

LEARNING TO LEARN

Adapted from

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"Here we use the Socratic method: I call on you; I ask you a question; you answer it. Why don't I just give you a lecture? Because through my questions you learn to teach yourselves. By this method of questioning-answering, questioning-answering, we seek to develop in you the ability to analyze that vast complex of facts that constitutes the relationships of members within a given society."

Professor Kingsfield (in the Paper Chase)

INTRODUCTION

Many students would likely cite a desire to learn as the primary reason for committing four years to a college education. But what do we really mean when we use the word "learn"? It is something we all do from the moment of birth, so most of us likely take this very complex process for granted. How many of you have spent time trying to understand the meaning of learning, or how it occurs? Although many of us have a general sense of what it means to learn, there are often many assumptions involved. Students assume that, because they have read their text and memorized facts, they have learned something. What should we expect to learn from a college education? What are the roles of students and teachers in the learning process? Are certain kinds of learning and thinking more valuable than others? What does sophisticated thinking look like and what are the developmental stages for getting there? How do grades reflect a student's thinking and learning? These are but a few questions to consider while reflecting on the purpose of a college education.

The past few decades have seen considerable advances in understanding the brain and learning. The purpose of this document is to provide a brief overview of learning, how people learn, and the importance of learning as a lifelong objective. This summary is distilled from a number of books, papers, and web pages related to learning, thinking, and educational practices.



NEED FOR NEW KINDS OF LEARNING

The focus of education is shifting from “teaching” to “learning” today. Faculty roles are changing from lecturing to being primarily

*The man who feels smug in an orderly world
has never looked down a volcano*

Anonymous

“designers of learning methods and environments” (Barr and Tagg 1995, cited in Fink 2003). Brookfield (1985) argues that the role of teachers is to “facilitate” the acquisition of knowledge, not “transmit” it, and the NRC (2000) recommends that the goal of education shift from an emphasis on comprehensive coverage of subject matter to helping students develop their own intellectual tools and learning strategies. It’s not that it isn’t important to learn some facts while in college; these will likely be necessary for future employment. More important though is having the skill to learn on one’s own after leaving college. This single, most-important skill will empower you for a lifetime and should be one of your highest priorities for attending college.

The 2002 panel report by the Association of American Colleges and Universities (*Greater Expectations: A New Vision for Learning as a Nation Goes to College*) defines student-learning needs for the 21st century. To prepare students for “emerging challenges in the workplace, in a diverse democracy, and in an interconnected world” colleges and universities should place new emphasis on educating students to be “intentional learners” who are purposeful and self-directed, empowered through intellectual and practical skills, informed by knowledge and ways of knowing, and responsible for personal actions and civic values (AACU, 2002). Becoming an intentional learner means “developing self-awareness about the reason for study, the learning process itself, and how education is used.”

Intentional learners are integrative thinkers who “see connections in seemingly disparate information” to inform their decisions. Self-directed learners are highly motivated, independent, and strive toward self-direction

*It is a great nuisance that knowledge can be
acquired only by hard work*

Somerset Maugham

and autonomy. They “take the initiative to diagnose their learning needs, formulate learning goals, identify resources for learning, select an implement learning strategies, and evaluate learning outcomes” (Savin-Baden and Major 2004).

DIFFERENT KINDS OF THINKING AND LEARNING: THE COGNITIVE DOMAIN

Since the 1950’s, researchers in cognitive theory and education have used Bloom’s (1956) taxonomies of learning. In a number of landmark papers, Bloom and colleagues identified three learning domains:

- the cognitive domain
- the affective domain
- the psychomotor domain

The *cognitive domain* involves thinking of all sorts; it is discussed in some detail below. The *affective domain* includes feelings, emotions, attitudes, values, and motivations. Levels within the affective domain range from initial awareness to a commitment to values that guide behavior and decisions. The *psychomotor domain* of learning includes physical movement, coordination, motor-, and sensory-skills. The psychomotor domain is not considered further in this document. The other two domains, however, are involved in just about everything that follows. (Read on!). Although widely used by instructors for course design and student assessment, Bloom's taxonomy does not include some of the new kinds of learning deemed important today (e.g., learning how to learn, communication and leadership skills, adaptability).

Without question, the most widely used of Bloom's taxonomies is for the cognitive domain. Bloom divided this domain into six levels of understanding in a hierarchical sequence (Table 1). According to Bloom, the acquisition of facts (*knowledge*) marks only the beginning of

Table 1. Bloom's levels of thinking, from lowest (1) to highest (6), in the cognitive domain. This taxonomy, recently revised by Anderson et al. (2001), remains essentially unchanged, except that synthesis (creating) is considered the highest level of thinking.

	Level of Thinking	Example Question That Targets Understanding
1	Knowledge (facts)	Define the term "mineral"
2	Comprehension (understand meanings)	Explain why some crystal faces grow faster than others
3	Application (apply to new situations)	For the 1994 flood in Minnesota, calculate the frequency of flooding of this magnitude.
4	Analysis (see organization and patterns)	Compare the distribution of earthquakes along mid-ocean ridges with those of subduction zones
5	Synthesis (generalize, create new ideas)	Use the sequence of rocks exposed along the Mississippi River to construct a model of the changes in sea level during the early Paleozoic.
6	Evaluation (assess value of evidence)	Evaluate the arguments for and against the evidence of fossil life in meteorites from Mars

understanding. The facts must be understood (*comprehension*) before they can be applied to new situations (*application*). Knowledge must be organized and patterns recognized (*analysis*) before it can be used to create new ideas (*synthesis*). Finally, to discriminate among competing models or evidence, the learner needs to be able to assess (*evaluation*) the relative merits and validity of information or ideas. Clearly, to attain the level of understanding that makes "*evaluation*" possible requires significant time and effort by the learner. Such a sophisticated level of understanding is not easily attained by simply reading a book or hearing a lecture. It requires active thought and reflection. Think about something in your own life in which you have attained a high level of understanding. Perhaps it is a hobby, a sport, or a skill. Try to write down examples of the different levels of understanding related to this proficiency that you have. How many hours did you spend dedicated to that task before you attained your current level of proficiency? Are you prepared to dedicate that much effort to leaning in college? Bloom and

colleagues identified six levels within the cognitive domain. Subsequently, Anderson et al. (2001) pointed out that there are four categories of knowledge within the cognitive domain, each requiring different kinds of learning. They identified four principal kinds of knowledge: factual, conceptual, procedural, and metacognitive. *Factual knowledge* consists of isolated and discrete content elements. *Conceptual knowledge* is more complex and organized, including such things as knowledge of classifications, categories, principles, theories, models, and structures. Knowledge of “how to do something” such as techniques, methods and skills is termed *procedural knowledge*. *Metacognitive knowledge* is “knowledge about cognition and awareness of and knowledge about one’s own cognition.” Anderson et al. (2001) revised Bloom’s taxonomy and showed that each of their four kinds of knowledge can be mapped across all six of Bloom’s levels of understanding. So, there are 24 distinct combinations of knowledge type and level of understanding. In *Learning to Think: Disciplinary Perspectives*, Donald points out that different disciplines involve different and specific kinds of thinking and information. This, according to Donald explains why students gravitate toward one field or another. It is also the single most important predictor for success in a given field. Wow, our concepts of learning and understanding have already gotten a lot more complicated, and we’re not finished yet!

FINK'S TAXONOMY OF SIGNIFICANT LEARNING

In response to a need for a broader consideration of learning, Fink (2003) proposed a taxonomy of “significant learning” (Table 2) that involves aspects of both the cognitive and affective domains. This taxonomy was developed to emphasize that learning involves changes in the learner. Significant learning is characterized by “some kind of lasting change that is important in terms of the learner’s life” (Fink 2003). Each of Fink’s rather broad categories includes several related specific kinds of learning. However, unlike in Bloom’s taxonomy, the categories in the Fink (2003) taxonomy are interactive rather than hierarchical.

Table 2. Fink’s (2003) Categories of Significant Learning.

Learning Categories	Specific Kinds of Learning
<i>Foundational Knowledge</i>	Understanding and Remembering Information & Ideas
<i>Application</i>	Skills; Critical, Creative, and Practical Thinking; Managing Projects
<i>Integration</i>	Connecting Ideas, People, and Realms of Life
<i>Human Dimension</i>	Learning about Oneself and Others
<i>Caring</i>	Developing New Feelings, Interests, and Values
<i>Learning How to Learn</i>	Becoming a Better Student; Inquiring About a Subject; Self-Directing Learners

According to the Fink scheme, *foundational knowledge* includes knowledge and understanding of basic facts, ideas, and perspectives. Foundational knowledge also includes understanding the conceptual structure of factual knowledge within a subject, essential when

applying factual knowledge in other areas. Foundational knowledge is also essential for other kinds of learning to be useful, hence the term foundational.

In addition to being able to recall information and ideas, one also needs to be able to apply one's knowledge or skills to new situations; this is *application*. This category includes learning to engage in new kinds of thinking (critical, creative, practical) as well as certain skills (e.g., communication, playing an instrument). Critical thinking refers to the process of analyzing and evaluating, whereas creative thinking is the process of creating new ideas, designs, products, or forms of expression (Sternberg 1989; cited in Fink 2003). Practical learning occurs when foundational knowledge is applied to answering questions, solving problems, or making decisions. In the Fink taxonomy, the real intellectual power comes from *integration*, which involves being able to make connections between specific ideas, people, or different realms of life. This includes interdisciplinary learning, learning communities, and connecting academic work with other areas of life. The *human dimension* of learning describes the type of learning that occurs when a student learns something important about himself or herself, or what they might desire to become. This new self-knowledge enables them to recognize the personal and social implications of their knowledge and to function and interact more effectively with others. (Others are broadly defined by Fink to include interacting with technology). These kinds of learning (human dimension) are broadly similar to "emotional intelligence," which Goleman (1998; cited in Fink 2003), describes as including self-awareness, self-regulation, motivation, empathy, and social skills. Both authors note the importance of understanding self and others, and of the reciprocity of learning about oneself and others.

When a learning experience has a profound effect on a student, it can result in a greater sense of *caring* for the subject, for themselves, others, or learning in general. Greater caring can lead to new interests, energy for learning, or a change in values. Finally, it is also important to *learn how to learn*. This includes learning how to diagnose one's own need for learning and how to be a self-learner. This type of learning enables students to continue learning with greater effectiveness and is a particularly important skill with the recent explosion of knowledge and technology.

At best, most traditional college courses and curricula are designed to provide students with foundational knowledge and the skills for self-directed learning after graduation. How does one develop the other aspects of significant learning? That's a question for both the learner and the instructor

A lecture is a process by which the notes of the professor become the notes of the students without passing through the minds of either

R.K. Rathbun

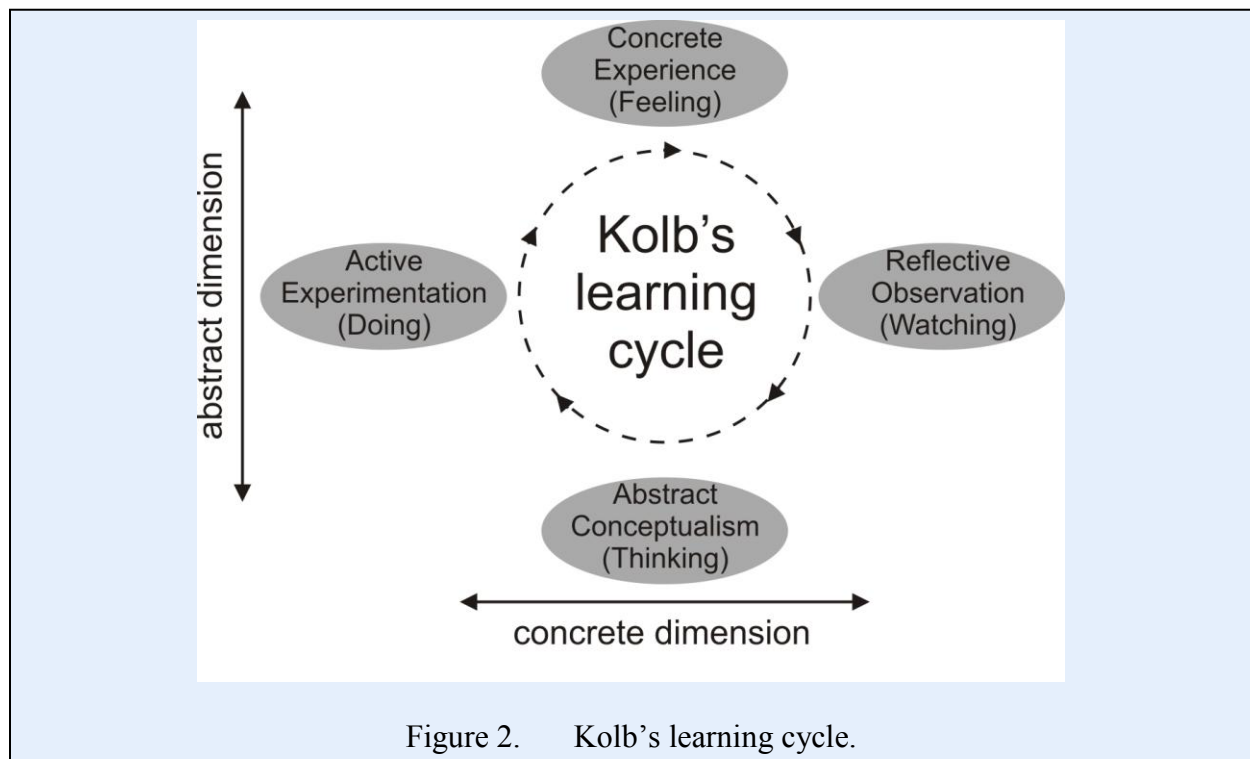
The bottom line is this: there is a lot more to learning than memorizing, recalling, or even understanding, facts. Stated another way: there is much more to learning than content. The successful student must also know how to apply knowledge to new areas; integrate knowledge with other aspects of life; understand the implications of knowledge for self and others; care about learning; and learn how to learn. None

of these learning categories can be neglected because learning in one area enhances learning in other areas (Fink 2003).

WHAT REALLY IS LEARNING?

Modern cognitive psychology tells us that learning is a constructive, not receptive, process. This theory of learning (constructivism) holds that understanding comes through experiences and interaction with the environment, and that the learner uses a foundation of previous knowledge to construct new understanding. Consequently, the learner has primary responsibility for constructing knowledge and understanding, not the teacher. In a constructivist classroom, the teacher is no longer the “authority” but instead is a guide or facilitator who assists students in learning.

According to Kolb (1984), the learning cycle begins when the learner interacts with the environment (*concrete experience*). Sensory information from this experience is integrated and compared with existing knowledge (*reflective observation*). New models, ideas, and plans for action are created from this information (*abstract hypotheses*), and finally new action is taken (*active testing*). The Kolb cycle is consistent with the earlier work of Piaget and others who pointed out that learning has both a concrete (active) and an abstract (intellectual) dimension.



(Figure 2).

METACOGNITION: THINKING ABOUT ONE'S OWN THINKING AND LEARNING

Intentional thought about one's own thinking (metacognition) is generally regarded as an essential component of successful thinkers and learners. Studies show "experts" constantly monitor their understanding and progress during problem solving. Critically,

I went to a bookstore and asked the saleswoman, "Where's the self-help section?" She said if she told me, it would defeat the purpose

George Carlin

their metacognitive skills allow them to decide when their current level of understanding is not adequate. This type of planning, self-monitoring, self-regulation, and self assessment not only includes general knowledge about cognitive processes and strategies, but also appropriate conditions for use of those strategies, and general self-knowledge. Research suggests that metacognitive skills cannot be taught out of context. In other words, one can't just take a course on metacognition. You need to learn it and apply it within the context of disciplinary content. As you learn, you should engage in constant questioning (e.g., What am I trying to accomplish? What is the best strategy for learning? How is my progress? Did I succeed?). This sort of self-monitoring and reflection not only leads to deeper and more effective learning, but also lays the groundwork for being a self-directing learner.

UNDERSTANDING GRADES

In many respects, grades are an unfortunate part of the learning process. Many students, especially those new to college, do not have a clear understanding of what it takes to be successful in the college environment. For other students, the focus is too easily shifted from learning to grades. For the college teacher, assigning grades at the end of the semester can be simultaneously rewarding and frustrating. When a student has worked hard, challenged himself or herself, and shown evidence of deep learning, it is very gratifying to assign a high mark. In contrast, it is very trying to assign a low mark to a student who has great potential, but who has demonstrated surface learning or has made little effort to improve. Although a single letter grade does not adequately represent the sum total of a person's potential or abilities, it is a widely accepted method for summarizing a student's performance in a particular course. Overall performance in a course is undoubtedly a function of many things, but can be distilled down to a student's native ability and motivation (as indicated by attendance, preparation, attitude, curiosity, effort, and retention). Although greater effort (working hard) in a course can result in improved results (learning), this is not necessarily always the case. It is important not to confuse these two very important, but different, dimensions of performance. Effort alone does not guarantee success. Conversely, the most outstanding student in a classroom is not necessarily the individual with the greatest native ability. Look over the following table (Table 6), modified from well-known papers in *The Teaching Professor* by J.H. Williams (1993) and Solomon and Nellen (1996) to evaluate your own behavior in the classroom. In which aspects do you excel? Which ones need improvement? Remember, time-on-task is the single variable most highly correlated with learning. If learning is not your highest priority, then you should not expect to

receive an “A” and you should work toward a more attainable grade. Lastly, remember that not every professor has the same standards for grading and that it is your responsibility to know which standards are in effect.

Behavioral Dimension	“A” or Outstanding Student	“C” or Average Student
1. Attendance (commitment)	Nearly perfect attendance; rare excused absences except for other scheduled conflicts; make prior arrangements for missed content	Sometimes comes to class late; occasional absences from class are rarely excused; frequently puts other priorities ahead of course
2. Preparation	Well-prepared; readings and assignments completed before class with great attention to detail; rarely misses deadlines; retains information from the course and makes connections with past learning	Readings and assignments completed in a timely, but perfunctory manner with little attention to detail or further contemplation; work often appears to be “draft” quality
3. Curiosity	Has a motivating purpose; inquisitive; asks thoughtful questions and is an active participant in classroom discussions; makes the extra effort to learn more and connect with other aspects of education or life	Uninterested in subject material and class; participates in class and projects without enthusiasm; exhibits only modest interest in subject matter
4. Attitude (dedication)	Has a winning attitude and shows responsibility, motivation and determination to succeed; enjoys and values learning; listens to feedback and acts on it	Rarely does more than required; Seldom shows initiative; defensive about feedback and unwilling to accept responsibility; perceive themselves as victims
5. Talent (ability)	Possesses special talents such as exceptional intelligence, unusual creativity, or outstanding commitment that are evident to the instructor	Can have greatly varying natural talent; some students are quite talented, but lack organization or motivation; others are motivated, but lack special aptitude
6. Retention	Learns concepts rather than memorizes details so better able to connect past learning with present material	Tries to memorize facts at the last minute rather than learn concepts; makes few conscious efforts to connect new learning with past knowledge
7. Effort (time commitment)	Reads, studies, and thinks about course subject on a regular basis; begins assignments and projects well before deadlines; often willing to devote extra time and effort when needed; attention to detail; seeks out instructor outside of class	Does not develop a regular system for studying and doing assignments; frequently begins readings and assignments at the last minute; rarely willing to devote time necessary to develop deeper understanding
8. Communication Skills	Speaks confidently and writes well; presentations and documents are well-conceived, well-prepared, and informative	Presentations and written work lack organization and clarity; papers are generally draft quality requiring extensive re-writing to be effective; quality of content limited by poor communication skills
9. Results (performance)	Exams and papers are always of the highest quality (among the highest in a class); contributions in the classroom are significant and insightful; work demonstrates critical thinking	Products are mediocre or inconsistent in quality; writing and speaking indicates only a cursory understanding rather than a mastery of material

Finally, it may not be obvious to you why there is so much emphasis on writing in college. Writing provides an opportunity to explore old ideas and find new ones. Simply stated, what you write, and how you write it, is evidence of your ability to think critically (Paul 2004). When you write vague sentences, or fail to provide detailed examples to make a point, it indicates that your understanding of a topic lacks clarity or detail. When you fail to provide a detailed logical analysis in your writing, it suggests that your conceptual understanding may be weak. “A” level work requires a clear demonstration of the elements of critical thinking, including evidence of a mind that has “taken charge of its own ideas, assumptions, inferences, and intellectual processes” (Paul 2004). To the extent that a student needs assessment by another individual, they are not thinking critically or engaging their metacognitive skills. As a student you should strive to be an independent, self-directing learner.

Remember, the choices that you make in college may result in habits that affect the rest of your life. Skip Downing, author of *On Course: Strategies for Creating Success in College and in Life* (2005) has provided a list of characteristics of successful and struggling students (Table 7). Look over this list. How do you measure up? Are you where you want to be, or would you like to make some changes? The choice is yours and we’re here to help!

Table 7. Characteristics of successful and struggling students (from Cuesta College, 2003)

<i>Successful Students</i>	<i>Struggling Students</i>
Accept personal responsibility for creating the outcomes and quality of their lives	See themselves as victims, believing for the most part that what happens to them is beyond their control
Discover a motivating purpose, characterized by personally meaningful goals and dreams	Have difficulty choosing a purpose and often experience depression and/or resentment about the meaninglessness of their lives
Consistently plan and take effective actions in pursuing their goals and dreams	Seldom identify the specific actions needed to accomplish a task, and when they do, they tend to procrastinate
Build mutually supportive relationships that assist them in pursuing their goals and dreams	Are solitary, seldom requesting, even rejecting offers of assistance from legitimate resources
Gain heightened self-awareness, developing empowering beliefs, attitudes, and behaviors that will keep them on course	Are slaves of disempowering life scripts that carry them far off course
Become life-long learners, finding valuable lessons in nearly every experience they have	Tend to resist learning new ideas and skills, often viewing learning as drudgery rather than mental play
Develop emotional maturity, characterized by optimism, happiness, and peace of mind	Live at the mercy of their emotions, having success hijacked by anger, depression, anxiety, and a need for instant gratification
Believe in themselves, feeling capable, lovable, and unconditionally worthy as human beings	Doubt their personal value, feeling inadequate to accomplish meaningful tasks and unworthy to be loved by others or themselves

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