content, connections they are making to other classes/topics, and also any feelings or thoughts they have on the class. In the right column they take traditional notes on what is being presented. Encourage students to refrain from writing everything. Write key concepts and headings on the board and indicate to students when you are shifting to a new section or concept.

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<tr>
<th>Learning Insights</th>
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**End of Class (Reflecting on Learning)**
Near the end of class, ask students to draw a line below their notes and write a summary of the whole class. Just a few sentences is enough to get students thinking about the key learning that has just happened and what the whole class was about.

You can also write a few prompts on the board to help students with their summary note (e.g., what were the most important ideas from today’s class? what did I find most interesting in class today? how did today’s content relate to another class?)
8. Reflective Writing
Reflective writing helps students make connections between what they are learning in their homework/class content and with how they are integrating the content into their current learning structures. Writing helps students observe themselves before, during and after their reading, watching and listening experience.

Here are some sample prompts to use for your reflective writing activities:

- The most important part of the reading, video or class is....
- The most useful or valuable thing(s) I learned today was....
- The most surprising or unexpected idea I encountered was...
- Two ideas that I have found confusing are....
- The advice I’d give myself based on what I know now and if I were starting this assignment over again would be....
- If I were to paraphrase what we have learned today for a high school student it would look like this....
- What I have learned today, I am able to connect to other courses in this way...

Metacognition: Purposefully thinking about one’s own thinking strategies – when students are able to “learn to think” and “think to learn”

Three critical steps to teaching metacognition:
1. Teaching students that their ability to learn is mutable
2. Teaching planning and goal-setting
3. Giving students ample opportunities to practice monitoring their learning and adapting as necessary

9. Wrappers
A wrapper is an activity that surrounds pre-existing learning or assessment task and fosters students’ metacognition. You can build a self-monitoring wrapper around any pre-existing part of a course (lecture, homework, or test)

Why Wrappers Work
- Time efficient
- Metacognition practice is built in to the that task
- Students are self-monitoring in context
• Feedback is immediate
• Support can gradually be faded out
• Minor Interventions can significantly change behavior

**Course/Lesson Wrapper**

1. **Before Lesson Begins:** Indicate to students that in the last minutes of class they will be asked to consider the 3 key ideas from the class. Give the students a few tips on how to actively listen, make effective class notes and engage with the content and

2. **Near End of Lesson:** 10-15 minutes before class ends, ask students to write 3 key ideas from the class. Students can do individually or in small groups (on chart paper, on white/blackboard) and share

3. **Teacher** gives his/her list of 3 key ideas for students to self-check. Students record the differences between their responses and the teacher’s.

4. **Debrief:** Have a brief discussion around similarities/differences between students’ and teacher’s 3 key ideas. Summarize class.

**Homework Wrapper**

1. Instructor creates self-assessment questions that focus on skills students should be monitoring

2. Students answer questions just before homework

3. Complete homework as usual

4. After homework, answer similar self-assessment questions and draw their own conclusions

**Exam/Test Wrapper**

Most times instructors hand back exams (tests, quizzes, mid-terms) and focus the discussion on the exam questions, the areas where students did well or poorly. They rarely engage students in a learning experience around how they prepared, studied or took the test.

1. The first exam is returned and students complete the exam wrapper either in class or online within a course management system. (Instructors can either make the assignment required or award participation points for completion).

2. The instructor collects the exam wrapper and reviews student comments. This allows the instructor to assess student behavior patterns and determine whether he or she needs to include additional teaching resources to support student learning.

3. The exam wrapper is returned to students within a week or two before the next exam.
Students review their comments and then have the opportunity to follow their own advice for studying

**Possible Questions for Exam Wrappers**

**Preparation for Exam**
1. How did you prepare for the exam? Explain your process.
2. What resources did you use in preparing for taking the exam?
3. How does your exam preparation compare to three other peers in the class (ask them)

**Planning**
1. What strategies did you use for studying (e.g., study groups, online practice quizzes, office hours with instructor, review sessions, peer teaching etc.)?
2. How much time did you study (and how long over what time period)?
3. What aspects of the course did you spend more time on (or less time on) based on your current understanding.
4. What percentage of your exam preparation time was spent on these activities? (re-reading the textbook___?; reviewing your own notes__?, reviewing PowerPoint presentations from lecture ___?; generating your own exam questions and answering them___?; studying in groups____?; other strategies____?

**Performance**
1. How did your actual grade on this exam compare with the grade you expected? How do you explain the difference, if any?
2. How do you feel about your exam grade (happy, surprised, disappointed)?
3. Examine the items on which you lost points and look for patterns. Were you careless or did you run out of time?

**Next Steps**
1. What are you going to do differently for your next exam?
2. What might be your goal (e.g., certain percentage)?
3. What study strategies are you going to use next time to enable you to get that score?

**10. Retrospective Post-Assessment**
Near the end of a topic or end of the course, ask students to reflect (retrospectively) as to what they thought about a topic or concept before the course and what they think about it now. This activity asks students to reflect on the changes in their knowledge, skills and attitudes and put that into perspective for moving forward.
Practices that Foster Learning and Retention

The National Survey of Student Engagement (NSSE) has identified ten engagement indicators and a set of high-impact educational practices that have substantial positive effects on student learning and retention.

**Academic Challenge**—Higher order learning (not just the facts!), reflective and integrative learning, quantitative reasoning (not just the formulas!) and helping students with effective learning strategies.

**Learning with Peers**—Collaborative Learning, opportunities for discussions with diverse peers. An erroneous assumption is often made that students will naturally learn about their peers simply by coming into contact with those who have different views and identities. Educators must facilitate structured opportunities for dialogues between students from different backgrounds and cultures for such learning to occur.

**Experiences with Faculty**—Intensive student-faculty interactions and effective teaching practices

**Campus Environment**—Quality of interactions (trust, warmth) and supportive environments

**High Impact Practices**—Service Learning, Experiential Learning, Study Abroad, Research with faculty, Internships and Coops.

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10 High Impact Educational Practices


For over 15 years, data gathering has occurred through the administration of the National Survey of Student Engagement (NSSE) across North America (including Canada). Follow up investigations have happened around campuses that have high achieving students with high retention and engagement rates.

From these investigations, ten key impactful educational practices have been widely tested and have been shown to be beneficial for post-secondary education students from many backgrounds. On many campuses, assessment of student involvement in active learning practices such as these has made it possible to assess the practices’ contribution to students’ cumulative learning. The following is a list of high impact practices that educational research has shown to improve student retention and engagement in learning. You may wish to consider including some of them in your courses or program.
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<th>Ten High Impact Educational Practices: Descriptions and Examples</th>
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| 1. **First Year Seminars and Experiences**  
Many schools now build into the curriculum first-year seminars or other programs that bring small groups of students together with faculty or staff on a regular basis. The highest-quality first-year experiences place a strong emphasis on critical inquiry, frequent writing, information literacy, collaborative learning, and other skills that develop students’ intellectual and practical competencies. First-year seminars can also involve students with cutting-edge questions in scholarship and with faculty members’ own research. |
| 2. **Common Intellectual Experiences**  
The older idea of a “core” curriculum has evolved into a variety of modern forms, such as a set of required common courses or a vertically organized general education program that includes advanced integrative studies and/or required participation in a learning community. These programs often combine broad themes—e.g., technology and society, global interdependence—with a variety of curricular and co-curricular options for students. |
| 3. **Learning Communities**  
The key goals for learning communities are to encourage integration of learning across courses and to involve students with “big questions” that matter beyond the classroom. Students take two or more linked courses as a group and work closely with one another and with faculty. Many learning communities explore a common topic and/or common readings through the lenses of different disciplines. Some deliberately link “liberal arts” and “professional courses”; others feature service learning. |
| 4. **Writing-Intensive Courses**  
These courses emphasize writing at all levels of instruction and across the curriculum, including final-year projects. Students are encouraged to produce and revise various forms of writing for different audiences in different disciplines. The effectiveness of this repeated practice “across the curriculum” has led to parallel efforts in such areas as quantitative reasoning, oral communication, information literacy, and, on some campuses, ethical inquiry. |
| 5. **Collaborative Assignments and Projects**  
Collaborative learning combines two key goals: learning to work and solve problems in the company of others, and sharpening one’s own understanding by listening seriously to the insights of others, especially those with different backgrounds and life experiences. Approaches range from study groups within a course, to team-based assignments and writing, to cooperative projects and research. |
| 6. **Undergraduate Research**  
Many colleges and universities are now providing research experiences for students in all disciplines. Undergraduate research, however, has been most prominently used in science disciplines. With strong support from the National Science Foundation and the research |
community, scientists are reshaping their courses to connect key concepts and questions with students’ early and active involvement in systematic investigation and research. The goal is to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions.

### Diversity/Global Learning

Many colleges and universities now emphasize courses and programs that help students explore cultures, life experiences, and worldviews different from their own. These studies—which may address diversity, world cultures, or both—often explore “difficult differences” such as racial, ethnic, and gender inequality, or continuing struggles around the globe for human rights, freedom, and power. Frequently, intercultural studies are augmented by experiential learning in the community and/or by study abroad.

### Service Learning, Community-Based Learning

In these programs, field-based “experiential learning” with community partners is an instructional strategy—and often a required part of the course. The idea is to give students direct experience with issues they are studying in the curriculum and with ongoing efforts to analyze and solve problems in the community. A key element in these programs is the opportunity students have to both apply what they are learning in real-world settings and reflect in a classroom setting on their service experiences. These programs model the idea that giving something back to the community is an important college outcome, and that working with community partners is good preparation for citizenship, work, and life.

### Internships

Internships are another increasingly common form of experiential learning. The idea is to provide students with direct experience in a work setting—usually related to their career interests—and to give them the benefit of supervision and coaching from professionals in the field. If the internship is taken for course credit, students complete a project or paper that is approved by a faculty member.

### Capstone Courses and Projects

Whether they’re called “senior capstones” or some other name, these culminating experiences require students nearing the end of their post-secondary years to create a project of some sort that integrates and applies what they’ve learned. The project might be a research paper, a performance, a portfolio of “best work,” or an exhibit of artwork.

### Portfolios

Developing a learning portfolio engages students in ongoing, reflective, and often collaborative analysis of their own learning, whether within one course or across all the courses in their chosen field of study. The reflection and analysis required to put a portfolio together is what creates the real impact on student learning and self-confidence. The evidence students collect shows them
the depth of their own learning, and makes it possible to effectively communicate to others the skills, knowledge and competencies they have developed.

Adapted from Association of American Colleges and Universities: Found online at http://www.aacu.org/leap/hip.cfm