This chapter contains an overview of the MVP model that is used as a basis for the other chapters in this issue. It also contains a description of key steps in the ARCS-V design process that is derived from the MVP model and a summary of a design-based research study illustrating the application of the ARCS-V model.

The MVP Model: Overview and Application

John M. Keller

According to the principle of Occam’s razor, simplicity is a virtue. Simpler theories are preferable to more complex ones because they have fewer assumptions and it is easier to test their validity. However, some situations are inherently complex and even the simplest explanations can be challenging. In the present case, I provide a theory of motivation, volition, and performance (MVP; Keller 2008) that is somewhat complex because it integrates research and theory to provide guidance for instructional designers who wish to develop comprehensive and ecologically valid programs of instruction. This theory is represented in a system model provided in this chapter. Even though the overall theory is complex, it follows a logical progression when you approach it one section at a time. This chapter contains a summary of the MVP model with an emphasis on its motivational and volitional components together with a systematic motivational design process for applying the model to many types of learning environments. An overview of the model is followed by a description of the ARCS-V design process and a case example of its application.

The Long History of Motivation

Efforts to understand human motivation are centuries old. For example, in the opening paragraph of Metaphysics, Aristotle stated, “All men [sic] by nature desire to know,” and he then explored the implications of this assumption about the inherent nature of curiosity. But, in the context of psychology, motivation was for many years defined as a person’s reactive response to external stimuli rather than as a propelling force. This conceptualization has often been characterized metaphorically as the “carrot or
stick” approach that assumes giving rewards for correct behavior increases the occurrence of that behavior and administering punishment for unacceptable behavior decreases its occurrence. But punishment does not have as high a success rate as rewards. The carrot or stick approach explains numerous facets of motivation but there are many aspects including desire, goals, and persistence that it does not explain. A definition that is inclusive enough to contain all of these characteristics was provided by Keller (1983) who proposed that motivation is that which explains the direction, magnitude, and persistence of behavior. This is more of a propelling approach that is closer to Aristotle’s assumption.

The MVP Model and ARCS-V

The genesis of this definition and its evolution into the MVP theory began years ago when I attempted to synthesize motivational concepts and theories in a parsimonious, valid, and practical way. This synthesis would be theoretically valid and also provide a basis for designing successful motivational interventions given that there was no adequate guidance for designing the motivational aspects of instruction. There were myriad theories that pertained to total design but no models that incorporated all of the relevant variables. This task became the focus of an advanced graduate seminar that I led on the topic of motivation and learning. The result was a four component model that resulted from listing as many motivational constructs as we could find and then aggregating them into groups by means of a qualitative cluster analysis in which we combined constructs based on shared attributes. Four clusters emerged (Keller 1983) and became known as the attention, relevance, confidence, and satisfaction (ARCS) model (Keller 1984). Thanks to the influence of a German colleague, this theory was expanded to include the concept of volition, which now makes it ARCS–V (Keller 2008). Elaborations of the following concepts together with scholarly citations can be found in Keller (2010).

Attention. The attention category incorporates research on curiosity and arousal, interest, boredom, and other related areas such as sensation seeking. These concepts illustrate the importance of incorporating a variety of tactics to gain learner attention by the use of interesting graphics and animations, visual or verbal scenarios that introduce incongruity or conflict, mystery, unresolved problems, and other techniques to stimulate a sense of inquiry in the learners. It is also important to incorporate variability in one’s approaches, because no matter how interesting a given tactic is, people will adapt to it and lose interest over time.

Relevance. The second category, relevance, refers to learners’ perceptions that the instructional requirements are consistent with their goals, compatible with their learning styles, and connected to their past experiences. A key component of relevance is goal orientation, which, as demonstrated in traditional achievement motivation research, has been proven to
facilitate motivation and achievement. Learner goals can be extrinsically motivated, as illustrated by the need to pass a course to be eligible for a desired opportunity, or intrinsically motivated as when the learner is engaged in actions that are personally interesting and freely chosen. This condition of intrinsic motivation is an example of self-determination, which leads to sustained goal-oriented behavior.

**Confidence.** The third category, confidence, refers to the effects of positive expectancies for success, experiences of success, and attributions of successes to one's own abilities and efforts rather than to luck, chance, or task difficulty (too easy or too difficult). This is accomplished by helping students establish positive expectancies for success. For example, students often have low confidence because they have very little understanding of what is expected of them. It is easier to build confidence by making the objectives clear and providing examples of acceptable achievements. Another aspect of confidence is how one attributes the causes of successes or failures. Being successful in one situation can improve overall confidence if the person attributes success to personal effort or ability. But, if students believe that success was a result of external factors such as luck, lack of challenge, or decisions of other people, then confidence in their skills is not likely to increase.

**Satisfaction.** If the learners are attentive, interested in the content, and moderately challenged, then they will be motivated to learn. But to sustain this motivation, the fourth condition of motivation, satisfaction, is required. It refers to positive feelings about accomplishments and learning experiences. It means that students receive recognition and evidence of success that supports their intrinsic feelings of satisfaction and their judgment that they believe they have been treated fairly. Tangible extrinsic rewards can also produce satisfaction and they can be either substantive or symbolic. That is, they can consist of grades, privileges, promotions, or such things as certificates or other tokens of achievement. Opportunities to apply what one has learned coupled with personal recognition support intrinsic feelings of satisfaction. Finally, a sense of equity, or fairness, is important. Students must feel that the amount of work required by the course was appropriate, that there was internal consistency between objectives, content, and tests and that there was no favoritism in grading. Thus, there are both cognitive and emotional aspects to feelings of satisfaction.

**Volition.** Although the ARCS model has been validated and applied, it is limited by certain assumptions about motivation and persistence. One of the conceptual foundations of the ARCS model is expectancy-value theory, which postulates that people will be motivated to pursue a goal if it has high perceived value and they expect it to be achievable. This theory presumes that high levels of motivation will result in persistent efforts to achieve the desired goal, but this isn't always true because various kinds of distractions, obstacles, and competing goals can interfere with persistence. People who are able to overcome these obstacles and maintain their
goal-oriented intentions tend to employ volitional (Kuhl 1987), or self-
regulatory (Zimmerman 2002), strategies that help them stay on task. All
of these strategies pertain to the problem of maintaining goal-oriented be-
havior and overcoming discouragement.

These five components provided the foundation for the final steps in
the evolution of the MVP model, which was formed by adding information
processing components and other cognitive and emotional compo-
nents to illustrate relationships among motivation, learning, and perfor-
mance. These relationships are illustrated in Figure 1.1, which is divided
into six segments to facilitate discussion:

1. Attention, Relevance, and Confidence Motivational Components
2. Volitional Planning
3. Volitional Actions
4. Mental Resource Management
5. Information Processing
6. Satisfaction Motivational Components

The original ARCS components are in Segments 1 and 6, and volition
is in Segments 2 and 3. Learning, as illustrated in Segment 5, results from a
complex set of mental and psychomotor activities related to the acquisition,
retention, and recall of information and behaviors. However, these activi-
ties do not stand alone in isolation from motivational factors that influence
learning. Segment 4 contains factors that explain how a person’s mental re-
source management governs the interactions between motivational orienta-
tions and both cognitive and perceptual activities that influence learning
(see Keller 2008 or 2010, for elaborations). Effective learning strategies will
incorporate the designed relationships related to mental resource manage-
ment.

The six segments of the MVP model contain the primary constructs
that explain the “Psychological Environment” related to motivation and
learning. In addition, the MVP model contains a set of “External Inputs,”
which refer to the types of strategies that influence attitudes and behav-
iors. Designers and researchers build interventions by examining variables
within these areas. Finally, the model contains a row of “Outputs” that
provide a basis for measurements associated with the various types of ef-
fort, learning, performance, and outcomes related to consequences and
satisfaction.

In summary, the five ARCS-V components of the MVP model provide
a basis for understanding the various aspects of human motivation. How-
ever, understanding is not sufficient for motivational design. The question
is, How do you use this knowledge as a basis for building effective moti-
vational strategies? The answer is to employ the systematic motivational
design process that was created specifically to accompany this model.
Figure 1.1. Components of the MVP Model

External Inputs
- Motivational strategies influencing curiosity, values, & expectancies
- Implementation strategies influencing preaction planning
- Volitional strategies influencing support of self-regulatory actions
- Facilitation strategies influencing interactions between motivation, volition, and learning
- Learning strategies affecting cognitive processing, learning, and performance
- Contingency management and intrinsic reinforcement strategies
- Strategies influencing cognitive & emotional outcomes evaluations

Psychological Environment
- Influence & interact with:
  - Motivation & Volitional Processing
    - Goals, Desires
    - Emotions (Positive & Negative)
    - Commitment Intentions
    - Action Control strategies (Self-regulatory actions)
    - Motivation & Information Processing Interface: Focus of Attention, Engagement, Monitoring, Metacognitive Activity

Resulting in:
- Effort direction
- Effort initiation
- Effort persistence
- Learning & Performance
- Satisfaction
- Consequences

Outputs
- Segments

Segments: 1, 2, 3, 4, 5, 6
Applying the MVP Model: The ARCS-V Design Process

The purpose of the ARCS-V design process is to determine what specific motivational problems are occurring in a given situation and then to design strategies that target these problems. For example, the problem in a given group of “unmotivated students” might be that even though the students believe the content is relevant and they are confident that they can learn it, the instruction does not hold their attention. The ARCS-V design process includes an analysis procedure that helps you pinpoint the problem, and doing this makes it easier to solve the problem. There are ten steps in the overall design process (see Keller 2010, for complete explanations and templates with worked examples):

1. Obtain course information such as purpose and requirements;
2. Obtain audience information regarding background and reasons for taking the course;
3. Analyze audience to determine their precourse motivational attitudes;
4. Analyze other course elements such as instructional materials and environment with regard to their motivational properties;
5. List motivational objectives and assessments based on the identified motivational problems;
6. List potential tactics by brainstorming and collecting potential tactics related to the problems;
7. Select and design tactics based on a systemic review of the potentially useful ones;
8. Integrate with instruction;
9. Select and develop materials; and
10. Evaluate and revise.

Steps 3, 6, and 7 are critical. Even though all of the steps are important, these three are most critical to the success of the design process, especially Step 3 because of its importance in identifying specific motivational problems to be solved.

Motivational Analysis. The goal of the analysis step is to identify your audience’s motivational attitudes regarding a given course or other learning event such as an online lesson or a new module that you are introducing. One of the challenges in analyzing motivational problems is that we cannot think of motivation as simply ranging from low to high because it can be too high as well as too low (Table 1.1). When motivation is too low, students will not try very hard to succeed, and when it is too high, students may be overstressed to an extent that their performance is impaired. Thus, it is important to assess the expected motivational levels of students when you are designing instruction or preparing for a classroom experience. You can do this by simply reflecting on each of the ARCS-V motivational
Table 1.1. Indicators of Motivation Levels Being Too Low or Too High

<table>
<thead>
<tr>
<th>Motivational Expectation</th>
<th>Motivation Too Low Indicators</th>
<th>Motivation Too High Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention Readiness</td>
<td>Bored, daydreaming</td>
<td>Incessant questioning, agitated</td>
</tr>
<tr>
<td>Perceived Relevance</td>
<td>Indifferent, skeptical</td>
<td>Insecure, feelings of jeopardy</td>
</tr>
<tr>
<td>Felt Confidence</td>
<td>Helpless, uncertain</td>
<td>Smug, presumptuous, careless</td>
</tr>
<tr>
<td>Anticipated Satisfaction</td>
<td>Cynical, resentful</td>
<td>Unrealistic, disappointed</td>
</tr>
<tr>
<td>Volitional Habits</td>
<td>Ineffective planning, weak commitment</td>
<td>Obsessive, overcontrolled</td>
</tr>
</tbody>
</table>

dimensions and making judgments based on your past experience, talking with other experienced instructors, or using a questionnaire.

Analyzing each component of motivation will enable you to determine where there are major problems, if any. In this regard, we make a distinction between tactics and strategies used to sustain motivation versus enhancing it. Even if learner motivation is satisfactory in a given area, it is necessary to include tactics to sustain motivation because motivation is not a fixed characteristic: it will fluctuate over time. In contrast, there may be areas where there are serious motivational problems as when students perceive the instruction to be boring, they do not believe it is relevant to anything important in their lives, or they believe they are not capable of learning a particular subject (“I’m not good at math”).

The focus in this explanation has been on learner motivation, but it is also important to analyze your own motivation because you are a key component of learner motivation! If you are not motivated and enthusiastic about the subject you are teaching, it is unlikely that the students will be. Many studies show that great instructors exhibit high enthusiasm (Patrick, Hisley, and Kempler 2000). But, enthusiasm is not enough. Analyzing your own attitudes will allow you to better modify them and better connect with students. An instructor’s motivation level can be higher or lower than the students’ levels. For example, a history professor might love the Middle Ages and get highly enthusiastic when she reaches that portion of a required world history course, but will her enthusiasm stimulate an equal level of excitement in her students? Probably not! But, by realizing that there is a gap, she can design strategies to create satisfactory interest.

Designing Motivational Tactics. There are several ways to transition from analysis to design by using the following two sets of questions (Table 1.2). One set is for self-analyzing your motivation and the other applies to your estimation of learner motivation. Additional tools and examples are available in Keller’s (2010) motivational design book. Your replies to these questions will provide a basis for selecting and creating motivational strategies and tactics that will help you and your students to be more motivated.
Table 1.2. An Analysis Checklist for Analyzing Instructor and Student Motivation

<table>
<thead>
<tr>
<th>Categories</th>
<th>Instructor’s Self-Analysis</th>
<th>Instructor’s Analysis of Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>Am I excited about this learning experience and how I can make it interesting?</td>
<td>Are the learners going to be interested? What tactics will stimulate their curiosity and interest?</td>
</tr>
<tr>
<td>Relevance</td>
<td>Do I believe that this learning experience will be valuable for my learners?</td>
<td>Will learners believe it is valuable? What can I do to help them believe it is important?</td>
</tr>
<tr>
<td>Confidence</td>
<td>Am I confident in my ability to lead this learning experience effectively and interestingly?</td>
<td>Will the learners feel confident about their ability to learn this? What do I need to do to help them be confident?</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Do I expect to have positive feelings about this learning experience?</td>
<td>What can I do to help the learners feel good about their experience and desire to continue learning?</td>
</tr>
<tr>
<td>Volition</td>
<td>Will I provide effective supervision and support to the learners throughout this learning event?</td>
<td>What can I do to help the learners maintain their goal orientation and task focus throughout this learning event?</td>
</tr>
</tbody>
</table>

Where Do Motivational Strategies Come from?”

One response to this question is to use established strategy frameworks that you can adapt to your situation. Here are four frameworks that are frequently used.

**Create a Felt Gap.** People will not engage in learning unless they perceive a gap between what they know and what they want to know or need to know. If learners do not believe that there is a gap between what they already know and what will be taught, then you can use an opening activity such as a case study that will leave them with an understanding of where their gaps are. An easy way to do this is to give them a meaningful task that they cannot accomplish successfully without the knowledge or skills that they will learn.

**Flip the Classroom.** This approach is a very old instructional strategy that many educators have used frequently throughout their careers (see Joyce and Weil 1980 for models that incorporate the “flipped” concept) but has recently been popularized thanks to now being labeled as such and promoted (Bergmann and Sams 2012). Flipping consists of having students read the assignments and do an individual or online small-group learning activity before coming to class. Then, class time might contain a very short lecture and discussion to highlight key points and provide supplemental information from the instructor’s experience, but the majority of class time...
would be spent on group learning activities that include such things as games, simulations, or problem-based learning activities. In this setting, the instructor becomes more of a facilitator and coach than lecturer.

**Produce Problem-Based and Project-Based Learning Environments.** Problem-based learning was created in a medical school setting in the 1960s (Barrows 1996). It is a student-centered approach in which groups are given complex problems to investigate. They use a systematic problem-solving process in which they identify what they already know, speculate about what they need to know, and then conduct research to obtain the necessary information to propose a solution. The instructor plays the role of a facilitator who provides support, guidance, and feedback but does not interfere with the students’ own problem identification and solution activities. Project-based learning is similar except that it focuses on real-world problems and can be interdisciplinary. Two examples are: (1) students in an instructional design course are given the task of designing a needs assessment for a given organizational setting, or (2) medical students are presented with the problem of investigating the growing incidence of antibiotic-resistant bacteria and proposing solutions for managing the problem. As in problem-based learning, students work collaboratively to develop their approach and process for the project and the instructor works as a facilitator and coach in support of the students’ work.

**Transcend the Boundaries of the Formal Learning Environment.** An example of this is provided by Small and Rotolo (2012) at Syracuse University who used social networking applications to more fully engage the students in class and to expand beyond the classroom walls. Students used social media, Twitter®, in this example, to communicate with the instructor, other students, and even people outside the classroom who became interested in the topic and activities. Part of their motivation for incorporating Twitter was that it is an example of social media that are having a huge impact on our knowledge-based society. At first, they used Twitter discussions during face-to-face classroom meetings. Students were encouraged to bring their personal device of choice—laptop, smartphone, or tablet—to tweet during class. Using a class-specific hashtag (hashtags are used on Twitter to group conversations around a topic or event), students were asked to share their thoughts or questions anytime they wanted to, providing they were appropriate for the classroom context. This use of Twitter provided a “backchannel” discussion that augmented the class with tweets that included questions, comments, and even humorous observations that added levity. Students also shared links to additional resources related to the topic at hand, which helped to build competence. Another benefit was that people who were not even enrolled in the class would sometimes participate. For example, when the instructor was describing the use of blogs by a major corporation in the United States, the account manager for one blog began to participate in the discussion as did...
the author of one of the books they were using and other professionals who shared observations and comments. This type of activity helped students appreciate the content they were learning in the context of society, and it increased their interest in the topic. It also helped them become quite sophisticated in their use of this social networking technology. In their paper, Small and Rotolo (2012) describe ways in which they incorporated the ARCS model in designing the use of Twitter and described some of the motivational benefits exhibited by the students.

These pedagogical approaches have powerful benefits for motivating learners because they are based on real-world problems and stimulate serious, meaningful thinking and problem solving. In many ways, they model the approaches by professionals working in various fields of research and practice.

You can create a strategy portfolio for your own use or for the members of your team if you are in a collaborative environment. “Where,” you might ask, “do you get ideas and ‘recipes’ for strategies that will be interesting and effective?” First of all, you have to want to do so! Instructors tend to focus on the content that they are teaching because this is their primary area of interest and they are intrinsically motivated by it. However, to build a good portfolio of motivational and instructional strategies, you have to look beyond content and become a student of your own game: the game of teaching. You can do this by browsing through books of teaching tips and strategies, learning to use media in creative and effective ways, and observing how people are teaching, not just what they are teaching. How do they organize content, especially when they use a technique that creates curiosity or drama? What kinds of interactive learning activities do they use, and what variety of ways do they use student-centered approaches such as group work? Then, in regard to approaches that you find appealing, ask yourself, “How can I modify these for my teaching setting?” This was exactly how I derived many of the strategies that were successful in my classrooms and workshops.

A Case Example of ARCS-V Design-Based Research

The other chapters in this issue contain examples of different settings and approaches illustrating research and applications related to the MVP model. In concluding this chapter, I describe an example of design-based research in which ARCS-V was applied by Dr. Janine Stockdale (Stockdale et al. 2008) during her doctoral research in the midwifery program at the University of Ulster in Northern Ireland. Dr. Stockdale points out that the World Health Organization challenges health professionals to increase breastfeeding rates, and in Northern Ireland, as in most places, the success rate in breastfeeding is lower than desired. Thus, the goal of her study was to develop and validate an antenatal and postnatal program of training and support for mothers. She incorporated the ARCS-V model in this process...
Figure 1.2. Antenatal Motivational Profile of Mothers Following the Original Antenatal Breastfeeding Instruction

because motivational issues are presumed to play a dominant role in the compliance or noncompliance behavior of the mothers. For the purpose of this example, I have added the “V” component to illustrate the full model.

In Northern Ireland, mothers-to-be typically attend a workshop prior to giving birth (an antenatal workshop) and then, following birth, they receive postnatal support that includes home visits from the midwife. Dr. Stockdale’s goal was to identify specific problems in the attitudes of the mothers and the behaviors of the midwives that negatively affected breastfeeding compliance. And then, after evaluating the existing antenatal workshop, her next step was to improve it together with other aspects of support. In her project, she established a baseline set of measures by analyzing the motivational attitudes of the mothers after they attended the antenatal instructional program on breastfeeding. Then, she measured them again during the postnatal period. An instrument called the “Course Interest Survey” (Keller 2010) was modified to fit this setting. After revising and implementing the antenatal workshop and elements of the postnatal support system, she measured mothers’ attitudes again to determine if there were changes.

The mothers’ attitudes following the original antenatal workshop are portrayed on the inverted-U curve in Figure 1.2. This graph is not a mathematical model but it illustrates an approximation of the magnitude of each of the five elements. These results revealed that the mothers were, overall, too optimistic about how easy breastfeeding would be and how great they would feel. More specifically:

1. Attention was slightly elevated. During the instruction, mothers were keenly attentive and received frequent reminders about breastfeeding characteristics;
2. Relevance was on the high side of satisfactory. Many of the mothers would make comments such as “It is important to me,” and “It is
very meaningful to me.” Some midwives made more negative or threatening comments to illustrate the relevance of breastfeeding. “If you don’t breastfeed, you could get breast cancer,” and “Bottle feeding will cost you £1600 every year”;
3. Confidence was slightly elevated. “It will feel comfortable”;
4. Satisfaction expectations were too high. “I look forward to breastfeeding,” and “Most people who breastfeed feel a great sense of personal satisfaction”;
5. Volitional expectations were also elevated. Many mothers expected that it would be easy to persist. “Most women find breastfeeding plain [smooth] sailing.”

During the postnatal period following the original instruction, some mothers were very successful and expressed positive attitudes on all five dimensions of the ARCS-V model. However, the number of mothers who were not successful was substantially higher than desired and Dr. Stockdale conducted an analysis of these mothers and found:

1. Attention diminished. Many mothers found that instead of being attentive to the baby, their attention would wander as they reflected on their experience. “I frequently think of quitting breastfeeding.”
2. Relevance was reduced. They began to reject some of their antenatal attitudes about the value of breastfeeding and found alternatives to be acceptable. “Bottle feeding has been adequate for thousands and thousands of mothers and babies.”
3. Confidence decreased. They found the challenges to be too great. “It is painful and uncomfortable.”
4. Satisfaction decreased. They were not happy about the experience. “Generally speaking I am not very satisfied with breastfeeding.”
5. Volition decreased. They gave up on their efforts to be persistent “Breastfeeding just doesn’t fit in with my schedule.”

Figure 1.3 summarizes results.

Based on these results, she enhanced the antenatal instruction. She found that the original instruction included both positive and negative motivational guidance (positive feelings for doing it and negative consequences for not doing it). The original class also included direct instruction with examples but sometimes included misconceptions and inaccuracies from the midwives themselves. She revised the antenatal instruction by avoiding negative motivation and lowering fear of failure by including realistic consideration of the problems that can and often do occur and how to solve them. She also improved the postnatal support system by adding more modeling, more emphasis on attributing positive events to the mothers’ efforts and abilities, and providing noncritical acceptance of mothers’ decisions to switch to bottles. Collectively, these enhancements were packaged in
a program called “Designer Breastfeeding” (Stockdale et al. 2008), and it was found to significantly improve breastfeeding experiences and success rates.

Summary

In settings where systematic design is used as part of the problem identification and problem-solving processes, people often strive to build algorithms based on straightforward cause and effect relationships. For example, “if the problem is X, then the solution is Y,” “If you do X, then Y will follow.” This level of prescription can be approximated if not achieved in some areas of managing human behavior. For example, distributed practice is better than massed practice for effective learning. Administering positive reinforcement will normally increase the frequency of the rewarded behavior. But, as I indicated at the beginning of this chapter and as is obvious to anyone actively involved in trying to influence people’s learning and performance, teaching and other behavioral change interventions can seldom be this mechanistic. At best, we can offer guidance and heuristics that are helpful but still require insight and active problem solving on the part of the teacher or other behavior change agent. It is this type of support that is offered by the MVP theory and the ARCS-V systematic design process. These models help you identify the areas in which you are already succeeding as a motivating designer or teacher and those areas in which you can make improvements. As illustrated in this chapter, MVP and ARCS-V models provide a means to design research and practices based on a systematic analysis of motivational characteristics. Basic inquiry on variables related to the model and on design-based research are supported by these models.
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John M. Keller is professor emeritus of the Department of Educational Psychology and Learning Systems, Florida State University.