Several of the materials we have used in this course have stressed the relationship between theory and practice and between practice and research. The readings in this module and the previous one both stressed the need to use appropriate theories to inform practice and the need, when dealing with complex phenomena, to use multiple theories to enhance explanatory power – to get the “full” picture. This applies to practice, too. I use four major bodies of theory in course design and delivery. Put simply, you are experiencing research and theory-based practice. This is a very brief overview of the theories I use.

# Angelo and Cross’ Six Teaching Goal Areas

Learning involves much more than acquiring subject matter expertise. In fact, to acquire and be able to use subject matter expertise, a learner must develop other knowledge, skills and attributes. For example, a student must have the basic skills needed for academic success to be able to learn subject matter effectively. Angelo & Cross, in a study of teaching practice and outcomes that continued for nearly a decade, found that we faculty members should address six goal areas when we develop learning experiences for students. I try to include activities in this class that will address each of these six learning goal areas. They are:

1. Higher order thinking skills (tied to Bloom’s taxonomy)
2. Academic success skills (organization, listening, writing)
3. Discipline-specific knowledge and skills
4. Appreciation of knowledge, ethics, & responsibilities (value diverse forms of knowledge, be open to new ideas, be informed about contemporary social issues)
5. Work and career preparation (teamwork, leadership, using time effectively, working productively with others)
6. Personal development (responsibility to others, develop self-confidence, learn to respect others, think for yourself)

Can you give an example of incorporation of each of these goal areas that you have experienced in a course?

Bloom’s taxonomy defines six cognitive levels that human beings can reach. Lower-level courses typically focus on lower level cognitive skills while graduate courses focus on higher level skills. Scaffolding is an important part of reaching higher cognitive levels. For example, you have to be able to remember and understand key concepts before you can apply them to solve a problem or use them in your work. This course aims to reach the highest cognitive level, but the course uses scaffolding in two ways. First, we start with basic concepts. Then we apply them to understand more complex ideas about sampling and data analysis. Finally, we take all of this knowledge and use it to create research designs. Second, we move within each module from lower-level cognitive levels to higher levels. Think about what you have learned to do. How confident are you that you can apply the higher cognitive tasks (analyzing, evaluating and creating) to your research?

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| --- | --- |
| **Cognitive Level** | **Nature of Learning** |
| Remembering | Rote memorization  Recall relevant information or facts |
| Understanding | Recognize principles  Be able to interpret or extrapolate meaning |
| Applying | Use knowledge to produce a result or solve a problem  Apply something learned to a new or different setting or situation |
| Analyzing | See patterns  Identify components or elements of complex systems – break the complex into simpler parts  See how components or elements are related to each other |
| Evaluating | Assess the value of theories, facts, data, etc. Discriminate between alternatives  Develop and use standards and criteria to make decisions |
| Creating | Reorganizing elements or components to create new knowledge or information |

The model below describes the four phases of the learning cycle. There are two ways you can take in experience – by Concrete Experience and Abstract Conceptualization. There are also two ways you deal with experience – by Reflective Observation and Active Experimentation. When you use both the concrete and abstract modes to take in your experience and when you both reflect and act on what you experience, you expand your potential to completely engage in a learning process. A very large body of research, generated over the past 40 years, shows that completing all of these aspects of the learning process is important if we want learning to go beyond the lower cognitive levels and be able to apply what we learn to complex tasks (like conducting research). Can you give examples of courses where you were encouraged to participate in all four of these steps in learning?

Concrete Experience: Learning by experiencing, such as learning from guided activities and examples, learning through interaction with other people, thinking about new ideas or finding new information

Reflective Observation: Learning by reflecting, such as carefully observing before making judgments, viewing issues from different perspectives, looking for the meaning of things

Abstract Conceptualization: Learning by thinking, such as logically analyzing ideas, planning systematically, acting on an intellectual understanding, identifying the assumptions underlying your own ideas

Active Experimentation: Learning by trying to solve problems, such as separating a complex task into parts, applying concepts or ideas to concrete situations, questioning your own conclusions

Concrete

Experience

Active

Experimentation

Reflective

Observation

Abstract

Conceptualization

There is much more to this. I just wanted to give you a hint of how this plays into what we do in this course. Here is an example of “teaching to the whole brain.”

Learning is biological. The brain remodels itself based on experience (neuroplasticity). We learn through repetition. Incorrect or flawed ideas or skills can become embedded in the brain just as easily as correct or flawed ones. Learning requires correcting errors in our thinking. For example, we might have erroneous information about dietary choices. There are all sorts of diets that simply do not stand up under scientific scrutiny and some of them are actually harmful. Learning in authentic environments – really trying to use what you are learning, even when it is hard – is critical to enhancing skill and expertise beyond basics. Please take a look at this video – [Flex Your Cortex](https://www.youtube.com/watch?v=uUL5o-1Yawo). The researcher provides “seven secrets” about we *think* is good for the brain that is in fact *not good for the brain.* It’s a 12-minute video that is worth every minute. I challenge you to identify one of these seven “myths about the brain” that affect your brain – something you would like to change about how your brain works.