The Learning Process Methodology: The Heart of Process Education

Matthew Watts

Abstract:	The workshop will start with a brief interactive lecture, followed by critical thinking done in small teams, and end with a discussion. Intended outcomes include: 1) A review of the Learning Process Methodology and its connection to other models of Learning and Instructional Design (this will be realized with a brief interactive lecture), 2) Determine how the LPM can be used to turn failure and risk into academic success (this will be realized by answering critical thinking questions in small groups), and 3) Discuss the connections between the LPM and classroom best practices, instructional design best practices, assessment, and research (this will be realized by a discussion of the results found from each group).
Learning Outcome:	1. A review of the Learning Process Methodology and its connection to other models of Learning and Instructional Design 2. Determine how the LPM can be used to turn failure and risk into academic success 3. Discuss the connections between the LPM and classroom best practices, instructional design best practices, assessment, and research.
Pre-Reading:	Before attending the workshop please review the following documents in your notebook: • The Learning Process Methodology (From *Learning to Learn: Becoming a Self-Grower*) • Learning Process Methodology (*Faculty Guidebook* 2.3.8)
Facilitation Plan:	**Part 1: Interactive Lecture** (15 minutes) The facilitator will review how the Learning Process Methodology and other models of learning are used as tools for instructional design. **Part 2: Small Group Discussions** (45 minutes) Attendees will work in teams of 3 - 4 to discuss Critical Thinking Questions about the LPM and its connection to other models, the conference theme, Process Education, and their own personal experiences. **Part 3: Discussion** (25 minutes) Spokespersons from each team will share responses to the Critical Thinking Questions and insights from the small group discussions with the audience.
Resources Needed:	All are found on the following pages: • Universal Model of Learning Process: Learning Process Methodology • Models • Critical Thinking Questions

One of our goals for you in this course is to help you raise your learning by at least one level. What would this mean? For example, after this course, Ken will find himself able to move from Level 1 in algebra to Level 2 where he not only understands the facts but is also able to solve simple equations. At Level 3, he will be able to use algebra to solve real-world problems. As you can see from this example, one of the essential purposes of learning is to be able to transfer knowledge to new situations and problems. One important way you can do that is to organize the way you learn. This can be accomplished by applying the Learning Process Methodology.

Ken's Level of Learning

Ken sees himself on different levels depending on the subject matter. With algebra, he's really at the level of information. He's just getting used to the vocabulary of algebra and how to use it to solve simple problems. But in the area of management, he is working at Level 3. He is able to solve new problems at work at the plant based on what he has learned from prior experience.

The Learning Process Methodology

Let's look at the process of learning—a process used continually as a student and one you will use throughout your entire life. While learning is not a new process, it is one that is complex and not easily understood. As you increase your ability to learn, your self-esteem and confidence will grow, and you will become a person with broader horizons. You will also increase your opportunities for personal growth, leading to life experiences that become more rewarding and enjoyable.

The Learning Process Methodology (LPM) has components that cover three main stages of learning: 1) preparing to learn, 2) performing a learning activity, and 3) assessing and building new knowledge. Each stage can then be broken down further as shown below. The Learning Process Methodology can also be used as a resource to gain insights into the processes you currently use when learning. No matter your strengths or weaknesses when it comes to the learning process, your learning CAN be improved. The Learning Process Methodology is a reliable and useful tool to improve your ability to learn.

Overview of the Learning Process Methodology

Stage 1: Preparing to Learn
Set the stage for learning: A person will perform better at the beginning of the learning process if he or she feels that what is to be learned is important and worthwhile, sees how what is to be learned fits into a "big picture" or builds on what he or she already knows, and has the necessary prerequisite skills and knowledge to start the process.
Set goals and criteria for learning: By determining learning objectives, the learner clarifies the general purpose of the learning activity. Performance criteria provide specifics as to what is expected of the learner in terms of outcomes or performance.
Obtain relevant information for learning: This provides the learner with the terminology and background information necessary to begin the process of learning something new.

Stage 2: Performing a Learning Activity
Implement action for learning: The process of building new knowledge (learning something new) involves constructing and following a plan with a set of tasks which results in meeting the learning objectives and established performance criteria. The plan should include the use of information, models, and questions which require critical thought. Models and examples help the learner to explore and build understanding about what is being learned. Knowledge is constructed by thinking critically which involves asking and answering key questions. **Apply what you have learned:** A measure of true understanding and learning is the presence or absence of a learner's ability to transfer what has been learned to new contexts and apply knowledge in new and different ways to solve problems.

Stage 3: Assessing and Building New Knowledge
Assess the learning process: The learning process can be improved if a learner becomes proficient at self-assessing his or her performance while he or she is learning. By focusing on strengths and areas for improvement, a learner can use this information to improve his or her performance in the next learning situation. **Construct new knowledge:** A learner becomes a "self-learner" when he or she continues the learning process to conduct research and construct new knowledge which builds upon prior knowledge. This includes applying knowledge in new contexts, creating new methodologies, and making new interpretations or understanding things in a new way.

The steps for the Learning Process Methodology (LPM) are presented below, followed by an example of how the LPM can be applied to situations that require learning. It is not critical that you memorize the LPM, but it is important that you become familiar enough with it that you can apply it to actual learning situations.

LEARNING PROCESS METHODOLOGY 1 ➡ 2 ➡ 3

Step	Explanation
Stage 1: Preparing to Learn	
1 Why	Identify and explain your reasons for learning.
2 Orientation	Develop a systematic overview of what is to be learned.
3 Prerequisites	Identify necessary skills and background knowledge needed to perform the learning.
4 Learning Objectives	Set appropriate goals and objectives for the learning activity.
5 Performance Criteria	Determine specific desired outcomes used to measure and gauge performance.
6 Vocabulary	Identify and learn key terminology.
7 Information	Collect, read, and study appropriate resources.

Step	Explanation
Stage 2: Performing a Learning Activity	
8 Plan	Develop a plan of action to meet the performance criteria.
9 Models	Study and review examples that assist in meeting the learning objectives and performance criteria.
10 Thinking Critically	Pose and answer questions that stimulate thought and promote understanding.
11 Transfer/Application	Transfer knowledge to different contexts; apply knowledge in new situations.
12 Problem Solving	Use knowledge in problem solving situations.
Stage 3: Assessing and Building New Knowledge	
13 Self-assessment	Assess use of the learning process and mastery of the material learned.
14 Research	Create and develop knowledge that is new and unique.

Now that you've seen an overview of the Learning Process Methodology as well as a description of its steps, let's apply the LPM to a possible real life scenario.

The Learning Process Methodology: *A Simple Example*

Scenario: You received a digital watch for your birthday. It's a great watch with all kinds of advanced functions. But it's currently showing the date as December 12, 2012, and the time as 12:12 p.m. Obviously, you're going to need to set the watch to the correct date and time...this is an ideal learning activity and a perfect time to test drive the LPM!

Step	Explanation
1 Why	You want to start wearing and using your new digital watch.
2 Orientation	Look over the contents of the package, the watch, and printed materials.
3 Prerequisites	Include reading skills, ability to tell time, and fine motor skills.
4 Learning Objectives	You want to learn how to set the watch to the correct time and date.
5 Performance Criteria	Set the watch to the correct time and date within five minutes.
6 Vocabulary	Terms to know: LCD screen, functions
7 Information	The operating instructions booklet

Step	Explanation
8 Plan	Read instructions for three minutes. Refer to the watch while reading instructions. Set the time and date according to the instructions and within two minutes.
9 Models	The diagram of the watch included with the instructions
10 Thinking Critically	Which buttons control which functions? What is the correct time and date? Does the watch need to be set according to A.M. and P.M.? Does a button need to be pressed more than once?
11 Transfer/Application	You should be able to adjust and change the time correctly when changing time zones.
12 Problem Solving	The watch needs to be used as a stopwatch and as an alarm.
13 Self-assessment	Are the time and date set correctly? Did you meet the criteria?
14 Research	Look at improving the design of digital watches.

Ken was not so sure he understood the LPM although the simple example with the digital watch helped. He decided to use the LPM to analyze a past learning experience. Last year, he learned to play tennis. This had been a pretty successful learning experience for him, so he decided to apply the LPM to the experience. He printed a blank LPM form from the course web site and filled it out. The following is what he came up with.

The Learning Process Methodology: *Ken Learns to Play Tennis (by Ken)*

Scenario: I want to learn to play tennis. I'd like to learn it well enough to play as well as appreciate watching it on television. My son, Bobby, is beginning to play tennis at school, so I'd like to know enough to help him. Next fall, we may go to New York City to watch the US Open together.

Step	Explanation
1 Why	We didn't have tennis in my high school, and I always wondered what it would be like to play. Tennis is interesting to me on many levels. First of all, it is good exercise. Second, while it is fun to watch on television now, it would be even more entertaining if I understood the rules of the game.
2 Orientation	I have a passing familiarity with the game, having watched it on TV. I've reviewed the basic rules of the game on a couple of web sites. I know that I'll be focusing on playing singles and on a community court. Nothing fancy, in other words!
3 Prerequisites	Includes eye-hand coordination, the ability to read and interpret rules, and reasonable physical fitness and stamina.
4 Learning Objectives	I want to know enough about playing to keep up with Bobby and watch tennis matches with an appreciation for the skill and strategy used.

Step	Explanation
5 Performance Criteria	I can play a game well enough to enjoy competition with another player (whose skill level is close to my own), rather than focusing only upon the skills I'm working to develop.
6 Vocabulary	Terms to know: lines and locations: net, baseline, singles line; scoring: point, game, set, match; shots: forehand, backhand, serve, volley, overhead, lob, drop-shot; serve-related: ace, let, fault, double fault, foot fault
7 Information	There are many sources of information; my local bookstore has a nice selection of both books and DVDs. There are also many web sites that offer terminology, tips, and rules. Tennis classes or private lessons are another potential resource.
8 Plan	I plan to study videos of professional tennis players and to pay greater attention when I watch tennis on TV. Bobby said that his coach also rec-ommends watching even amateur-level players and matches because in assessing their performance, actions, and strategy, you can strengthen your own mental game and decision-making.
9 Models	Study videos of pros; videotape myself and review with a tennis teacher; use games that will help me keep my eye on the ball.
10 Thinking Critically	How do I keep score? What are the most important things to remember about getting in the correct position to hit a forehand and backhand shot? How can I best monitor and maximize my physical condition in order to play well? How can I include my son and other family members in my new hobby?
11 Transfer/Application	Learning to play tennis will potentially help me understand other sports such as racquetball, squash, maybe even table tennis. I'll also learn more about keeping physically fit.
12 Problem Solving	Playing to capitalize on your own strengths and your opponent's weak-nesses is a problem that tennis professionals routinely have to solve. I'll certainly need to think about that in order to play a competitive game, but I first need to work on my basic skills! My son has recommended a book, *Tennis for Beginners*, but all the pictures and instructions are for right-handed players, and I'm a leftie! I know the book will be helpful, but I've got to figure out how to adapt the information so that it's most useful for me. Maybe I can view the pictures reflected in a mirror...
13 Self-assessment	I plan to regularly self-assess my performance and improvement. I've developed a couple of questions that will allow me to gauge and assess my performance at least at the beginning: Can I understand enough of what is going on in a televised tennis match to discuss aspects of the match and player actions with Bobby? Also, can I play a game, enjoy myself, and keep an accurate score?
14 Research	Now that I've used a racket, I have a much better appreciation of how an alternative design could have an impact on different aspects of my game. I plan to do a bit of research regarding different racket options and costs.

WOW. This is a powerful tool and one that I can begin to use immediately in so many different contexts! I hate that I'm having some difficulty with factoring in my Algebra course. I see how I can use the LPM to outline precisely how I will tackle that problem. And this summer I'm taking an Officer Training Course where I'll need to learn the state codes inside and out; that will be another place to apply the LPM. Bobby's got the tennis thing under control (I'm not going to admit how often he skunks his old man!), but he IS having a tough time learning to play the guitar. The LPM will provide him with a way to "divide and conquer" that challenge. It won't mean he or ANY of us don't need to practice, but it does give an incredible structure for tackling a learning activity. Oh, and I'm restoring a 1972 Norton Commando motorcycle on the weekends and learning as I go. While I probably won't need to use all the steps of the LPM, that project has dragged on long enough that I COULD use a new way to move things along. Then there's my sister who is taking a beginning pottery course...

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2.3.8 Learning Process Methodology

by Cy Leise (Psychology & Human Services, Bellevue University), Steven W. Beyerlein (Mechanical Engineering, University of Idaho), and Daniel K. Apple (President and Founder, Pacific Crest)

The Learning Process Methodology (LPM) is a guide for learners who wish to improve their efficiency and depth of learning and for educators who wish to help learners achieve these goals. Implementing each of the steps in the LPM can add value to any learning activity. The LPM flexibly supports the construction of knowledge in any field and its elevation from basic information to applications. It also supports the creation of new knowledge. The steps in the methodology have validity across disciplines and are consistent with the tenets of major learning theories. Examples are provided to demonstrate use of the LPM at novice and at expert levels.

Universality of the LPM

Learning is a complex process involving multiple steps (Table 1) which are usefully modeled as a methodology. Learning also requires simpler processes which are identified in the ***Classification of Learning Skills (2.3.3)***. For fully developed knowledge in a specific topic or application, learners will need several other process methodologies to complement the LPM, such as those for information processing, reading, writing, and assessment. Although it is created from the constructivist perspective of Process Education, the LPM approach is consistent with virtually all models of learning (e.g., Grow, 2003; Lorsbach, 2003; NCREL [North Central Regional Educational Laboratory], 2003; Epsilon Learning Systems, 2003; Dufresne, Leonard, & Gerace, 2003).

Every learning theory or model includes elements or implications related to each step in the LPM. The authors of the sample of models cited above exemplify, argue, or describe why learning occurs best when the learner is motivated; is aware of his or her current personal level of knowledge; has set specific learning objectives and related performance criteria; has a plan for finding, remembering, and managing information; can transfer the learning to new situations and problems; and can create new knowledge through research if desired. The LPM provides additional value because it is a generalized model of the learning process and is a basis for evaluating the pros and cons of any specific model of learning because it integrates and is consistent with tenets of major learning theories.

Using the LPM to Elevate the Level of Knowledge

Because learning is a process that is characterized by the distinct steps in the LPM, it is possible to add value to learning activities in any discipline through its use. Bloom (***2.2.1 Bloom's Taxonomy—Expanding its Meaning***) pioneered the concept of a hierarchy of knowledge levels that should guide curriculum design and learning facilitation (***2.2.2 Elevating Knowledge from Level 1 to Level 3*** and ***2.2.3 Developing Working Expertise (Level 4 Knowledge)***).

Halpern (2003) argues, consistent with Process Education principles, that the essential purpose of learning is to be able to transfer learning/knowledge to new situations and problems. She provides the following set of scientifically supported principles and propositions that support this position.

1. Long-term transfer requires a series of learning opportunities that involve varied "cues" for use of the learning, e.g., in different contexts.

2. Long-term transfer also requires that learning episodes be spaced over time, i.e., the learner must use "spaced practice."

3. Varying cues and contexts make learning more challenging; this is essential for improving the probability that learning will transfer.

4. Using multiple kinds of models and representing knowledge in multiple ways enhances the construction of knowledge so that it will transfer.

5. Learner assumptions (e.g., that they are innately incapable of certain kinds of learning), experiences (e.g., of anxiety or pleasure with certain kinds of learning), and expectancies (e.g., that learning certain subjects is easy) must be assessed in order to help learners build effective models of knowledge that will transfer.

6. Performance assessment and evaluation must focus on the main learning objectives in order to avoid learner misperceptions and the forgetting of essential knowledge as a result of attending to the wrong knowledge for the purpose at hand (e.g., learning to pass a test rather than learning to perform in a real context).

7. In-depth knowledge is usually needed for effective transfer. The amount of information to be learned at Bloom's Levels 1 and 2 must support the goal of transfer.

8. Learning strategies must be validated with empirical evidence that they actually produce desired outcomes in learner transfer of knowledge.

Description of LPM Steps	Learning Plan Criteria
1. **Why:** Motivation to learn depends upon the relevance of learning to personal, educational, career, and life goals. State why learning about this topic is important and how it is relevant to your interests, needs, or concerns. Think beyond immediate needs.	a. Reason is personally meaningful b. Reason indicates a practical benefit
2. **Learning Objective:** State a knowledge or skill outcome or result that you intend to achieve. It should be personally meaningful, relevant, valuable, motivating, and supportive of your larger learning goals.	a. Outcome specified as a positive achievement b. Medium "scope" or range of learning described
3. **Performance Criteria:** Indicate two or three general areas of performance, e.g., writing quality, and what standard you intend to meet in each area, e.g., Level 3 on a writing rubric, to demonstrate that the learning outcome has been met. These should be measurable, observable, fair, and challenging.	a. Indicates qualities or types of performance that will indicate achievement of the objective b. Describes how the learning outcome will be measured, e.g., by a rubric or exam c. Sets a standard that must be met for success, e.g., level, grade, number of items completed d. Method of documenting results is clear, e.g., in a Recorder Report or from an exam grade
4. **Orientation:** Review the instructions, materials, and main focus of what is to be learned about the topic. Usually a subset of knowledge is needed but one must be aware of the whole topic area and how the knowledge is used.	a. Statement indicates the context, e.g., a course assignment or a research project b. Statement demonstrates awareness of the overall topic or area of knowledge, e.g., factoring problems in algebra or hormone systems in biology
5. **Prerequisites:** Identify what prior learning or skills are necessary as background or foundation for new learning about this topic. Review this issue again after setting a specific learning objective.	a. Required entry or background knowledge is described briefly b. Personal limitations in background knowledge specified
6. **Study Plan:** Identify resources to use, concepts to study, models and examples to apply, questions that must be answered, a study schedule, and what to assess about your learning process in Steps (a) through (f).	Record elements of your study plan in the cells below as specified in Steps (a) through (f)
a. **Information:** Follow the Information Processing Methodology (IPM) to identify a list of relevant resources, e.g., readings, library items, notes, Internet.	a. List of useful resources compiled b. List validated by reviewing the IPM steps
b. **Vocabulary:** Identify essential concepts that must be understood and remembered. Use analysis techniques, e.g., concept mapping, and memory techniques, e.g., chunking, to deeply learn concepts.	a. List of concepts collected from all relevant information resources, e.g., text, notes, articles b. Categorization or organization techniques used before memorizing or using terms c. Effective memorization technique chosen

Description of LPM Steps	Learning Plan Criteria
c. **Models and Examples:** Identify simpler models/examples to study first, such as easy or worked-out problems. Then plan more complex or varied ones.	a. Collect and rank-order models/examples from easy to complex b. Time management plan (Step 6e) includes spaced practice of problems in order of difficulty
d. **Critical Thinking Questions:** State the most important questions that relate background knowledge to the learning objective. Questions should be open-ended, logical, and challenging.	a. Questions are open-ended b. Questions raise important issues c. Questions suggest connections between the learning objective and background or prerequisite knowledge
e. **Time Management:** Schedule enough time, and space the time over a number of days to benefit from "spaced practice." Allot time for each step in your plan. Make use of brief time periods to review.	a. Include enough time to realistically complete all learning steps b. Include spaced practice spread over days or weeks c. Calendar record is not too detailed or general
f. **SII (Strength, Improvement, Insight):** Use to assess your performance in terms of your study plan steps and in terms of the performance criteria for your learning objective.	a. Assessments focus on processes in the study plan used to achieve the learning objective b. SII statements answer "Why?" for strength, "How?" for improvement, and "So What?" for insight
7. **Transfer/Application:** To enhance your learning, change the context/situation to demonstrate flexibility in applying knowledge related to the learning objective. This step may require a new learning objective and related plans.	a. State a related learning objective for a new context or situation b. SII assessments indicate generalization of the original learning to the new context or situation
8. **Problem Solving:** To enhance application of knowledge related to the learning objective, challenge yourself to solve more complex types of problems that are closer to those worked on by experts in the field.	a. Document use of knowledge to analyze and solve a problem in an "unstructured" context b. Document awareness of perspective and skills used by experts in the problem type
9. **Research:** Increase the creative aspects of your learning by designing new ways to investigate knowledge or applications related to the topic. Expand your range of artistic expression or interpretation.	a. Design a study that investigated a challenging question related to the learning or problem area b. Share results and interpretation to an appropriate audience
10. **Self-Assessment of Growth:** Document improvements in "knowing you know" that will change your future "learning style." Steps 7, 8, & 9 involve challenges that demonstrate growth.	a. Use appropriate rubric(s) related to growth in learning skills b. Identify new ways to challenge still further growth in learning skills and metacognition

By facilitating the systematic use of the LPM, educators can help learners at any level to elevate their learning. The initial steps in the methodology engage learners and educators in considering the rationale for specific learning objectives, in assessing readiness to learn, in planning effective study methods, and eventually in learning to transfer and problem solve with the new knowledge. Initially users of the LPM struggle to understand how to respond to the requirements of each step, but over time the purpose and potential become more apparent. The "Rubric for Internalization of Methodologies" from *2.3.7*

Learning Processes through the Use of Methodologies provides a guide for expected levels of progress in using the LPM. New users of a methodology typically move from a step-by-step (Level 1) or outcome-oriented (Level 2) approach to a task before achieving a true level of comfort at Level 3 ("explorer"). Meta-cognitive awareness must be developed by exposing of learners to increasingly challenging learning tasks that they achieve with decreasing amounts of guidance. Extensive assessment (*4.1.1 Overview of Assessment* and *4.1.4 Assessment Methodology*) is essential for progress.

Applying the Learning Process Methodology

Example 1: A Novice Learner's Use of the LPM

Students in an introduction to psychology course are engaged in an activity designed to facilitate learning about Piaget and Vygotsky's theories of development. The LPM was introduced in the previous class session as a framework to use to guide their learning process. In that "guided tour" of the LPM, the students readily found that these theories of development are important because they could easily imagine themselves as future—or present—parents. The stated objective is for them to provide a model that they can learn from for future independent work. They are to "Identify three insights that Piaget and/or Vygotsky propose in their theories about the developmental basis for 'internalization' of learning styles." The orientation process is assisted by reviewing the Critical Thinking Questions in the activity. This review helps the students realize that internalization is a basic feature of all development and that their own learning style is a good example. There are no academic prerequisites, but students find that once they move into teams and address the objective, it is important to have read the assignments. The performance criterion is to identify three insights about developmental internalization that are related to learning style. The steps in the Study Plan section of the LPM are reviewed so the students recognize that various components and strategies are part of effective studying. At this point the students are ready to do the work to prepare for the cooperative teamwork on the objective during the next class. Assessment of their insights helps them realize the quality of their insights, and provides the instructor with an opportunity to discuss potential ways to transfer and problem solve with the knowledge attained.

Example 2: An Expert Learner's Use of the LPM

A curriculum designer wishes to produce an integrated set of learning activities for an introductory course in psychology. It is clear from previous knowledge and experience that courses are much more effective if the knowledge to be learned is properly analyzed to identify a realistic set of concepts, processes, and tools that are related to the context and the "way of being" of the learners. Curriculum design steps are an essential resource that must be well-internalized; the educator must also have at least Level 3 (application) and preferably Level 4 (working knowledge) of the topic at hand (*2.2.1 Bloom's Taxonomy—Expanding its Meaning*). For the expert, setting a clear objective with challenging performance criteria takes special attention and care. The critical thinking questions and models in the Study Plan section are also significant because of the need to identify

assumptions, discover inconsistencies, and to articulate the model one is using. The transfer and problem-solving steps are essential as indicators of the level of expertise and ongoing assessment of growth in the processes of curriculum design. These are extremely important because of their career and employment implications.

Concluding Thoughts

The LPM supports educational process from both the learner and the educator perspectives. Using the LPM, learners increase their metacognitive awareness; as a result, they can self-assess and expand the learning skills and strategies that they use. Educators "leverage" their influence through effective curriculum design in combination with thoughtful planning and facilitation. They raise the level of challenge so that learners become more active, independent, and self-directed. The examples illustrate how to facilitate the use of the LPM with novices and show how it can serve as a guide for an expert. Novices are unaware of the process of knowledge construction that should be at the heart of their learning efforts. Experts have internalized the LPM so well that all the steps occur without need for much direct attention once the objective has been established.

References

Dufresne, R. J., Leonard, W. J., & Gerace, W. J. (February 1995). Model of knowledge, cognition, and learning: A qualitative model for the storage of domain-specific knowledge and its implications for problem-solving. *Physics Education Research Group. University of Massachusetts-Amherst.* Retrieved May 25, 2004 from <http://umperg.physics.umass.edu/perspective/model/>

Grow, G. O. (1996). A cognitive model of learning. *Gerald Grow's Home Page*. Retrieved May 25, 2004 from <http://www.longleaf.net/ggrow/StrategicReader/Strat-Model.html>

Halpern, D. F., & Hakel, M. D. (2003). Applying the science of learning. *Change, July/August*, 36-41.

Learning Objects. (2003). *Epsilon Learning Systems*. Retrieved May 25, 2004 from <http://www.epsilonlearning.com/objects.htm>

Lorsbach, A. W. (2003). The learning cycle as a tool for planning science education. *Illinois State University Science Education Laboratory*. Retrieved May 25, 2004 from <http://www.coe.ilstu.edu/scienceed/lorsbach/257lrcy.htm>

North Central Regional Educational Laboratory (NCREL). (2003). *Incorporating assessment into the learning process*. Retrieved May 25, 2004 from <www.ncrel.org/sdrs/areas/issues/content/cntareas/science/sc3asses.htm>

Universal Model of Learning Process: Learning Process Methodology

Matthew Watts

Abstract

The most important knowledge available is the learning process itself, as it allows one to learn all other knowledge in a more efficient manner. The key to becoming an effective self-learner is to understand and apply the universal learning process. A quality educator will therefore employ this process when designing learning activities for others. First formally published in 1992, the Learning Process Methodology (LPM) found successful implementation in Foundations of Chemistry (Hanson, 1995) and has since become the framework for the design of active learning experiences in all content areas. This paper will explore each step of the LPM: justifying the underlying learning theory, providing components of learning experiences that support the step, and stating criteria to measure quality with the components. The article will sequence the discussion around the LPM but give design and facilitation criteria for the components as well.

Step 1: Why

The first step of the LPM identifies and explains the reasons for learning. The idea that adults need to know *why* before they in fully engage in the learning process is well supported (Knowles 2011A quality learning activity begins with a title followed by the purpose statement, both of which support the first step of the methodology. The title serves as a label for the knowledge item(s) focused on in the experience and introduces the topic to the learner in relevant language, thus motivating the need for the activity in the most basic sense. An effective title is succinct and memorable, setting the tone for the discourse that follows. A purpose statement highlights what is to be learned along with its various contextual facets. Aspects of effective purpose statements include: clarity achieved through a non-technical approach to the topic, motivation through the defining of a relationship to the "big picture" in the content area, and relevancy in the learner's life. When the learner recognizes the activity will improve or maintain their self, the process is already geared toward a more significant level of learning (Rogers, 1969). A strong purpose statement will get the learner's attention and make the learning relevant, coinciding with the attention and relevance steps in the ARCS Model of Motivational Design and the first of Gagne's Nine Events of Instruction - gaining attention.

Step 2: Orientation

The development of a systematic overview of what is to be learned comprises the second step in the learning process methodology. It has been shown by Hicks and Klimoski (1987) that a proper preview of the learning activity results in a greater commitment to and satisfaction with the subsequent learning. A discovery activity supports the Orientation step of the Learning Process Methodology as it sets the context and area of knowledge prior to dispensing information. Dewey (1944) argued long ago that new ideas should be introduced with "something

to do, not something to learn", comparing each learning activity to an act of experimentation performed by a scientist in a laboratory. To best encourage learners to explore the essential content's core, an interesting, intriguing, and fun activity is advised for inclusion into the learning experience. An interactive discovery activity agrees well with the first step in Kolb's Experiential Learning Cycle – concrete experience. Thus by exploring and experimenting a successful learning environment is established (Bransford, Brown, & Pellegrino, 2000).

Step 3: Prerequisites

Prerequisites identify background knowledge and skills needed to perform strongly in the learning experience. The paradigm of learning as a "successive transition between knowledge states" is well known from classic cognitive research (Dochy, 1995). The hierarchical nature of knowledge within a content area is well supported e.g. in Mathematics the learning of higher-level rules is dependent on the mastery of the lower-level rules (Gagne, 1970). By asking the question "What Do You Already Know?" (See Appendix C) we consider the previous knowledge of prior courses or life experiences and how this relates to the new learning in the experience. Questions that draw on previous knowledge and the discovery activity prepare the learner for the reading and models to follow, therefore supporting the Prerequisites step of the LPM. This component supports the third stage of the Dick and Carey Systems Approach Model - analyze learners and contexts, Merrill's second principle of instruction – activation, and Gagne's third event of instruction – stimulate recall of prior learning. Ultimately, the richest resource for adult learners may be the relating and interpreting of personal experiences (Lindeman, 1926).

Step 4: Learning Objectives

The ideal learning process is prefaced with statements of what outcomes are intended. Stakeholders in the process

must know ahead of time what they will learn so that they can validate this later on (Dick, Carey, & Carey, 2004). John Dewey, Ralph Tyler, William Torrey Harris, and others established well the importance of learning objectives in the last century (Block, 2012). Most modern models also align with this step in some way: Stage 1 of the Dick and Carey model, 4th key element in Kemp's model, second of Gagne's Nine Events of Instruction, the confidence step in the ARCS model, and the first stage in Cathy Moore's Action Mapping. The learning objectives themselves should be orthogonal meaning that the overlap is minimized. Best practices also suggest there should be no more than three for a single activity. There should be clear alignment between the learning objectives for the activity and the learning objectives for the course. Ultimately, the measurement of learning is done via "the performance exhibited by the learner" (Gagne, 1970), thus the criteria for that performance must be specified to allow for proper assessment and evaluation.

Step 5: Performance and Criteria

While the learning objectives list what should be learned in an activity, the performance criteria set the expectations on the quality of the performance so to allow measurement later. Performance criteria are now acknowledged as a requirement for high quality assessment (Stiggins, 2001). In modern models we see the following support: Stage 4 of the Dick and Carey model, step 2 in Cathy Moore's model, the confidence step in the ARCS model, and step 2 in Guaranteed Learning. In fact, Gagne exhorts the deposition of the performance criteria to the learner as the first step in a learning activity (1970). While it is ideal that the performer design the criteria with the subsequent assessment process in mind, situations faced by many educators require a more flexible and holistic approach to this crucial step (Baehr, 2007).

Step 6: Vocabulary

The identification and learning of vocabulary also includes terminology and notation for some subjects. According to Davis (1944), the study of vocabulary is essential to reading comprehension, the foundation of reading for learning. Knowing the correct vocabulary and its precise meaning allows learners to read resources and communicate with the class effectively in speech and writing. While it is common for textbooks to include important vocabulary as part of a summary or index, the inclusion of this task in the early stages of the learning process is well supported (Richardson & Morgan, 1990). The activity component's name is often dependent upon the content area (e.g. *Learning the Language of Mathematics*) however its necessity permeates across the curriculum. A strategy for studying relevant terminology

should be included in the course or program design as it has been seen that "students will skip over unfamiliar words" otherwise (McMurray, Laffey, and Morgan, 1979). A typical best practice is to have learners writing definitions in their own words or use the words in context.

Step 7: Information

The last step in the preparing to learn stage of the learning process is to collect, read, and study appropriate background information. In some ways this is the only step that is always included in a learning activity so it precludes gratuitous justification. It is generally agreed upon in academia that reading should be a "lifetime experience" (Richardson & Morgan, 1990). While the medium of information and resources varies now more than ever, it still serves as the locus of instructional design. While reading assignments from print resources now compete with digital audio/verbal performances, recordings, and transmissions as the primary repository for learner information; they should always be available, relevant, and variegated to foster maximum learning (Gagne, 1970). Methodologies, generalizations of procedures, are essential to effectively learning process knowledge. By analyzing the generalized steps and applying it to similar examples, internalization of the methodology is facilitated (Leise & Beyerlein, 2007). Organizational tools (e.g. concept maps) are better suited for conceptual knowledge, highlighting the importance of classifying the knowledge form prior to the designation of the information in the learning activity (Quarless, 1970). Gagne (1970) specifically emphasizes organization as a key criteria when describing resources for effective learning activities. Use of a component that emphasizes common errors with examples, while technically misinformation, aligns well with step 7. Students are bound to make mistakes and most of them are clustered around a few common errors. In order for students to learn validation of their work they should see the analysis of incorrect thinking and misconceptions.

Step 8: Plan

In the same way steps 1-7 prepare the learner for the learning activity, steps 8-12 guide the participant while they perform the learning activity. The first step in the performance is to develop a plan to meet the performance criteria. With a performance in mind and criteria developed in step 5, the learner should follow the proverbial advice that tells us to *stop and think before you act*. To ensure the best possible performance, a well thought out plan must be developed first (Black, Harrison, Lee, Marshall, & William, 2004). We see this acknowledged in stage 6 of the Dick and Carey Model and the 7th key element in Kemp's model. In the loosest

sense, the plan is a set of directions for how to complete the activity. With active learning and collaborative learning, this includes items such as: defining teams and team roles, sharing of pre-activity learning, analyzing models, in-class discovery exercises, answering critical thinking questions, and assessing the performance. See FGB 3.2.5 for more detailed information on development of facilitation plans. The fact is students "need to know how the learning will be conducted" in order to be prepared and the plan should be written with clarity and detail for the performance that follows (Knowles, 2011). If learners have a copy of this plan or are even groomed to take part in its development then they will take more responsibility for their learning.

Step 9: Models

Providing examples of work that demonstrated the learning objectives and performance criteria is the ninth step in the learning process. One of the keys to becoming a master learner is to learn that the methods used by those with more experience are more important to master than the knowledge itself (Dewey, 1944). Effective learners use and apply models to understand all forms of knowledge (Knowles, 2011). Comparison to other experts in education reveals comparable ideas in the form of Merrill's third principle of instruction – demonstration and Gagne's 5th event of instruction – provide learner guidance. While traditional lectures technically fulfill this role, active learning suggests using inanimate models when possible to build self-learning habits. This better supports a collaborative learning facilitation plan as well as accounting for differences in styles and speed of comprehension. Having some familiarity with the basic methodology, more difficult problems can be used in the models and serve as an object of inquiry for the critical thinking questions, which are often difficult due to their abstraction of ideas, and a resource for the problem solving that will follow. Models should always be paired with analysis or validation from a subject matter expert, often after initial dissection by the learners alone.

Step 10: Thinking Critically

To depose and respond to critical questions is at the heart of the universal learning process. The questions will promote basic understanding and elevate the learning to Level 2 on Bloom's taxonomy. The literature abounds with support for critical thinking in the learning process. It is considered a significant step to understand highly complex issues (Brookfield, 1986). It is even the sixth basic principle in Constructivism to support and challenge the thinking of the learner (Savery & Duffy, 1996). Dewey (1944) goes even further to assert that only by wrestling with these questions and figuring out the answers do

we actually *think*. The questions are essential to guide the student's inquiry through the models to produce understanding and meaning, to address misconceptions that might form, to serve as interplay between steps in the methodology, and to deal with subject specific reasoning issues. This makes the experience active and encourages them to eventually ask their own questions when learning. By juxtaposing questions with the models or information already developed in steps 9 and 7, the retention of knowledge is significantly improved. Best practices for critical thinking questions suggest six to ten questions that are relevant, growth-oriented, and logical (Hanson, 2007). The first two to three questions should be directed and focus on level 1 knowledge. The next three to six questions should be convergent and build level 2 knowledge. The final question should be divergent and have no right or wrong answer. This last question opens up to research level learning projects as well as providing a balance for advanced teams that would normally finish an assignment early.

Step 11: Transfer/Application

After thinking critically, the learner should test their understanding by transferring it to varying contexts and applying it in new situations. The underlying motivation of all adult learners is the awareness to situations that can serve as applications of the knowledge (Knowles, 2011). This "testing ideas against alternative contexts" is the seventh constructivist principle (Savery & Duffy, 1996) and the key to elevating knowledge from Level 2 to Level 3 (Nygren, 2007). Merrill's fourth principle of instruction is application and these applications serve as the practice activities in Cathy Moore's model. While many books recognize this step with problems simply called Applications, the sample in the appendix uses the label *Demonstrate Your Understanding*. In this component the structure is again crucial and should be scaled in difficulty with scrutiny. As students deal with more challenging problems they should start with a familiar context, then move into less familiar and finally unfamiliar contexts in at least three problems of increasing difficulty. This grows the confidence of the learners supporting the ARCS theory. In content areas where problem solving is integral, the quintessential component for the transfer/application is the eponymous *Hardest Problem*, where learners come up with the hardest problem they can think of and then try to solve it or explain why it cannot be solved. In doing so, the learner identifies the key parameters and how their variation affects the solution, ultimately learning to generalize the problem. This technique of abstract conceptualization is also the third stage in Kolb's experiential learning cycle.

Step 12: Problem Solving

While step 11 has learners applying knowledge into new contexts, the problems solving step pits the learner against complex problems like those worked on by experts in the field. Problem solving combines knowledge to elevate the level of learning and generalize an entire set of situations as a single type (Gagne, 1970). Though challenging, the relevance to career credentials has been shown to improve motivation (Clark, Dobbins, & Ladd, 1993). Problem solving is the eighth type of learning according to Gagne, the fourth step in the experiential learning cycle according to Kolb, the fourth Constructivist principle, the fifth step in guaranteed learning, Merrill's fifth principle of instruction, and provides satisfaction to the learner according to the ARCS model. In the component called "*Making it Matter*", students are given a real-life problem that deals with the topic at hand. In general education courses, where learners are all pursuing mutually disjoint career paths, the context can be academic or generated from the duties of an individual in a human community. The motivation created by the appearance of utility often supersedes any actual value as techniques used in any industry are mercurial.

Step 13: Self-Assessment

Having finished the learning performance, the mastery of the learning objectives and fulfilling of the performance criteria can be assessed. Self-assessment has the learner give themselves feedback on the performance with a growth mindset, i.e. the intention of improving future performances. Constructivism supports this type of reflection on content and the learning process, as does Gagne's eight event of instruction, Kolb's second step of the learning cycle - reflective observation, the satisfaction in the ARCS model, and principle 5 in Merrill's model - integration. Learning how to learn is a skill necessary for all workers to stay competitive (Knowles, 2011). A self-assessment on the learning process has the learner identify strengths in their performance, provide plans for improving in future performances, and share insights gained from the experience. This should be done in the form of a positive attitude that avoids harsh self-judgement. A separate assessment of the content-specific mastery (e.g. *Learning to Learn Mathematics*) has the students reflect on the processes used in that subject, making the learning experience a transformative one.

Step 14: Research

The final step in the learning process opens the individual to the creation of new knowledge from what has been learned. As students become master learners their pursuit of knowledge will transition from guided discovery to independent exploration fueled by self-interest (Dewey, 1944). While most activities do not formally allocate components to this step it is not absent from education entirely. Long-term research projects assigned for outside of class can potentially fulfill this step, especially if the student is the catalyst for the assignment and decides on the topic. Research learning can also occur in class when students seriously approach the divergent critical thinking question. Ultimately the step is needed for a complete model of the learning process but does not required a corresponding component in many educational activities.

References

Baehr, M. (2007). Issues in Choosing Performance Criteria. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty Guidebook: A comprehensive tool for improving faculty performance* (4th ed. pp. 463-464) Lisle, IL: Pacific Crest.

Black, P., Harrison, C., Lee, C., Marshall, B., & William, D. (2004). Working Inside the Black Box: Assessment for Learning in the Classroom. *Phi Delta Kappan, 86,* 9-21.

Block, A. (2012). Toward Objectives and Assessment: Means of Control. *Journal of the American Association for the Advancement of Curriculum Studies, 8*(1), 1.

Bransford, J., Brown, A., & Pellegrino, J. (Eds.) (2000). *How People Learn: Brain Mind, Experience, and School* (Expanded Ed. pp209). Washington, DC: National Academy Press.

Brookfield, S. D. (1987). *Developing Critical Thinkers.* San Francisco: Jossey-Bass.

Clark, C. S., Dobbins, G. H., & Ladd, R. T. (1993) Exploratory Field Study of Training Motivation. *Group and Organization Management*, 18, 292-307.

Davis, F. B. (1944). Fundamental factors of comprehension in reading, *Psychometrika*, 9, 185-197.

Dewey, J. (1944). *Democracy and Education* New York, NY: The Free Press.

Dick, W. O., Carey, L. & Carey, J. O. (2004). *The systematic design of instruction.* Boston: Allyn & Bacon.

Dochy, F. & Alexander, P. (1995). Mapping Prior Knowledge: A Framework for Discussion among Researchers. *European Journal of Psychology of Education, 10*(3), 225-242.

Gagne, Robert M. (1970). *The Conditions of Learning.* New York: Holt, Rinehart and Winston.

Gagné, R. M., Briggs, L. J., & Wager, W. W. (1992). Principles of instructional design (4th ed.). Forth Worth, TX: Harcourt Brace Jovanovich College Publishers.

Hanson, D. (1995). *Foundations of Chemistry.* Lisle, IL: Pacific Crest.

Hanson, D. (2007). Writing Critical Thinking Questions. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty Guidebook: A comprehensive tool for improving faculty performance* (4th ed. pp. 285-286) Lisle, IL: Pacific Crest.

Hicks, W. & Klimoski, R. (1987). Entry into training programs and its effects on training outcomes: a field experiment. *Academy of Management Journal*, *30*(3), 542-552.

Keller, John M. (2010) *Motivational Design for Learning Performance*: *The ARCS Model Approach*. Springer.

Knowles, Malcolm; Holton, E. F., III; Swanson, R. A. (2005). The adult learner: The definitive classic in adult education and human resource development (6th ed.). Burlington, MA: Elsevier.

Kolb, David A. 1984. Experiential Learning: Experience as the Source of Learning and Development. Prentice-Hall, Inc. Englewood Cliffs, N.J.

Leise, C. & Beyerlein, S. (2007). Learning Processes through the Use of Methodologies. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty Guidebook: A comprehensive tool for improving faculty performance* (4th ed. pp. 225-228) Lisle, IL: Pacific Crest.

Lindeman, E. (1926). *The Meaning of Adult Education*. New York, NY: New Republic, Inc.

McMurray, M., Laffey, J., & Morgan, R. (1979). College students' word identification strategies. *Twenty-Eighth Yearbook of the National Reading Conference*.

Merrill, M. D. (2009). First Principles of Instruction. In C. M. Reigeluth & A. Carr (Eds.), Instructional Design Theories and Models: Building a Common Knowledge Base (Vol. III). New York: Routledge Publishers.

Morrison, G. R., Ross, S. M., & Kemp, J. E. (2001). Designing effective instruction, 3rd ed. New York: John Wiley.

Nygren, K. (2007). Elevating Knowledge from Level 1 to Level 3. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty Guidebook: A comprehensive tool for improving faculty performance* (4th ed. pp. 165-168) Lisle, IL: Pacific Crest.

Quarless, D. (2007). Forms of Knowledge and Knowledge Tables. In S. W. Beyerlein, C. Holmes, & D. K. Apple (Eds.), *Faculty Guidebook: A comprehensive tool for improving faculty performance* (4th ed. pp. 225-228) Lisle, IL: Pacific Crest.

Richardson, J. S. & Morgan, R. F. (1990) *Reading to Learn in the Content Areas*. Belmont, CA: Wadsworth.

Rogers, Carl (1969). *Freedom to Learn.* Columbus, OH: Charles E. Merrill.

Rothkopf, E. Z. & Coke, E. U. (1968). Learning about added sentence fragments following repeated inspection of written discourse. *Journal of Experimental Psychology, 78*, 191-199.

Savery, J. R. & Duffy, T. M. (1996) Problem Based Learning: An Instructional Model and Its Constructivist Framework. In Wilson B. (ed.), *Constructivist Learning Environments: Case Studies in Instructional Design.* Englewood Cliffs, NJ: Educational Technology Publications.

Stiggins, R.J. (2001). *Student-involved classroom assessment* (3rd ed. pp.21-30). Upper Saddle River, NJ: Prentice-Hall, Inc.

Appendix A: Mapping of LPM to Components of Learning Activity

LPM	Component
Step 1	Title, Why, Purpose
Step 2	Concept Map, Table of Contents, Discovery
Step 3	Prerequisites, What Do You Already Know
Step 4	Learning Objectives, Learning Goals
Step 5	Performance and Criteria (Success Criteria)
Step 6	Developing Language in the Content Area (Vocabulary, Notation)
Step 7	Information, Resources, Methodologies, Common Errors, Models
Step 8	Plan
Step 9	Models/Examples, Your Turn
Step 10	Critical Thinking Questions, Exploratory Questions
Step 11	Skill Exercises, Demonstrate Your Understanding, Hardest Problem
Step 12	Making it Matter, Problem Solving
Step 13	Learning to Learn Mathematics (or other knowledge area), Self-Assessment, Identify and Correct Errors, Troubleshooting
Step 14	Divergent Critical Thinking Question, Undergraduate Research

Appendix B: Activity 7.1 from Quantitative Reasoning & Problem Solving

(Available on the secure site: www.processeducation.org/peconf/2016/secure)

Appendix C: Mapping of LPM step to other Models of Instructional Design

LPM	Support
Step 1	ARCS model – 1. Attention and 2. Relevance Gagne's model – 1. Gain attention Kolb's model – 1. Concrete experience Guaranteed Learning model – 3. Develop interactive instructional materials
Step 2	Dick & Carey model – 1. Instructional goals ARCS model – 3. Confidence Gagne's mode – 1. Gain attention
Step 3	Dick & Carey model – 3. Analyze learners and contexts ARCS model – 3. Confidence Merrill's model – 2. Activation Gagne's model – 3. Stimulate recall of prior learning
Step 4	Dick & Carey model – 1. Instructional goals ARCS model – 3. Confidence Kemp's model – 4. Instructional objectives Gagne's model – 2. Inform learner of objectives Moore's model – 1. Identify the goal
Step 5	Dick & Carey model – 2. Instructional analysis ARCS model – 3. Confidence Kemp's model – 4. Instructional objectives Gagne's model – 2. Inform learner of objectives Moore's model – 2. Identify what people need to do to reach the goal Guaranteed Learning model – 2. Develop criterion tests and performance measures

LPM	Support
Step 6	Dick & Carey model – 3. Analyze learners and contexts ARCS model – 3. Confidence Moore's model – 4. Identify the minimum information needed to complete each activity Kemp's model – 9. Select resources to support instruction and the learning activities
Step 7	Dick & Carey model – 7. Instructional materials ARCS model – 3. Confidence Merrill's model – 3. Demonstration Kemp's model – 9. Select resources to support instruction and the learning activities Gagne's model – 4. Present stimulus material Moore's model – 4. Identify the minimum information needed to complete each activity Guaranteed Learning model – 3. Develop interactive instructional materials
Step 8	Dick & Carey model – 6. Instructional strategy ARCS model – 3. Confidence Kemp's model – 7. Plan the instructional message and delivery Gagne's model – 5. Provide learner guidance
Step 9	Dick & Carey model – 7. Instructional materials ARCS model – 3. Confidence Merrill's model – 3. Demonstration Kemp's model – 9. Select resources to support instruction and the learning activities Gagne's model – 5. Provide learner guidance Moore's model – 4. Identify the minimum information needed to complete each activity Guaranteed Learning model – 3. Develop interactive instructional materials
Step 10	Dick & Carey model –5. Develop assessment instruments Gagne's model – 7. Provide feedback Kolb's model – 2. Reflective observation Moore's model – 3. Practice activities Guaranteed Learning model – 3. Develop interactive instructional materials
Step 11	Dick & Carey model –5. Develop assessment instruments ARCS model – 3. Confidence Merrill's model – 4. Application Gagne's model – 6. Elicit performance Moore's model – 3. Practice activities Guaranteed Learning model – 5. Create simulations or performance activities
Step 12	Dick & Carey model –5. Develop assessment instruments ARCS model – 4. Satisfaction Merrill's model – 1. Problem centered and 5. Integration Gagne's model – 9. Enhance retention transfer Kolb's model – 4. Active experimentation Guaranteed Learning model – 5. Create simulations or performance activities
Step 13	Dick & Carey model –9. Conduct summative evaluation ARCS model – 4. Satisfaction Merrill's model – 5. Integration Gagne's model – 8. Assess performance
Step 14	ARCS model – 4. Satisfaction Merrill's model – 5. Integration Kolb's model – 4. Active experimentation

Models

ARCS Model of Motivational Design (Keller)
1. Getting the learner's attention
2. Establishing relevance
3. Build confidence
4. Instill a sense of satisfaction

Gagne's Nine Events of Instruction (Conditions of Learning)
1. Gain attention
2. Inform learners of objectives
3. Stimulate recall of prior learning
4. Present the content
5. Provide "learning guidance"
6. Elicit performance (practice)
7. Provide feedback
8. Assess performance
9. Enhance retention and transfer to the job

Kolb's Experiential Learning Cycle
1. Concrete experience
2. Reflective observation
3. Abstract Conceptualization
4. Active Experimentation

Dick and Carey Model
1. Identify Instructional Goals
2. Conduct Instructional Analysis
3. Analyze Learners and Contexts
4. Write Performance Objectives
5. Develop Assessment Instruments
6. Develop Instructional Strategy
7. Develop and Select Instructional Materials
8. Design and Conduct Formative Evaluation of Instruction
9. Revise Instruction
10. Design and Conduct Summative Evaluation

First Principles of Instruction (Merrill)
- Centered on relevant real-world tasks or problems
- Activation of prior knowledge
- Demonstration in the context of real-world tasks or problems
- Application of learning to real-world problems with feedback and guidance
- Integration of learning into their life through reflection and discussion

The Kemp Instructional Design Model
1. Identify instructional problems, and specify goals for designing an instructional program.
2. Examine learner characteristics that should receive attention during planning.
3. Identify subject content, and analyze task components related to stated goals and purposes.

4. State instructional objectives for the learner.
5. Sequence content within each instructional unit for logical learning.
6. Design instructional strategies so that each learner can master the objectives.
7. Plan the instructional message and delivery.
8. Develop evaluation instruments to assess objectives.
9. Select resources to support instruction and learning activities.

Guaranteed Learning (formerly IDLS)
1. Design a task analysis
2. Develop criterion tests and performance measures
3. Develop interactive instructional materials
4. Validate the interactive instructional materials
5. Create simulations or performance activities (Case Studies, Role Plays, and Demonstrations)

Roger's Experiential Learning Principles
1. Significant learning takes place when the subject matter is relevant to the personal interests of the student
2. Learning which is threatening to the self (e.g., new attitudes or perspectives) are more easily assimilated when external threats are at a minimum
3. Learning proceeds faster when the threat to the self is low
4. Self-initiated learning is the most lasting and pervasive.

Seven Principles of Andragogy (Knowles)
1. Adults must want to learn
2. Adults will learn only what they feel they need to learn
3. Adults learn by doing
4. Adult learning focuses on problems and the problems must be realistic
5. Experience affects adult learning
6. Adults learn best in an informal situation
7. Adults want guidance

Critical Thinking Questions

1. After hearing about the different models presented
   a. Which models presented are models of the learning process?

   b. Which are models of instructional design process?

   c. Which are neither?

2. Which steps of the LPM might address the idea of turning failure into academic success?

3. Pick a model for the learning process or instructional design process and find the correspondence between its components and the components of the LPM

4. How can the LPM be used to encourage learners to take risks?

5. What is the relationship between assessment and the LPM?

6. How are you using the LPM to support your process for instructional design? If you are not using it, how can you?