

**LEARNING STYLES**

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**PRETEST**

1. Define the term "Learning Style."
2. Name the three basic learning styles
3. Which style is preferred?
4. Why should the VPI student's learning style be assessed?
5. How is VPI instruction different from traditional classroom teaching?
6. What is your learning style? How does it affect your VPI instruction of students?
7. List three basic differences in teaching adult students-as opposed to K-12 students.
8. Andragogy is a term used for adult learning. True or false
9. Name three barriers to adult learning.
10. Name three aspects that motivate adult learners.

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## INTRODUCTION

Interest in how people learn is not a new concern. Philosophers of ancient Greece and Rome formulated ideas about learning that were to influence educators for centuries. Aristotle's mnemonic techniques of association and visual imagery are still in use today, and are a good way to help special needs students learn. Learning style can be defined as a consistent pattern of behavior with a certain amount of variability. It is the way individuals concentrate on, absorb, and retain new or difficult information or skills (Thome). When people learn, they use learning styles that are uniquely their own, but make adjustments, depending on the nature of the task and the teaching style being used. One important fact must be noted: No one type of learning style is better or worse than any other type. Each type occurs at a different frequency in the general population; some types are therefore more common. (\* Deluxe Personality)

Albert Einstein was a daydreamer. His teachers in Germany told him that he would never amount to anything, that his questions destroyed class discipline, and that he would be better off out of school. Yet he went on to become one of the greatest scientists in world history.

Winston Churchill did poorly at school work. He talked with a stutter and a lisp. Yet he became one of the greatest leaders and orators of the country.

Thomas Alva Edison was beaten at school with a heavy leather strap because his teachers considered him "addled" for asking too many questions. He was chastised so much that his mother took him out of school after only three months' formal education. He went on to become probably the most prolific inventor of all time. Edison's mother – a former school teacher herself – was a pioneer in true learning, says the World Book Encyclopedia. "She had the notion, unusual for those times: that learning could be fun. She made a game of teaching, and she called it exploring, the exciting world of knowledge."

Einstein, Churchill, and Edison had learning styles not suited to their school styles. That same mismatch continues today and is probably the biggest single cause of school failure. The Learning Revolution, Chapter 10, pp.341-342.

Says Barbara Prashnig, head for the Creative Learning Company in New Zealand in *Diversity Is Our Strength, the Learning Revolution in Action* "People of all ages can learn virtually anything if allowed to do it through their unique styles, through their own personal strengths." <http://www.thelearningweb.net/chapter10/page355.html>

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## HISTORY

Four basic psychological types were identified as far back as 450 B.C., but modern psychologists have divided each of these four types into four more sub-types to create 16 different types of learners. Each of these types, shown below, shares similar psychological themes and values with other types: thus people of varied different types can end up in the same careers or lifestyles. Each of these types has a different approach to learning and is consequently motivated by different factors. Knowledge of learning styles, whether you are teaching others or receiving instruction, can help you to prevent losses of productivity that can occur at school or on the job. (\*Deluxe Personality)

- Field Dependent (global external motivation and rewards)
- Field Independent (details internal motivation and rewards)
- Innovative Reasoning
- Analytic Reasoning
- Common Sense (concrete, experiential)
- Dynamic (creative, intuition)
- Visual / Auditory (reception )
- Tactile / kinesthetic hands on, participatory
- "Right Brained" non-linear
- "Left-brained" linear processing
- Serialist (sequential)
- Holistic (hierarchical)
- Concrete Perceiver (experiences)
- Abstract Perceiver (analysis)
- Active Processors (application)
- Reflective Processors (reflection)

<http://reach.ucf.edu/~fctl/research/ls.html>

Traditional instruction has always emphasized abstract receiving and reflective processing, where learner centered instruction allows for all receiving and processing styles. In learning centered instruction, curriculum emphasizes the skills of intuition, feeling, sensing, imagination and syntheses, as well as the traditional styles of analysis, reason, and sequential problem solving. Instruction should be designed to connect with all learning styles by using alternating combinations of experience, reflection, conceptualization, and experimentation. (\* UCF Faculty Center for Teaching and Learning)

Over the years, teachers have come to realize that different students learn in different ways. VPI prescriptions are written with the individual student's learning style in mind. Instructors can enhance their instructional program and students' learning experiences if they know more about the relationship of learning styles with teaching methods. The student's learning style should be assessed within the first week of enrollment in the lab.

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There are several web sites that provide information about various learning styles and short questionnaires so you can identify your preferred learning style.

- Learning Style Inventory (self scored; from Inter-Universities North)
- Learning Styles: Modal Preference Inventory (self scored; from Middlesex Community- Technical College)
- Personal Learning Style Inventory (scored online; from How to Learn Anything... Fast)
- The four learning styles of the DVC Survey (scored online; from DVC on-line)
- <http://agelesslearner.com/assess/learningstyle.html>
- <http://www.psy.pdx.edu/PsyTutor/StudyTips/LearnStyle.htm>

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## LEARNING STYLES

A learning style is a student's consistent way of responding to and using stimuli in the context of learning. One of the most popular models is the VAK – derived from the accelerated learning world. Its main strength is that it appeals to a lot of people and is quite simple.

### VAK Learning Styles

This style uses three main sensory receivers – Visual, Auditory, and Kinesthetic (movement) to determine dominant learning styles. Learners use all three to receive information. However, one or more of these receiving styles is normally dominant. Thus defines the best way for a person to learn new information by filtering what is to be learned. The style may not always be the same for some tasks. The learner may prefer one style for learning one task, and a combination of others for another task.

Classically, our learning style is forced upon us through life like this: In grades kindergarten through third grade, new information is presented to us kinesthetically; gradually grades 4 through 8 are visually presented; while grades 9 to college and into the business learning environment, information is presented to us auditory by lectures.

AUDITORY	VISUAL	KINESTHETIC
Identify sounds related to an experience	Have a sharp, clear picture of an experience	Develop a strong feeling toward an experience
I <b>hear</b> you clearly. I want you to <b>listen</b> This <b>sounds</b> good	Do you <b>make pictures</b> in your head? Do you have <b>visual images</b> as you are talking and listening to me? Can you <b>see</b> what I am saying?	Do you <b>feel</b> what you are saying?  Are you in <b>touch</b> with what I am saying?
How do you <b>hear</b> this situation going? What do you <b>hear</b> that is stopping you? <b>Sounds</b> heavy.	How do you <b>see</b> the situation? What do you <b>see</b> stopping you? This <b>looks</b> good So you <b>see</b> what I am showing you?	How do you <b>feel</b> about this situation? I am <b>getting a handle</b> on this material. Let's <b>move</b> together Does what I am putting you in <b>touch</b> with <b>feel</b> right? <b>Sounds heavy.</b>

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WORD SELECTIONS	WORD SELECTIONS	WORD SELECTIONS
tinkling silent squeal blast screaming choking	color clear spiral showed vivid notice	felt body sensations feel pain touch
Lecture Do you love me?  Auditories complain that Kinestherics don't listen.	Fantasies Visuals complain that auditories don't pay attention to them because they do not make eye contact.	Kinesthetics complain that auditory and visual people are insensitive.

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If you fit mostly into the visual learning style, you learn by seeing and looking.

- Take numerous detailed notes
- Tend to sit in the front of the class
- Often close eyes to visualize or remember something
- Find something to watch if they are bored
- Like to see what they are learning
- Benefit from illustrations and presentations, especially color

If you fit mostly into the auditory learning styles, you learn by hearing and listening.

- Sit where they can hear but do not need to pay attention to what is happening in front
- May not coordinate color or clothes, but can explain why
- Acquire knowledge by reading out loud
- Hum or talk to themselves when bored
- Remember by verbalizing lessons

If you fit mostly into the kinesthetic learning style, you learn by touching and doing.

- Need to be active and take frequent breaks
- Speak with their hands and with gestures
- Remember what done but have difficulty recalling what was said or seen
- Find reasons to tinker or move when bored
- Sit near the door or someplace where they can easily get up and move
- Communicate by touching and appreciate physically expressed encouragement, such as a pat on the back

http:// [www.usd.edu/trio/tut/ts/styleunder.html](http://www.usd.edu/trio/tut/ts/styleunder.html)

As trainers, we need to present information using all three styles. This allows all learners, no matter what their preferred style is, the opportunity to become involved. Just because we prefer one style, does not mean that the other two do us no good. On the contrary, they help us to learn even faster by reinforcing the material. <http://www.nwlink.com/~donclark/hrd/learning/styles.html>

VPI personnel have participated in learning styles activities for over twenty years, starting with the Second Special Needs Conference in Winter Park in 1981, when Dr. Suanne Knopf introduced participants to the Myers-Briggs Type Indicator. The Myers-Briggs Type Indicator, which is based on the work of Carl Jung, has been thoroughly researched and has been found useful in a number of settings including education, business and industry. (\*SAIL NEWSLETTER, Sept. 28, 1990)

The Myers-Briggs Type Indicator® designates one's personality type, based upon a classification scheme which posits four basic scales and two types within each scale. Thus, there are sixteen Myers-Briggs types possible. The scheme is based upon the intuitions of Carl Jung, whose gifted insight revealed that all people at all times are best understood in terms of extroversion/introversion, sensation/intuition, and objective/subjective. The latter category has since been subdivided into two classes by revisionists: feeling/thinking, and perceiving/judging. (\* Skeptic's Dictionary: the Myers-Briggs Type Indicator) Wysiwyg://26/http://skepdic.com/myersb.html

Jung also held that each type had an auxiliary function, as well as the dominant function. For the sake of balance, the auxiliary for a psychologically healthy individual was a perceiving function if the dominant was a judging function and a judging function if the dominant was a perceiving function. Furthermore, a person would use the auxiliary in the opposite way as the dominant function. Extroverts would rely on the auxiliary for introverting, and introverts would rely on it for extroverting. The introduction of the auxiliary split each of Jung's types into two, effectively giving us Myers-Briggs' sixteen psychological types. For example, Introverted Thinkers would be divided into Introverted Thinkers with Intuition as an auxiliary and Introverted Thinkers with Sensing as an auxiliary. The Myers-Briggs types are based on four sets of opposing preferences.

These are extraversion vs. introversion (E vs. I), intuition vs. sensing (N vs. S), thinking vs. feeling (T vs. F), and perceiving vs. judging (P vs. J). The preference for extraversion or introversion indicates the way in which a person uses his dominant function. The preference for perceiving or judging indicates which function (the dominant or the auxiliary) the person relies on for extroverting. As already indicated, the dominant and the auxiliary together include both a perceiving function and a judging function. P's rely on the perceiving function for extroverting, and J's rely on the judging function for extroverting. The preference for thinking or feeling indicates the preferred judging function, and the preference for sensing or intuition indicates the preferred perceiving function.

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Using this information, we can determine the Jungian type that corresponds to each Myers-Briggs type. Take, for instance, this personality type: INTP. The "I" indicates that the subject uses dominant function for introverting. The "P" indicates that that the subject relies on preferred perceiving function for extroverting. The dominant function is the preferred judging function. Therefore, an INTP is an Introverted Thinker with Intuition as an auxiliary. Each Myers-Briggs type can be translated into its corresponding Jungian type in like manner.

Here is a table of what each type corresponds to:

- INTP: Introverted Thinker with auxiliary Intuition
- ISTP: Introverted Thinker with auxiliary Sensing
- INFP: Introverted Feeler with auxiliary Intuition
- ISFP: Introverted Feeler with auxiliary Sensing
- INTJ: Introverted Intuitor with auxiliary Thinking
- INFJ: Introverted Intuitor with auxiliary Feeling
- ISTJ: Introverted Sensor with auxiliary Thinking
- ISFJ: Introverted Sensor with auxiliary Feeling
- ENTJ: Extraverted Thinker with auxiliary Intuition
- ESTJ: Extraverted Thinker with auxiliary Sensing
- ENFJ: Extraverted Feeler with auxiliary Intuition
- ESFJ: Extraverted Feeler with auxiliary Sensing
- ENTP: Extraverted Intuitor with auxiliary Thinking
- ENFP: Extraverted Intuitor with auxiliary Feeling
- ESTP: Extraverted Sensor with auxiliary Thinking
- ESFP: Extraverted Sensor with auxiliary Feeling

(\*The DDLI Support Page)

<http://www.geocities.com/SiliconValley/Vista/8405/ddli.html>

### Andragogy

The notion of andragogy has been around for nearly two centuries. It became particularly popular in North America and Britain as a way of describing adult learning through the work of Malcolm Knowles. But what actually does it mean, and how useful a term is it when thinking about adult learning?

The term andragogy was originally formulated by a German teacher, Alexander Kapp, in 1833 (Nottingham Andragogy Group 1983: v). He used it to describe elements of Plato's education theory. Andragogy (*andr-* meaning "man") could be contrasted with pedagogy (*paid-* meaning "child" and *agogos* meaning "leading") (see Davenport 1993: 114)

In the minds of many in the adult education field, andragogy and the name of Malcolm Knowles (<http://www.infed.org/thinkers/et-knowl.htm>) have become inextricably linked. For Knowles, andragogy is premised on at least four crucial assumptions about the characteristics of adult learners that are different from the

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assumptions about child learners on which traditional pedagogy is premised. A fifth was added later.

1. Self-concept: As a person matures his self concept moves from one of being a dependent personality toward one of being a self-directed human being
2. Experience: As a person matures he accumulates a growing reservoir of experience that becomes an increasing resource for learning.
3. Readiness to learn. As a person matures his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles.
4. Orientation to learning. As a person matures, his time perspective changes from one of postponed application of knowledge to immediacy of application. Accordingly his orientation toward learning shifts from one of subject-centeredness to one of problem-centeredness.
5. Motivation to learn: As a person matures the motivation to learn is internal (Knowles 1984:12).

Each of these assertions and the claims of difference between andragogy and pedagogy are the subject of considerable debate. Useful critiques of the notion can be found in Davenport (1993) Jarvis (1977a) Tennant (1996)

There are some general issues with Knowles' Approach First, as Merriam and Caffarella (1991: 249) have pointed out, Knowles' conception of andragogy is an attempt to build a comprehensive theory (or model) of adult learning that is anchored in the characteristics of adult learners. Cross (1981: 248) also uses such perceived characteristics in a more limited attempt to offer a "framework for thinking about *what* and *how* adults learn." Such approaches may be contrasted with those that focus on:

- An adult's life situation (e.g. Knox 1986; Jarvis 1987a)
- Changes in consciousness (e.g. Mezirow 1983; 1990 or Freire 1972) (Merriam and Caffarella 1991).

Second, Knowles makes extensive use of a model of relationships derived from humanistic clinical psychology - and, in particular, the qualities of good facilitation argued for by Carl Rogers. However, Knowles adds in other elements which owe a great deal to scientific curriculum making and behavior modification (and are thus somewhat at odds with Rogers). These encourage the learner to identify needs, set objectives, enter learning contracts and so on. In other words, he uses ideas from psychologists working in two quite different and opposing therapeutic traditions (the humanist and behavioral traditions). This means that there is a rather dodgy deficit model lurking around this model.

Third, it is not clear whether this is a theory or set of assumptions about learning, or a theory or model of teaching (Hartree 1984). We can see something of this in relation to the way he has defined andragogy as the art and science of helping adults learn as against pedagogy as the art and science of teaching children. There is an inconsistency here.

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With these things in mind we can look at the assumptions that Knowles makes about adult learners:

**1. Self-concept:** As a person matures his self concept moves from one of being a dependent personality toward one of being a self-directed human being. The point at which a person becomes an adult, according to Knowles, psychologically, 'is that point at which he perceives himself to be wholly self-directing. And at that point he also experiences a deep need to be perceived by others as being self-directing' (Knowles 1983: 56). As Brookfield (1986) points out, there is some confusion as to whether self-direction is meant here by Knowles to be an empirically verifiable indicator of adulthood. He does say explicitly that it is an assumption. However, there are some other immediate problems:

- Both Erikson and Piaget have argued that there are some elements of self-directedness in children's learning (Brookfield 1986: 93). Children are not dependent learners for much of the time, "quite the contrary, learning for them is an activity which is natural and spontaneous" (Tennant 1988: 21). It may be that Knowles was using self-direction in a particular way here or needed to ask a further question – "dependent or independent with respect to what?"
- The concept is culturally bound. It arises out of a particular (humanist) discourse about the self which is largely North American in its expression. This was looked at last week - and will be returned to in future weeks.

**2. Experience:** As a person matures he accumulates a growing reservoir of experience that becomes an increasing resource for learning. The next step is the belief that adults learn more effectively through experiential techniques of education such as discussion or problem solving (Knowles 1980: 43). The immediate problem we have is the unqualified way in which the statement is made. There may be times when experiential learning is not appropriate - such as when substantial amounts of new information are required. We have to ask the question, what is being learnt, before we can make judgments.

A second aspect here is whether children's and young people's experiences are any less real or less rich than those of adults. They may not have the accumulation of so many years, but the experiences they have are no less consuming, and still have to be returned to, entertained, and made sense of. Does the fact that they have 'less' supposed experience make any significant difference to the process? A reading of Dewey (1933) and the literature on reflection (e.g. Boud et al 1985) would support the argument that age and amount of experience makes no educational difference. If this is correct, then the case for the distinctiveness of adult learning is seriously damaged. This is of fundamental significance if, as Brookfield (1986: 98) suggests, this second assumption of andragogy "can arguably lay claim to be viewed as a given in the literature of adult learning."

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**3. Readiness to learn.** As a person matures his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles. As Tennant (1988: 21-22) puts it, "it is difficult to see how this assumption has any implication at all for the process of learning, let alone how this process should be differentially applied to adults and children." Children also have to perform social roles.

Knowles does, however, make some important points at this point about teachable moments. The relevance of study or education becomes clear as it is needed to carry out a particular task. At this point more ground can be made as the subject seems relevant.

However, there are other problems. These appear when he goes on to discuss the implications of the assumption. "Adult education programs, therefore, should be organized around 'life application' categories and sequenced according to learners' readiness to learn." (1980: 44)

First, as Brookfield comments, these two assumptions can easily lead to a technological interpretation of learning that is highly reductionist. By this he means that things can become rather instrumental and move in the direction of competencies. Language like life application categories reeks of skill-based models - where learning is reduced to a series of objectives and steps (a product orientation). We learn things that are useful rather than interesting or intriguing or because something fills us with awe. It also thoroughly underestimates just how much we learn for the pleasure it brings (see below).

Second, as Humphries (1988) has suggested, the way he treats social roles, as worker, as mother, as friend, and so on, takes as given the legitimacy of existing social relationships. In other words, there is a deep danger of reproducing oppressive forms.

**4. Orientation to learning.** As a person matures, his time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject-centeredness to one of problem-centeredness. This is not something that Knowles sees as natural but rather it is conditioned (1984: 11). It follows from this that if young children were not conditioned to be subject-centered then they would be problem-centered in their approach to learning. This has been very much the concern of progressives such as Dewey. The question here does not relate to age or maturity but to what may make for effective teaching. We also need to note here the assumption that adults have a greater wish for immediacy of application. Tennant (1988: 22) suggests that a reverse argument can be made for adults being better able to tolerate the postponed application of knowledge.

Last, Brookfield argues that the focus on competence and on "problem-centeredness" in Assumptions 3 and 4 undervalues the large amount of learning undertaken by adults for its innate fascination. Much of adults' most joyful and personally

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meaningful learning is undertaken with no specific goal in mind. It is unrelated to life tasks and instead represents a means by which adults can define themselves. (Brookfield 1986: 99).

**5. Motivation to learn:** As a person matures the motivation to learn is internal (Knowles 1984:12). Again, Knowles does not see this as something natural but as conditioned; in particular, through schooling. This assumption sits awkwardly with the view that adults' readiness to learn is "the result of the need to perform (externally imposed) social roles and that adults have a problem-centered (utilitarian) approach to learning" (Tennant 1988: 23).

In sum it could be said that these assumptions tend to focus on age and stage of development. As Ann Hanson (1996: 102) has argued, this has been at the expense of questions of purpose, or of the relationship between individual and society

Knowles' theory of andragogy is an attempt to develop a theory specifically for adult learning. Knowles emphasizes that adults are self-directed and expect to take responsibility for decisions. Adult learning programs must accommodate this fundamental aspect.

Andragogy makes the following assumptions about the design of learning: (1) Adults need to know why they need to learn something (2) Adults need to learn experientially, (3) Adults approach learning as problem-solving, and (4) Adults learn best when the topic is of immediate value.

In practical terms, andragogy means that instruction for adults needs to focus more on the process and less on the content being taught. Strategies such as case studies, role playing, simulations, and self-evaluation are most useful. Instructors adopt a role of facilitator or resource rather than lecturer or grader.

Andragogy applies to any form of adult learning and has been used extensively in the design of organizational training. Example: Knowles (1984, Appendix D) provides an example of applying andragogy principles to the design of personal computer training:

1. There is a need to explain why specific things are being taught (e.g., certain commands, functions, operations, etc.).
2. Instruction should be task-oriented instead of memorization. Learning activities should be in the context of common tasks to be performed.
3. Instruction should take into account the wide range of different backgrounds of learners; learning materials and activities should allow for different levels/types of previous experience with computers.
4. Since adults are self-directed, instruction should allow learners to discover things for.

What are some of the principles of andragogy?

1. Adults need to be involved in the planning and evaluation of their instruction.
2. Experience (including mistakes) provides the basis for learning activities.

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3. Adults are most interested in learning subjects that have immediate relevance to their job or personal life.
4. Adult learning is problem-centered rather than content-oriented.

### Learning Styles Defined

Learning styles are simply different approaches or ways of learning. What are the types of learning styles?

#### **Visual learners learn through seeing.**

These learners need to see the teacher's body language and facial expression to fully understand the content of a lesson. They tend to prefer sitting at the front of the classroom to avoid visual obstructions (e.g. people's heads). They may think in pictures and learn best from visual displays including: diagrams, illustrated text books, overhead transparencies, videos, flipcharts and hand-outs. During a lecture or classroom discussion, visual learners often prefer to take detailed notes to absorb the information.

#### **Auditory learners learn through listening.**

They learn best through verbal lectures, discussions, talking things through and listening to what others have to say. Auditory learners interpret the underlying meanings of speech through listening to tone of voice, pitch, speed and other nuances. Written information may have little meaning until it is heard. These learners often benefit from reading text aloud and using a tape recorder.

#### **Tactile/kinesthetic learners learn through, moving, doing and touching.**

Tactile/Kinesthetic persons learn best through a hands-on approach, actively exploring the physical world around them. They may find it hard to sit still for long periods and may become distracted by their need for activity and exploration.

### Multiple Intelligence Defined

Conceived by Howard Gardner, Multiple Intelligences are seven different ways to demonstrate intellectual ability. What are the types of Multiple Intelligence?

**Visual/Spatial Intelligence is the ability to perceive the visual.** These learners tend to think in pictures and need to create vivid mental images to retain information. They enjoy looking at maps, charts, pictures, videos, and movies.

Their skills include: puzzle building, reading, writing, understanding charts and graphs, a good sense of direction, sketching, painting, creating visual metaphors and analogies (perhaps through the visual arts), manipulating images, constructing, fixing, designing practical objects, interpreting visual images.

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Possible career interests: navigators, sculptors, visual artists, inventors, architects, interior designers, mechanics, engineers

**Verbal/Linguistic intelligence is the ability to use words and language.** These learners have highly developed auditory skills and are generally elegant speakers. They think in words rather than pictures.

Their skills include: listening, speaking, writing, story telling, explaining, teaching, using humor, understanding the syntax and meaning of words, remembering information, convincing someone of their point of view, analyzing language usage.

Possible career interests: poet, journalist, writer, teacher, lawyer, politician, translator

**Logical/Mathematical Intelligence is the ability to use reason, logic and numbers.** These learners think conceptually in logical and numerical patterns making connections between pieces of information. Always curious about the world around them, these learners ask lots of questions and like to do experiments.

Their skills include: problem solving, classifying and categorizing information, working with abstract concepts to figure out the relationship of each to the other, handling long chains of reason to make local progressions, doing controlled experiments, questioning and wondering about natural events, performing complex mathematical calculations, working with geometric shapes

Possible career paths: scientists, engineers, computer programmers, researchers, accountants, mathematicians

**Bodily/Kinesthetic Intelligence is the ability to control body movements and handle objects skillfully.** These learners express themselves through movement. They have a good sense of balance and eye-hand co-ordination. (e.g. ball play, balancing beams). Through interacting with the space around them, they are able to remember and process information.

Their skills include: dancing, physical co-ordination, sports, hands on experimentation, using body language, crafts, and acting, miming, using their hands to create or build, and expressing emotions through the body

Possible career paths: Athletes, physical education teachers, dancers, actors, firefighters, artisans

**Musical/Rhythmic Intelligence is the ability to produce and appreciate music.** These musically inclined learners think in sounds, rhythms and patterns. They immediately respond to music either appreciating or criticizing what they hear. Many of these learners are extremely sensitive to environmental sounds (e.g. crickets, bells, dripping taps).

Their skills include: singing, whistling, playing musical instruments, and recognizing tonal patterns, composing

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music, remembering melodies, understanding the structure and rhythm of music

Possible career paths: musician, disc jockey, singer, composer

**Interpersonal Intelligence is the ability to relate and understand others.** These learners try to see things from other people's point of view in order to understand how they think and feel. They often have an uncanny ability to sense feelings, intentions and motivations. They are great organizers, although they sometimes resort to manipulation. Generally they try to maintain peace in group settings and encourage cooperation. They use both verbal (e.g. speaking) and non-verbal language (e.g. eye contact, body language) to open communication channels with others.

Their skills include: seeing things from other perspectives (dual-perspective), listening, using empathy, understanding other people's moods and feelings, counseling, co-operating with groups, noticing people's moods, motivations and intentions, communicating both verbally and non-verbally, building trust, peaceful conflict resolution, establishing positive relations with other people.

Possible Career Paths: counselor, salesperson, politician, business person

**Intrapersonal Intelligence is the ability to self-reflect and be aware of one's inner state of being.** These learners try to understand their inner feelings, dreams, relationships with others, and strengths and weaknesses.

Their skills include recognizing their own strengths and weaknesses, reflecting and analyzing themselves, awareness of their inner feelings, desires and dreams, evaluating their thinking patterns, reasoning with themselves, understanding their role in relationship to others

Possible Career Paths: researchers, theorists, philosophers

### Learning-Style Inventory

David A. Kolb's Learning Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. As this instrument is copyrighted please contact Hay Resources Direct (a division of the Hay Group, Inc.) at 1-800-729-8074 for purchasing information. You can also get information directly from [http://www.hayresourcesdirect.haygroup.com/Learning\\_Self-Development/Assessments\\_surveys/Learning\\_Style\\_Inventory/Overview.asp](http://www.hayresourcesdirect.haygroup.com/Learning_Self-Development/Assessments_surveys/Learning_Style_Inventory/Overview.asp)

David Kolb's learning cycle model (*Experiential Learning*. 1984), the learning style inventory, and associated terminology are based on the work of John Dewey, Kurt Lewin, Jean Piaget, and J. P. Guilford. For more information see the following materials:

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- Kolb, David A. 1984. *Experiential Learning: Experience as the Source of Learning and Development*. Prentice-Hall, Inc., Englewood Cliffs, N.J.
- Smith, Donna M., and David A. Kolb. 1986. *The User's Guide for the Learning-Style Inventory: A Manual for Teachers and Trainers*. McBer & Company. Boston, MA.

### Learning Styles: A Multiple Intelligences Approach

Multiple Intelligence (MI) theory states that there are at least seven different ways of learning anything, and therefore there are seven intelligences: body/kinesthetic, interpersonal, intra-personal, logical/mathematical, musical/rhythmic, verbal/linguistic and visual/spatial. In addition most all people have the ability to develop skills in each of the intelligences, and to learn through them. However, in education we have tended to emphasize two of the ways of learning: logical/mathematical and verbal/linguistic. Much of this material is from: *Seven Ways of Knowing: Teaching for Multiple Intelligences* by David Lazear. 1991. IRI/Skylight Publishing, Inc. Palatine, IL.

The seven intelligences are as follows:

#### 1. **Body/Kinesthetic Intelligence**

This intelligence is related to physical movement and the knowing/wisdom of the body, including the brain's motor cortex, which control bodily motion. Body/kinesthetic intelligence is awakened through physical movement such as in various sports, dance, and physical exercises as well as by the expression of oneself through the body, such as inventing, drama, body language, and creative/interpretive dance.

#### 2. **Interpersonal Intelligence**

This intelligence operates primarily through person-to-person relationships and communication. Interpersonal intelligence is activated by person-to-person encounters in which such things as effective communication, working together with others for a common goal, and noticing distinctions among persons are necessary and important.

#### 3. **Intra-personal Intelligence**

This intelligence relates to inner states of being, self-reflection, metacognition (i.e. thinking about thinking), and awareness of spiritual realities. Intra-personal intelligence is awakened when we are in situations that cause introspection and require knowledge of the internal aspects of the self, such as awareness of our feelings, thinking processes, self-reflection, and spirituality.

#### 4. **Logical/Mathematical Intelligence**

Often called "scientific thinking," this intelligence deals with inductive and deductive thinking/reasoning, numbers, and the recognition of abstract patterns. Logical mathematical intelligence is activated in situations requiring problem solving or meeting a new challenge as well as situations requiring pattern discernment and recognition.

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### 5. Musical/Rhythmic Intelligence

This intelligence is based on the recognition is based on the recognition of tonal patterns, including various environmental sounds, and on a sensitivity to rhythm and beats. Musical/rhythmic intelligence is turned on by the resonance or vibrational effect of music and rhythm on the brain, including such things as the human voice, sounds from nature, musical instruments, percussion instruments, and other humanly produced sounds.

### 6. Verbal/Linguistic Intelligence

This intelligence, which is related to words and language both written and spoken, dominates most Western educational systems. Verbal linguistic intelligence is awakened by the spoken word, by reading someone's ideas thoughts, or poetry, or by writing one's own ideas, thoughts, or poetry, as well as by various kinds of humor such as "plays on words," jokes, and "twists" of the language.

### 7. Visual/Spatial Intelligence

This intelligence, which relies on the sense of sight and being able to visualize an object, includes the ability to create internal mental images/pictures. Visual/spatial intelligence is triggered by presenting the mind with and/or creating unusual, delightful, and colorful designs, patterns, shapes, and pictures, and engaging in active imagination through such things as visualization guided imagery, and pretending exercises.

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### An MI Inventory for Adults

Check those statements that apply in each intelligence category. Use these intelligence categories to help you understand the types of intelligence you possess and your strengths and weaknesses.

#### Body/Kinesthetic Intelligence

- \_\_\_ I engage in at least one sport or physical activity on a regular basis.
- \_\_\_ I find it difficult to sit still for long periods of time.
- \_\_\_ I like working with my hands at concrete activities such as sewing, weaving, carving, carpentry, or model building.
- \_\_\_ My best ideas often come to me when I'm out for a long walk or a jog, or when I'm engaged in some other kind of physical activity.
- \_\_\_ I often like to spend my free time outdoors.
- \_\_\_ I frequently use hand gestures or other forms of body language when conversing with someone.
- \_\_\_ I need to touch things in order to learn more about them.
- \_\_\_ I enjoy daredevil amusement rides or similar thrilling physical experiences.
- \_\_\_ I would describe myself as well coordinated.

\_\_\_ I need to practice a new skill rather than simply reading about it or seeing a video that describes it.

**Interpersonal Intelligence**

\_\_\_ I'm the sort of person that people come to for advice and counsel at work or in my neighborhood.

\_\_\_ I prefer group sports like badminton, volleyball, or softball to solo sports such as swimming and jogging.

\_\_\_ When I have a problem, I'm more likely to seek out another person for help than attempt to work it out on my own.

\_\_\_ I have at least three close friends.

\_\_\_ I favor social pastimes such as Monopoly or bridge over individual recreations such as video games and solitaire.

\_\_\_ I enjoy the challenge of teaching another person, or groups of people, what I know how to do.

\_\_\_ I consider myself a leader (or others have called me that).

\_\_\_ I feel comfortable in the midst of a crowd.

\_\_\_ I like to get involved in social activities connected with my work, church, or community.

\_\_\_ I would rather spend my evenings at a lively party than stay at home alone.

**Intra-personal Intelligence**

\_\_\_ I regularly spend time alone meditating, reflecting, or thinking about important life questions.

\_\_\_ I have attended counseling sessions or personal growth seminars to learn more about myself.

\_\_\_ I am able to respond to setbacks with resilience.

\_\_\_ I have a special hobby or interest that I keep pretty much to myself.

\_\_\_ I have some important goals for my life that I think about on a regular basis.

\_\_\_ I have a realistic view of my strengths and weaknesses (borne out by feedback from other sources).

\_\_\_ I would prefer to spend a weekend alone in a cabin in the woods rather than at a fancy resort with lots of people around.

\_\_\_ I consider myself to be strong willed or independent minded.

\_\_\_ I keep a personal diary or journal to record the events of my inner life.

\_\_\_ I am self-employed or have at least thought seriously about starting my own business.

**Logical/Mathematical Intelligence**

\_\_\_ I can easily compute numbers in my head.

\_\_\_ Math and/or science were among my favorite subjects in school.

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- \_\_\_ I enjoy playing games or solving brainteasers that require logical thinking.
- \_\_\_ I like to set up little "what if" experiments (e.g. "What if I double the amount of water I give my rosebush each week?")
- \_\_\_ My mind searches for patterns, regularities, or logical sequences in things.
- \_\_\_ I'm interested in new developments in science.
- \_\_\_ I believe that almost everything has a rational explanation.
- \_\_\_ I sometimes think in clear abstract, wordless, imageless concepts.
- \_\_\_ I like finding logical flaws in thing that people say and do at home and work.
- \_\_\_ I feel more comfortable when something has been measured, categorized, analyzed, or quantified in some way.

**Musical/Rhythmic Intelligence**

- \_\_\_ I have a pleasant singing voice.
- \_\_\_ I can tell when a musical note is off-key.
- \_\_\_ I frequently listen to music on the radio, cassette tapes or compact discs.
- \_\_\_ I play a musical instrument.
- \_\_\_ My life would be poorer if there were no music in it.
- \_\_\_ I sometimes catch myself walking around with a jingle or other tune running through my mind.
- \_\_\_ I can easily keep time to a piece of music with a simple percussion instrument.
- \_\_\_ I know the tunes to many different songs or music pieces.
- \_\_\_ If I hear a musical selection once or twice, I am usually able to sing it back fairly accurately.
- \_\_\_ I often make tapping sounds or sing little melodies while working, studying, or learning something new.

**Verbal/Linguistic Intelligence**

- \_\_\_ Books are very important to me.
- \_\_\_ I can hear words in my head before I read, speak, or write them down.
- \_\_\_ I get more out of listening to the radio or a spoken-word cassette than I do from television or films.
- \_\_\_ I enjoy word games like Scrabble, Boggle, Anagrams, or Password.
- \_\_\_ I enjoy entertaining myself or others with tongue twisters, nonsense rhymes, or puns.
- \_\_\_ Other people sometimes have to stop and ask me to explain the meaning of the words I use in my writing and speaking.

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- \_\_\_ English, social studies, and history were easier for me in school than math and science.
- \_\_\_ When I drive down a freeway, I pay more attention to the words written on signs than to the scenery.
- \_\_\_ My conversation includes frequent references to things that I've read or heard.
- \_\_\_ I've written something recently that I was particularly proud of or that earned me recognition from others.

**Visual/Spatial Intelligence**

- \_\_\_ I often see clear visual images when I close my eyes.
- \_\_\_ I'm sensitive to color.
- \_\_\_ I frequently use a camera or camcorder to record what I see around me.
- \_\_\_ I enjoy doing jigsaw puzzles, mazes, and other visual puzzles.
- \_\_\_ I have vivid dreams at night.
- \_\_\_ I can generally find my way around unfamiliar territory.
- \_\_\_ I like to draw or doodle.
- \_\_\_ Geometry was easier for me than algebra in school.
- \_\_\_ I can comfortably imagine how something might appear if it were looked down upon from directly above in a bird's-eye view.
- \_\_\_ I prefer looking at reading material that is heavily illustrated.

**Gardner's Multiple Intelligences**

Gardner chose to look at learning styles in a different light. Winters (1995) and Wang (1996) provided the following summary of Gardner's Multiple Intelligences:

- Plays with words (Verbal/Linguistic)
- Plays with questions (Logical/Mathematical)
- Plays with pictures (Visual/Spatial)
- Plays with music (Music/Rhythmic)
- Plays with moving (Body/Kinesthetic)
- Plays with socializing (Interpersonal)
- Plays alone (Intrapersonal)

Again, each of us uses some of these styles when learning, but we tend to prefer a small number of methods over the rest.

The following chart helps you determine your learning style. Read the word in the left column and then answer the questions in the successive three columns to see how you respond to each situation. Your answers may fall into all three columns, but one column will likely contain the most answers. The dominant column indicates your primary learning style. (The chart was adapted from Accelerated Learning, Colin Rose, 1987.)

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When you...	Visual	Auditory	Kinesthetic & Tactile
<b>Spell</b>	Do you try to see the word?	Do you sound out the word or use a phonetic approach?	Do you write the word down to find if it feels right?
<b>Talk</b>	Do you sparingly but dislike listening for too long? Do you favor words such as <i>see, picture, and imagine</i> ?	Do you enjoy listening but are impatient to talk? Do you use words such as <i>hear, tune, and think</i> ?	Do you gesture and use expressive movements? Do you use words such as <i>feel, touch, and hold</i> ?
<b>Concentrate</b>	Do you become distracted by untidiness or movement?	Do you become distracted by sounds or noises?	Do you become distracted by activity around you?
<b>Meet someone again</b>	Do you forget names but remember faces or remember where you met?	Do you forget faces but remember names or remember what you talked about?	Do you remember best what you did together?
<b>Contact people on business</b>	Do you prefer direct, face-to-face, personal meetings?	Do you prefer the telephone?	Do you talk with them while walking or participating in an activity?
<b>Read</b>	Do you like descriptive scenes or pause to imagine the actions?	Do you enjoy dialog and conversation or hear the characters talk?	Do you prefer action stories or are not a keen reader?
<b>Do something new at work</b>	Do you like to see demonstrations, diagrams, slides, or posters?	Do you prefer verbal instructions or talking about it with someone else?	Do you prefer to jump right in and try it?
<b>Put something together</b>	Do you look at the directions and the picture?	Do you ask a friend for help or call the manufacturer?	Do you ignore the directions and figure it out as you go along?
<b>Need help with a computer application</b>	Do you seek out pictures or diagrams?	Do you call the help desk, ask a neighbor, or growl at the computer?	Do you keep trying to do it or try it on another computer?

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## The 4MAT System

The next step was the 4MAT System developed by Dr. Bernice McCarthy presented at the Florida Developmental Education Association (FDEA) Conference in St. Augustine on March 4, 1982. The 4MAT System is based on left and right brain hemisphere, and emphasizes staff development. Dr. McCarthy tells us, that if all teachers taught in each of the four learning styles 25% of the time, all students in any class on any subject would be reached. Instead of focusing on the student's learning style, she focused on staff development - training all teachers to include all four learning styles in presenting each learning task. In the 4-MAT system, the four major learning styles are:

1. **Imaginative Learners:** These learners perceive information concretely and process it reflectively. They are imaginative thinkers and believe in their own experiences. They have difficulty making decisions, and they seek meaning and clarity.
2. **Analytic learners:** These learners perceive information abstractly and process it reflectively. They learn by thinking through ideas and need to know what experts think. They also need details, and enjoy traditional classrooms.
3. **Common Sense Learners:** These learners perceive information abstractly and process it actively. They integrate theory and practice. They apply common sense; if they believe something works they will use it. They resent being given answers, and they value strategic thinking.
4. **Dynamic Learners:** These learners perceive information concretely and process it actively. They learn by trial and error, are enthusiastic about new things, and are risk takers. They are manipulative and pushy, and to them, school is tedious and frustrating. (\*SAIL NEWSLETTER, Sept. 28, 1990)

## Center for Innovative Teaching Experience (CITE)

Center for Innovative Teaching Experience, CITE, is a learning style inventory developed by the State of Kansas Department of Education at the Murdock Center. It was introduced at the 1990 FDEA Conference in Tampa. CITE is available from many vendors, a vocationally related CITE is also available. Call PESCO International at 1-800-431-2016 or visit [www.pesco.org](http://www.pesco.org). A tally of responses on the 45 items produces a preference for major learning style, minor learning style and negligible learning style, according to these categories: visual language; visual numerical; auditory language; auditory numerical; kinesthetic-tactile; social-individual; social-group; expressiveness-oral; and expressiveness-written. The inventory can be administered individually or in groups, and is available in written, computer, and audio-visual format.

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**The Visual/Verbal Learning Style:** You learn best when information is presented visually and in a written language format. In a classroom setting, you benefit from instructors who use the blackboard (or overhead projector) to list the essential points of a lecture, or who provide you with an outline to follow along with during lecture. You benefit from information obtained from textbooks and class notes. You tend to like to study by yourself in a quiet room. You often see information "in your mind's eye" when you are trying to remember something.

**Learning Strategies for the Visual/Verbal Learner:** To aid recall, make use of "color coding" when studying new information in your textbook or notes. Using highlighter pens, highlight different kinds of information in contrasting colors. Write out sentences and phrases that summarize key information obtained from your textbook and lecture. Make flashcards of vocabulary words and concepts that need to be memorized. Use highlighter pens to emphasize key points on the cards. Limit the amount of information per card so your mind can take a mental picture of the information.

When learning information presented in diagrams or illustrations, write out explanations for the information. When learning mathematical or technical information, write out in sentences and key phrases your understanding of the material. When a problem involves a sequence of steps, write out in detail how to do each step. Make use of computer word processing. Copy key information from your notes and textbook into a computer. Use the print-outs for visual review. Before an exam, make yourself visual reminders of information that must be memorized. Make "stick it" notes containing key words and concepts and place them in highly visible places: on your mirror, notebook, car dashboard, etc.

**The Visual/Nonverbal Learning Style:** You learn best when information is presented visually and in a picture or design format. In a classroom setting, you benefit from instructors who use visual aids such as film, video, maps and charts. You benefit from information obtained from the pictures and diagrams in textbooks. You tend to like to work in a quiet room and may not like to work in study groups. When trying to remember something, you can often visualize a picture of it in your mind. You may have an artistic side that enjoys activities having to do with visual art and design.

**Learning Strategies for the Visual/ Nonverbal Learner:** Make flashcards of key information that needs to be memorized. Draw symbols and pictures on the cards to facilitate recall. Use highlighter pens to highlight key words and pictures on the flashcards. Limit the amount of information per card, so your

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mind can take a mental picture of the information. Mark up the margins of your textbook with key words, symbols, and diagrams that help you remember the text. Use highlighter pens of contrasting colors to color code the information.

When learning mathematical or technical information, make charts to organize the information. When a mathematical problem involves a sequence of steps, draw a series of boxes, each containing the appropriate bit of information in sequence. Use large square graph paper to assist in creating charts and diagrams that illustrate key concepts.

Use the computer to assist in organizing material that needs to be memorized. Using word processing, create tables and charts with graphics that help you to understand and retain course material. Use spreadsheet and database software to further organize material that needs to be learned.

As much as possible, translate words and ideas into symbols, pictures, and diagrams.

**The Tactile/Kinesthetic Learning Style:** You learn best when physically engaged in a hands-on activity. In the classroom, you benefit from a lab setting where you can manipulate materials to learn new information. You learn best when you can be physically active in the learning environment. You benefit from instructors who encourage in-class demonstrations, hands-on student learning experiences, and field work outside the classroom.

**Strategies for the Tactile/Kinesthetic Learner:** To help you stay focused on class lecture, sit near the front of the room and take notes throughout the class period. Don't worry about correct spelling or writing in complete sentences. Jot down key words and draw pictures or make charts to help you remember the information you are hearing.

When studying, walk back and forth with textbook, notes, or flashcards in hand and read the information out loud. Think of ways to make your learning tangible, i.e. something you can put your hands on. For example, make a model that illustrates a key concept. Spend extra time in a lab setting to learn an important procedure. Spend time in the field (e.g. a museum, historical site, or job site) to gain first-hand experience of your subject matter.

To learn a sequence of steps, make 3'x 5' flashcards for each step. Arrange the cards on a table top to represent the correct sequence. Put words, symbols, or pictures on your flashcards--anything that helps you remember the information. Use highlighter pens in contrasting colors to emphasize important points. Limit the amount of information per card to aid recall.

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Practice putting the cards in order until the sequence becomes automatic.

When reviewing new information, copy key points onto a chalkboard, easel board, or other large writing surface. Make use of the computer to reinforce learning through the sense of touch. Using word processing software, copy essential information from your notes and textbook. Use graphics, tables, and spreadsheets to further organize material that must be learned.

Listen to audio tapes on a Walkman tape player while exercising. Make your own tapes containing important course information.

**The Auditory/ Verbal Learning Style:** You learn best when information is presented auditory in an oral language format. In a classroom setting, you benefit from listening to lecture and participating in group discussions. You also benefit from obtaining information from audio tape. When trying to remember something, you can often "hear" the way someone told you the information, or the way you previously repeated it out loud. You learn best when interacting with others in a listening/speaking exchange.

**Strategies for the Auditory/ Verbal Learner:** Join a study group to assist you in learning course material. Or, work with a study buddy on an ongoing basis to review key information and prepare for exams. When studying by yourself, talk out loud to aid recall. Get yourself in a room where you won't be bothering anyone and read your notes and textbook out loud. Tape-record your lectures. Use the 'pause' button to avoid taping irrelevant information. Use a tape recorder equipped with a 3-digit counter. At the beginning of each lecture, set your counter to '000.' If a concept discussed during lecture seems particularly confusing, glance at the counter number and jot it down in your notes. Later, you can fast forward to that number to review the material that confused you during lecture. Making use of a counter and pause button while tape recording allows you to avoid the tedious task of having to listen to hours and hours of lecture tape.

Use audio tapes such as commercial books on tape to aid recall. Or, create your own audio tapes by reading notes and textbook information into a tape recorder. When preparing for an exam, review the tapes on your car tape player or on a Walkman player whenever you can.

When learning mathematical or technical information, talk your way through the new information. State the problem in your own words. Reason through solutions to problems by talking out loud to yourself or with a

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study partner. To learn a sequence of steps, write them out in sentence form and read them out loud.

### Learning Style Inventory

The Learning Style Inventory (LSI) of Dr. David A. Kolb measures four learning modes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). These refer to learning from feeling, learning by watching and listening, learning by thinking, and learning by doing. The LSI is a reliable, research-based, self-scoring test that can be completed and scored in less than 30 minutes. This popular 12-item assessment tool is based on Experiential Learning Theory. The LSI identifies the Four Learning Style Types as Converger (thinking), Diverger (feeling), Assimilator (watching), and Accommodator (doing). The LSI:

- Identifies preferred learning styles
- Explores the opportunities different styles present in problem solving and decision making
- Is used in actual training design
- Offers an effective "icebreaker" in group dynamic or team-building programs
- Can be useful in determining career paths

LSI self-scoring booklets are also available in French (Repertoire des Styles D'Apprentissage) and Spanish (Inventario Autoevaluativo y su Interpretacion). (\*SAIL NEWSLETTER, Sept. 28, 1990)

Effective aspects of learning style include emotional and personality characteristics related to such areas as motivation, attention, control, interests, willingness to take risks, persistence, responsibility, and sociability. Knowledge of this aspect of learning can help educators understand why praise and external reinforcement have a positive effect on some learners but a negative on others. Another effective aspect is the type of group in which a person learns best.

The physiological aspects of learning include the following: sensory perception (visual, auditory, kinesthetic, taste and smell); environmental factors (noise level, light, temperature, room arrangement); need for food during study; and times of day for optimum learning. All of these physiological aspects affect the way a student learns and processes information. Learning styles are a combination of nature and nurture. Even though learning style has been defined as a consistent pattern of behavior, it does change with age and experience.

Cognitive styles tend to move in the direction of greater abstraction and field independence, but only in technical societies like the United States. While the learning style is initially based on inheritance and prenatal influences, a person's learning predisposition is subject to qualitative changes resulting from maturation and environmental stimuli.

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## ADULT LEARNING STYLES

What makes adult learners different from children learners? Knowles's theory of ANDROGOGY (adult learning) is an attempt to differentiate the way adults learn from the way children learn. A number of assumptions are made based on this theory as outlined by Cantor (1992, 36-37) and Cranton (1992, 13-14, 49):

- Adults are autonomous and self-directed
- Adults are goal oriented
- Adults are relevancy oriented (problem centered)--they need to know why they are learning something
- Adults are practical and problem-solvers
- Adults have accumulated life experiences

Kearsley summarizes what this means to instructors in practical terms: "Andragogy means that instruction for adults needs to focus more on the process and less on the content being taught. Strategies such as case studies, role playing, simulations, and self-evaluations are most useful. Instructors adopt a role of facilitator or resource rather than lecturer or grader."

### What Motivates Adult Learners?

Adults typically, have different motivations for learning than children such as those pointed out by Cantor (1992, 37-38):

- To make or maintain social relationships
- To meet external expectations--the boss says you have to upgrade skill X to keep your job
- To learn to better serve others -- managers often learn basic First Aid to protect their employees
- Professional advancement
- Escape or stimulation
- Pure interest

Instructors should be aware of the possible motivations behind their students' enrollment. Then they can better shape the instructional materials.

### What Are the Barriers to Adult Learning?

Cantor also points out the adults have different barriers than children on their way to learning. Some of these potential barriers might include (1992, 39):

- Many other responsibilities (such as families, careers, and social commitments)
- Lack of time
- Lack of money
- Lack of child care
- Scheduling problems
- Transportation problems

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- Insufficient confidence
- Having to learn, if told by boss, but not interested or ready

### Differences Between Men's and Women's Learning Styles

Not only do adults have different learning styles than children, but men and women do not approach the world of thinking in quite the same way either! In 1968, William Perry did a study of male undergraduate New England college students. From this study he determined that young men pass through a developmental sequence in their thinking modes. Perry isolated nine stages in the sequence, but in outline the stages form the following pattern (Bodi 1988; Cranton 1992, 47; McNeer 1991):

1. Male students see the world as black/white, right/wrong. They are convinced there is one right answer.
2. Male students see there is diversity of opinion, but feel that authorities that describe diversity are poorly qualified, or just exercising students so students will be forced to find the right answer themselves.
3. Male students begin to feel that diversity is temporary. They feel that maybe the right answer just hasn't been found yet.
4. Male students understand that diversity is a legitimate state, but they would still prefer to know what is right.
5. Male students see that everyone has a right to his or her own opinion.
6. Finally, the male student develops a personal commitment to the relativistic world.

Nearly 20 years later, Belenky et al. wondered how women fit into this "male" scale (if at all). In their 1986 study they discovered that women indeed do have different "ways of knowing." Unlike Perry developmental stages, Belenky et al. chose not to describe the way women think in a staged sequence, although women do move from one style of thinking to others as they mature and gain life experience. In outline, Belenky et al. found that women have the following possible "ways of knowing."

1. Silence: women students feel mindless and voiceless, subject to whims of external authority
2. Received knowledge: women students feel they can receive knowledge, but not create it
3. Subjective knowledge: truth and knowledge are private and subjectively known or intuited
4. Procedural knowledge: women students are invested in learning and applying objective procedures for obtaining and communicating knowledge
5. Constructed knowledge: women students view knowledge as contextual and can create knowledge found objectively or subjectively

With those two thinking structures in the background, let's turn to some specific theories on learning styles that have come out of writings in education and psychology.

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## LEARNING STYLE PREFERENCES

Litzyger & Osif describe learning styles as "the different ways in which children and adults think and learn (1992, 73)." They see that each of us develops a preferred and consistent set of behaviors or approaches to learning. In order to better understand the learning process, they break it down into several processes:

1. Cognition--how one acquires knowledge
2. Conceptualization--how one processes information. There are those who are always looking for connections among unrelated events. Meanwhile for others, each event triggers a multitude of new ideas.
3. Affective--people's motivation, decision making styles, values and emotional preferences will also help to define their learning styles.

A number of people have tried to catalogue the ranges of learning styles in more detail than this. Kolb is perhaps one of the best known and his thinking is outlined below.

### Kolb's Theory of Learning Styles

First Kolb showed that learning styles could be seen on a continuum running from:

1. Concrete experience: being involved in a new experience
2. Reflective observation: watching others or developing observations about own experience
3. Abstract conceptualization: creating theories to explain observations
4. Active experimentation: using theories to solve problems, make decisions

Hartman (1995) took Kolb's learning styles and gave examples of how one might teach to each them:

1. For the concrete experiencer--offer laboratories, field work, observations or trigger films
2. For the reflective observer--use logs, journals or brainstorming
3. For the abstract conceptualizer--lectures, papers and analogies work well
4. For the active experimenter--offer simulations, case studies and homework

Although Kolb thought of these learning styles as a continuum that one moves through over time, usually people come to prefer, and rely on, one style above the others. And it is these main styles that instructors need to be aware of when creating instructional materials.

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**LEARNING STYLES STRATEGIES**

There are many ways to help students understand and build on their learning style. After identifying the student's learning style(s), discuss the style with the student and inform them of some of the ways to enhance learning. The following chart contains suggestions to assist students in understanding their learning style and activities to enhance learning:

<b>Sound Preference</b>	<b>Recommendations</b>
No Sound	Provide a "silence zone" where student can concentrate.
Needs Sound	Provide background music, preferably classical baroque music.
<b>Light Preference</b>	<b>Recommendations</b>
Low Light	Permit study with soft lights.
Bright Light	Bright Light Provide extra illumination. For some who need bright light, artificial light is preferred. Others may need natural light. Those who need natural light can be aided by using full spectrum light bulbs.
<b>Temperature Preference</b>	<b>Recommendations</b>
Cool	Permit student to work in cooler sections of the classroom.
Warm	Warm Permit student to work in warmer sections of classroom or let student wear a sweater or extra clothing.
<b>Design Preference</b>	<b>Recommendations</b>
Formal	Provide a straight chair and a hard surface for books & papers.
Informal	Permit student to study on the floor, couch, easy chair or a beanbag.
<b>Sociological Preference</b>	<b>Recommendations</b>
Alone	Allow student to work alone.
Authority	Provide frequent interaction and direction with authority figure.
Peer	Allow students to work with a peer or group. Check periodically to make sure that the students are on task.

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<b>Structure Preference</b>	<b>Recommendations</b>
Needs More	Go over assignment directions and map out a plan for work completion. Periodically check progress.
Needs Little	Permit choice and options and establish flexible time limits.
<b>Responsible</b>	<b>Recommendations</b>
Is Not	Provide short assignments; check work often. Explain why what you want the student to do is important to you. Speak collegially, rather than authoritatively. Give choices.
Is	Be specific; permit self-pacing & self-checking. Provide feedback as needed.
<b>Persistence</b>	<b>Recommendations</b>
Is Not	Allow frequent breaks during concentration periods.
Is	Provide uninterrupted work or leisure-reading periods.
<b>Motivation Preference</b>	<b>Recommendations</b>
Teacher	Explain how good work will please the teacher. If necessary, interact with teacher to get assignments.
Parent	Needs praise and feedback from supervising parent figure.
Self	Permit self-pacing and self-checking. Provide a variety of instructional resources.
Is Not	Establish specific, attainable short-term goals. Provide frequent praise & feedback. Help the student understand how assignment applies to own life.
<b>Perceptual Preference</b>	<b>Recommendations</b>
Visual	Must see what they are trying to remember. List assignments; provide written directions. When appropriate, use pictures & videos to help understanding.
Auditory	Provide tape-recorded books. Tape record

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	spelling list, first pronouncing the word, then pausing to let the learner write it down and finally providing the correct spelling. Emphasize phonics and linguistic reading approaches. Encourage student to talk through problems.
Tactual	Get hands involved in learning. Use materials like Flip Charts, Task Cards, Electro-boards, Pick and Answer, puzzles, and paper letters and numerals. Permit frequent use of the chalkboard, flannel board, magnetic board, typewriter and computer.
Kinesthetic	Kinesthetic Get the whole body involved in learning. To improve spelling, have the student make the letters with his/her body; provide cardboard squares or letters for student to walk on while spelling each letter. Have learner act out scenes. Use rhythm & rap to memorize formulas, lists and processes. Put gestures to stages or lists to be committed to memory. Allow learner to walk or rock while reading. Discuss or verbalize lists while shooting basketball, jumping rope, etc.
<b>Intake Preference</b>	<b>Recommendations</b>
Does Not Require	Permit student to choose their own snack time if they wish.
Does Require	Keep on hand nutritious snacks & liquids; allow frequent snack breaks.
<b>Mobility Preference</b>	<b>Recommendations</b>
Does Not Require	Allow to remain stationary while concentrating.
Does Require	Allow undisruptive movement.
<b>Time Preference</b>	<b>Recommendations</b>
Morning	Get difficult work done in the morning. Have important information sharing in the a.m.
Afternoon	Allow difficult work to be performed in the afternoon. Share important information during the afternoon.
Evening	Let work be done after 6:00 p.m. Share important information at night.

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## TEACHING STYLES

Teachers can influence style changes in students by modeling many styles themselves. By using probing questions, teachers can supply stimulation for cognitive development. Two helpful questions are "What did you learn?" and "Will you tell me about what you read?" Both allow students to use their preferred cognitive and affective style modes, which create a feeling of success without focusing on the RIGHT answers. Teachers can also probe to bring out main ideas, key concepts, etc. We must remember that we tend to teach the way we learn. It is interesting to note that teachers tend to choose areas of teaching based on their personal learning proclivities: abstract, sequential, analytical learners tend to teach math and science. Everyone needs to know his or her learning style, realizing that it may change over time and even during daily interactions. Consider how differently you would give directions to the nearest hospital if asked by: (1) a man with a pregnant woman in the car; (2) an inebriated adolescent; or (3) a person who speaks very little English. The goal is to have both teacher and student become aware of their learning style so they can continuously adjust, adapt or modify as necessary for maximum learning.

In teaching students to learn, we must first give them information about their basic learning characteristics and make them aware that it is possible to teach oneself. This can enable students to feel more in control of their destinies. Teachers should have a variety of teaching styles from which to draw, and they should be based on both content and skill objectives of the lesson. By using variety, teachers provide a model of flexibility for students. One of the contributions of learning style research is to help educators realize that all people possess ways to learn despite their ability level. We have to realize that there is no right or wrong way to learn, but there are styles that are more appropriate for some than for others. It is true that in our society, reflective, abstract, sequential thinking seems to be favored for most school tasks and prestigious jobs, but we all possess latent learning styles that are not used until a situation demands them.

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## TEACHING STYLES STRATEGIES

One common complaint about the modern educational system is that it is based on the assumption that everyone has the same learning style. If you are a teacher, knowing whether a student is a conceptual thinker (intuitive) or a concrete thinker (sensing) may mean the difference between success or failure in reaching that person. (\* Deluxe Personality)

The ARCS model, developed by Keller, an American researcher (Keller 1987), is an acronym for **Attention, Relevance, Confidence and Satisfaction**.

**Attention:** This is the need to arouse and sustain both the learner's curiosity and perceptual arousal. For example, this can be done by starting the lesson with an alarming statistic.

The teacher must ask themselves questions. How can I provide novelty and surprise? How can I stimulate curiosity? How are my students motivated? The teacher needs to provide a range of methods and media to vary the presentation and meet the needs and learning styles of a mixed audience.

**Relevance:** Instruction needs to relate to the learner's needs. Make the lessons familiar, goal oriented and motive matching. The teacher needs to make the objectives and purposes of the lesson as clear as possible, and match them to the audience's needs and motives. This may mean reshaping the curriculum in order to make the content meaningful and understandable, clearly relating to the students' backgrounds and knowledge.

**Confidence:** Learner's challenges need to match to learner's capabilities. The student must have an expectation for success. Make the challenge for varying skill levels, provide feedback to the student, and promote an internal sense of control.

**Satisfaction:** This implies both intrinsic and extrinsic rewards, including equity, or the use of fair and consistent evaluation standards. When planning lessons, make use of newly gained knowledge or skills. Provide positive feedback to sustain the desired behavior. (\*J.M. Keller <http://ouray.cudenver.edu/~nflrjeun/ARCS.html>)

The ARCS model can be used as the starting point to produce a checklist and then to evaluate the tasks that were set, and find out what features make them more or less motivating. (\* Reshaping the Curriculum: The role of motivation)

### Factors that Affect Learning

The time of day affects learning in 70% of the population. Any time (morning, afternoon, or evening) is going to be the wrong time of day for 23% of the class. Motivation, math scores, etc. are all affected by time. The Time Profile, a 15-statement energy level chart taken from Rita Dunn's "How to Raise Independent and

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Professionally Successful Daughters," may be used to determine a good match between time of day and best concentration. The profile is helpful in personal planning, matching people for teamwork, and offering education in the evening for students who can benefit from it.

Sound, light, temperature, design, motivation, persistence, responsibility, structure, intake, time, mobility, perceptual strength or modality, and sociological and psychological factors affect learning styles. Most special needs students are tactual/kinesthetic and visual/spatial learners. It is recommended that teachers use more symbols, pictures, and illustrations with these students.

- **Sound:** Total quiet is not everyone's style. Twenty percent need sound to concentrate (Pizzo study), e.g. tapping pencil or foot, smacking gum, humming, listening to the radio or TV. Make rules to allow for individuals' learning styles, i.e., (Rule 1: You must not disturb others). Some people can mentally block out noise (sound) without aids. Others benefit from "white noise." For those who need quiet, consider soft earplugs, earphones or ear protectors (OSHA type).
- **Light:** Some need bright, some need dim. Traditional bright light over the left shoulder is not necessary for learning. Do not impose bright light upon all students. Many read, study, and learn better in dim light. Dim light does not "hurt" eyes. Therefore, try normal daylight (low light for remedial readers). Let students choose their own light when possible. Some may choose to work in carrels without lights turned on. Try using colored transparency overlays, colored lenses, etc. Fluorescent lighting tends to make learning more difficult for some learners.
- **Temperature:** Some students are cool, others warm, some are just right. Look at the way students dress for the classroom. What temperature is necessary for concentration? Have the student dress appropriately for them; some may need to carry a sweater or jacket to be comfortable in air-conditioned rooms. The center of the classroom tends to be warmer. Try having fans in the classroom so students who are warmer can sit in front of the fans. If the temperature is not right, the student cannot concentrate, and therefore learning will not take place.
- **Design:** Formal versus informal. Take a look at your classroom; chairs are exactly the same size, students are not. Some students have their knees in their face and others cannot reach the floor. Ten percent of students need informal design and the need increases with adolescence. The need may be higher for vocational education students (and adult learners). Seventy percent of special needs students need informal design. In addition to desks, let students

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choose rather to sit at tables, chairs or even on the floor. (Remember the rule - do not disturb others)

- **Motivation:** Interest and motivation will offset any elements of learning style.
- **Persistence:** This is the only element related to IQ. When given choices about how the task can be done, many students do better and understand the material. The more learning style elements are met, the more time-on-task will increase.
- **Responsibility:** The desire to do what they should do. Many of our students are non-conforming. Try the following hints: (1) Explain why the task is important. (2) Talk to the student as an adult. (3) Give the student choices about how the task is to be done.
- **Structure:** Many students hate "wasting time" on structure details. They are ready to get to work. On the other hand, some students cannot start an assignment without sufficient structure. They may ask many questions, even after the instructor has informed them of the assignment. As a teacher, you may have to set deadlines for students so they can stay on task and not procrastinate.
- **Sociological:** Sixty seven percent of teachers are affected. Students perform better when allowed sociological preference. Many students do well alone. Most gifted students do well alone but can work cooperatively with true peers.

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### Cooperative Learning

There are three types of cooperative learning. These are:

1. TACTUAL/KINESTHETIC: Example: A baby...touch, feel, taste.
2. VISUAL (two types):  
 Visual Print = sees 5  
 Visual Spatial = \*\*\*\*\*  
 Most special needs students are tactual/kinesthetic and visual/spatial learners. Use more symbols, pictures, and illustrations with them. Special needs students like to draw on chalkboard and do projects (drawing, etc.) to show understanding.
3. AUDITORY: Female infants remember (recognize) voices earlier than boys, develop vocabulary, and do better in school since schools are auditory (lectures, talking). Boys tend to have trouble with sound differential (phonics). Note: Females also intuit better; therefore, study for tests with a female.

### Multi-Modal

Some people are multi-modal.

### Intake

Sixty percent need nibbling. The need increases during adolescence. The student can use this knowledge for homework if not allowed in school. For exams in school, the teacher might bend the rules and allow these students to suck on hard candy, which is quiet and not messy.

### Mobility

Build mobility into the classroom. Some people (especially kinesthetic students) need to move. (Cannot be still for long. Let students work at different stations. Let students stand. Strongly kinesthetic students can read and write while walking. Some students need to pace, i.e. walk up and down (can do this with homework if not permitted at school).

### Time

You can use the Time Profile, which is a 15-statement energy level chart taken from Rita Dunn's "How to Raise Independent and Professionally Successful Daughters." It concerns time of day and best concentration. It says a lot about personal planning, matching people for teamwork, and about offering education in the evening and who can benefit from it.

### Modality

Modality is the hardest to deal with. One way for the teacher to start using more modality is to take curriculum lesson plans and examine them according to tactual/kinesthetic, visual, and auditory. Analyze and apply additional modality where holes are. Expand curriculum to include more modalities: e.g. global/analytic, small groups, options for task completion, and more illustrations.

We have known for some time that the left side of the brain is primarily responsible for verbal behavior. However, in the zeal to ensure mastery of reading skills, schools have focused on the use of narrowly prescribed approaches to reading (skill management and code emphasis systems) that suit the analytic and logical processing mode of the left hemisphere. We are now aware that right hemisphere input helps children focus on the holistic aspects of reading; right hemisphere input also complements their preferred use of the processing mode of the right hemisphere.

The dominant processing style of the right side of the brain is holistic, intuitive, visual/spatial. It excels in the perception of configurational information (information represented through flow charts, time lines, graphs, semantic maps, etc.) The right side of the brain also indicates superiority in many tasks requiring the use of tactile, kinesthetic and auditory modalities, the creation of imagery and creativity, and the tuning of one's emotional state. Learners who prefer to see and feel the "big picture" rather than the details, can be unintentionally discriminated against in our reading classes. The processing mode of the left hemisphere is essentially what many

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teachers require of children during reading time, and why one school principal conceived of school as being "left-brained." When children are urged to sound it out, to tell the literal meaning of what they have read, asked to look up words in the dictionary, or to analyze sentence parts to figure out an exact meaning, they activate the logical, computer-like left hemisphere.

In very young children, each hemisphere appears to be equally developed in language and speech functioning. By the time youngsters reach school age, the left side begins to dominate for language processing, a distinction nurtured by most part to whole reading practices. Studies reveal that reflective children prefer a left hemispheric, analytic cognitive style, while impulsive children used a right hemispheric, global cognitive style for differing thinking tasks. Data suggests that impulsive children were found more frequently in the lower socioeconomic group, and that relational thinkers are largely urban, inner-city Black children, who prefer a global, holistic mode of problem-solving.

Following is a list of general characteristics of analytic (left brain) and global (right brain) individuals that should be considered when planning/delivering instruction:

**Analytic (Left Brain)**

No sound  
 Bright light  
 Formal design  
 Words  
 Verbal  
 Respond to word meaning  
 No intake  
 Plan ahead  
 Recall facts and dates  
 Sequential  
 Process information  
 Outlines well  
 Respond to logical appeal  
 Trust logical appeal  
 Tidy and organized  
 Punctual: time conscious  
 Recall people's names  
 Speak with few gestures  
 Reflective

**Global (Right Brain)**

Music/Sound  
 Low light  
 Informal design  
 Pictures, symbols, illustrations  
 Nonverbal  
 Respond to word pitch, feeling  
 Intake  
 Spontaneous  
 Recall images and patterns  
 Random  
 Process in chunks  
 Ties everything at the end  
 Respond to emotional appeal  
 Trust gut reaction and intuition  
 Disorganized  
 Random: late to meetings  
 Recall people's faces  
 Gestures often  
 Impulsive

The reflective student needs time to think things through. To control the impulsive and give the reflective more time, wait before asking for a response.

The global student is more likely to have poor reading, spelling, computational skills and study habits. Written work tends to be

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bizarre, but often creative. They generally have lower self-esteem and tend not to score well on IQ and standardized achievement tests. (\*SAIL NEWSLETTER, Sept. 28, 1990)

The following are several suggestions that do not require specialized techniques or training, to aid in teaching the global learner:

1. Use pictures and objects. This will tie the use of language to non-verbal experiences.
2. Use drama, pantomime, music, art and construction projects from which activities can be developed. This helps the student associate the meanings of new words with the actual lived experience. Rather than continue to provide poor readers with remedial training requiring left-hemisphere processing, involve them in right hemisphere activities that will give them a sense of success. Make lessons real!
3. Use configurational materials such as flow charts, time lines, graphs, semantic maps and word boundary clues to aid the right side of the brain in the holistic perception of the content to be learned. Something as simple as an outline of the lecture can help by providing structure.
4. Use tactual stimulation and kinesthetic movement for students whose learning styles prohibit them from learning words through normal visual and auditory means.
5. Involve the student in the use of imagery and visual strategies that allow the right brain to simultaneously recall, all at a time, a mental picture from an assignment.
6. Present overviews to lessons and units, stressing the main ideas.
7. Use open-ended questions and assignments.
8. Teach globals to use devices that make the activity more acceptable to them. (i.e., tapes for visuals)
9. Allow globals to take breaks, and provide short-term assignments.
10. Provide small group activities. Globals usually like to learn in groups.

While most functions of the left hemisphere are concerned with convergent production (getting the right answer), functions of the right hemisphere are principally involved with divergent production, which involves imagery, the vehicle through which creativity occurs. We must remember that we tend to teach the way we learn. It is interesting to note that teachers tend to choose areas of teaching based on their personal leaning proclivities. Abstract, sequential, analytical learners tend to teach math and science. Teachers should have a variety of teaching styles from which to draw and they should be based on both content and skill objective of the lesson. By using variety, teachers provide a model of flexibility for students. One of the contributions of learning style research is to help educators realize that all people possess ways to learn despite their ability level. We have to realize that there is no right or wrong way to learn, but there are styles that are more appropriate for some than for

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others. It is true that in our society, reflective, abstract, sequential thinking seems to be favored for most school tasks and prestigious jobs, yet we all possess latent learning styles that are not used until a situation demands them.

Encourage students to discuss their learning styles with their academic and vocational instructors, or plan regular meetings with instructors to discuss student progress and needs. Once the student and instructor understand the individual's learning style, the student usually finds it easier to learn.

If students are auditory, have them read into a tape recorder and listen to what they recorded. If they are visual, have them refer to books with many illustrations on the subject, draw charts, and take notes in class. If they are tactual, encourage the student to handle and examine subject materials and to take notes and rewrite them in condensed form.

Prescriptions should be developed based on the student's learning style. ALL students should use a variety of materials/media that match their learning style, throughout their program.

### Active versus Reflective Learners

- Active learners tend to retain and understand information best by doing something active with it--discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first.
- "Let's try it out and see how it works" is an active learner's phrase; "Let's think it through first" is the reflective learner's response.
- Active learners tend to like group work more than reflective learners, who prefer working alone.
- Sitting through lectures without getting to do anything physical but take notes is hard for both learning types, but particularly hard for active learners.

Everybody is active sometimes and reflective sometimes. Your preference for one category or the other may be strong, moderate, or mild. A balance of the two is desirable. If you always act before reflecting you can jump into things prematurely and get into trouble, while if you spend too much time reflecting you may never get anything done.

### How Can Active Learners Help Themselves?

If you are an active learner in a class that allows little or no class time for discussion or problem-solving activities, you should try to compensate for these lacks when you study. Study in a group in which the members take turns explaining different topics to each other. Work with others to guess what you will be asked on the next test and figure out how you will answer. You will always retain information better if you find ways to do something with it.

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### How Can Reflective Learners Help Themselves?

If you are a reflective learner in a class that allows little or not class time for thinking about new information, you should try to compensate for this lack when you study. Don't simply read or memorize the material; stop periodically to review what you have read and to think of possible questions or applications. You might find it helpful to write short summaries of readings or class notes in your own words. Doing so may take extra time but will enable you to retain the material more effectively.

### Sensing and Intuitive Learners

Sensing learners tend to like learning facts, intuitive learners often prefer discovering possibilities and relationships.

- Sensors often like solving problems by well-established methods and dislike complications and surprises; intuitors like innovation and dislike repetition. Sensors are more likely than intuitors to resent being tested on material that has not been explicitly covered in class.
- Sensors tend to be patient with details and good at memorizing facts and doing hands-on (laboratory) work; intuitors may be better at grasping new concepts and are often more comfortable than sensors with abstractions and mathematical formulations.
- Sensors tend to be more practical and careful than intuitors; intuitors tend to work faster and to be more innovative than sensors.
- Sensors don't like courses that have no apparent connection to the real world; intuitors don't like "plug-and-chug" courses that involve a lot of memorization and routine calculations.

*Everybody is sensing sometimes and intuitive sometimes.* Your preference for one or the other may be strong, moderate, or mild. To be effective as a learner and problem solver, you need to be able to function both ways. If you overemphasize intuition, you may miss important details or make careless mistakes in calculations or hands-on work; if you overemphasize sensing, you may rely too much on memorization and familiar methods and not concentrate enough on understanding and innovative thinking.

### How can sensing learners help themselves?

Sensors remember and understand information best if they can see how it connects to the real world. If you are in a class where most of the material is abstract and theoretical, you may have difficulty. Ask your instructor for specific examples of concepts and procedures, and find out how the concepts apply in practice. If the teacher does not provide enough specifics, try to find some in your course text or other references or by brainstorming with friends or classmates.

### How can intuitive learners help themselves?

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Many college lecture classes are aimed at intuitors. However, if you are an intuitor and you happen to be in a class that deals primarily with memorization and rote substitution in formulas, you may have trouble with boredom. Ask your instructor for interpretations or theories that link the facts, or try to find the connections yourself. You may also be prone to careless mistakes on test because you are impatient with details and don't like repetition (as in checking your completed solutions). Take time to read the entire question before you start answering and be sure to check your results

### Visual and Verbal Learners

Visual learners remember best what they see--pictures, diagrams, flow charts, time lines, films, and demonstrations. Verbal learners get more out of words--written and spoken explanations. Everyone learns more when information is presented both visually and verbally.

In most college classes very little visual information is presented: students mainly listen to lectures and read material written on chalkboards and in textbooks and handouts. Unfortunately, most people are visual learners, which means that most students do not get nearly as much as they would if more visual presentation were used in class. Good learners are capable of processing information presented either visually or verbally.

### How Can Visual Learners Help Themselves?

If you are a visual learner, try to find diagrams, sketches, schematics, photographs, flow charts, or any other visual representation of course material that is predominantly verbal. Ask your instructor, consult reference books, and see if any videotapes or CD-ROM displays of the course material are available. Prepare a concept map by listing key points, enclosing them in boxes or circles, and drawing lines with arrows between concepts to show connections. Color-code your notes with a highlighter so that everything relating to one topic is the same color.

### How Can Verbal Learners Help Themselves?

Write summaries or outlines of course material in your own words. Working in groups can be particularly effective: you gain understanding of material by hearing classmates' explanations and you learn even more when you do the explaining.

### Sequential and Global Learners

- Sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one. Global learners tend to learn in large jumps, absorbing material almost randomly without seeing connections, and then suddenly "getting it."
- Sequential learners tend to follow logical stepwise paths in finding solutions; global learners may be able to solve

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complex problems quickly or put things together in novel ways once they have grasped the big picture, but they may have difficulty explaining how they did it.

Many people who read this description may conclude incorrectly that they are global, since everyone has experienced bewilderment followed by a sudden flash of understanding. What makes you global or not is what happens before the light bulb goes on. Sequential learners may not fully understand the material but they can nevertheless do something with it (like solve the homework problems or pass the test) since the pieces they have absorbed are logically connected. Strongly global learners who lack good sequential thinking abilities, on the other hand, may have serious difficulties until they have the big picture. Even after they have it, they may be fuzzy about the details of the subject, while sequential learners may know a lot about specific aspects of a subject but may have trouble relating them to different aspects of the same subject or to different subjects.

### **How Can Sequential Learners Help Themselves?**

Most college courses are taught in a sequential manner. However, if you are a sequential learner and you have an instructor who jumps around from topic to topic or skips steps, you may have difficulty following and remembering. Ask the instructor to fill in the skipped steps, or fill them in yourself by consulting references. When you are studying, take the time to outline the lecture material for yourself in logical order. In the long run doing so will save you time. You might also try to strengthen your global thinking skills by relating each new topic you study to things you already know. The more you can do so, the deeper your understanding of the topic is likely to be.

### **How Can Global Learners Help Themselves?**

If you are a global learner, it can be helpful for you to realize that you need the big picture of a subject before you can master details. If your instructor plunges directly into new topics without bothering to explain how they relate to what you already know, it can cause problems for you. Fortunately, there are steps you can take that may help you get the big picture more rapidly. Before you begin to study the first section of a chapter in a text, skim through the entire chapter to get an overview. Doing so may be time-consuming initially but it may save you from going over and over individual parts later. Instead of spending a short time on every subject every night, you might find it more productive to immerse yourself in individual subjects for large blocks. Try to relate the subject to things you already know, either by asking the instructor to help you see connections or by consulting references. Above all, don't lose faith in yourself; you will eventually understand the new material, and once you do your understanding of how it connects to other topics and disciplines may enable you to apply it in ways that most sequential thinkers would never dream of.

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Taken from: Richard M. Felder, Hoechst Celanese Professor of Chemical Engineering North Carolina State University; and Barbara A. Soloman, Coordinator of Advising, First Year College North Carolina State University.

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**POST-TEST**

1. Can a student's learning style change?
2. What external factors affect learning?
3. What do the letters VAK represent in reference to adult learning styles?
4. List three of the five assertions that constitute the concept of androgogy (adult learning versus children's learning).
5. The Myers-Briggs Indicators introduced the development of learning styles based on what?
6. The Multiple Intelligences theory is based on seven different ways of learning. Major emphasis is placed on which two?
7. The 4MAT system is based on left and right brain hemisphere learning. What are the four major learning styles of the 4MAT system.
8. List three reasons for using an LSI – Learning Styles Inventory.
9. List three ways that make adult learners different for kids.
10. List two ways that Visual Learners can help themselves learn.

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## REFERENCES

Using the 4MAT System to Bring Learning Styles to Schools  
McCarthy, Bernice. October 1990.

Programs for Special Needs, IMTS Program Guide. State of Florida,  
Department of Education, Tallahassee, FL 1983.

System for Applied Individual Learning, SPECIAL NEWSLETTER,  
Learning Styles and the SAIL/IMTS Program. The University of West  
Florida, September 28, 1990.

Selecting Teaching Methods based on Student's Learning Styles.  
Thompson, Mary J. Division of Workforce Development, Florida  
Department of Education. Tallahassee, FL.

J.M. Keller, <http://ouray.cudenver.edu/~nflejeun/ARCS.html>

Skeptics Dictionary: the Myers-Briggs Type Indicator,  
[wysiwyg://26/http://skepdic.com/myersb.html](http://wysiwyg://26/http://skepdic.com/myersb.html)

The DDLI Support Page,  
<http://www.geocities.com/SiliconValley/Vista/8405/ddli.html>

Myers/Briggs Temperament Indicator,  
[wysiwyg://19/http://elvis.rowan.edu/~cusumano/MBTest.html](http://wysiwyg://19/http://elvis.rowan.edu/~cusumano/MBTest.html)

Learning Styles, University of Central Florida,  
<http://reach.ucf.edu/~fctl/research/lis.html>

From Learning Style to Teaching Styles,  
[http://utenti.tripod.it/learning\\_p.Questionnaires.Teachstylequest.htm](http://utenti.tripod.it/learning_p.Questionnaires.Teachstylequest.htm)

Personality Types - Learning Styles,  
<http://www.dougdean.com/learningstyles/index.cfm>

Brain-Dominance Questionnaire,  
[http://utenti.tripod.it/learning\\_paths/Questionnaires/Lrquest.htm](http://utenti.tripod.it/learning_paths/Questionnaires/Lrquest.htm)

Howard Gardner (1993) Frames of Mind: The theory of multiple  
intelligences (10<sup>th</sup> Anniversary edition). New York: Basic Books

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Leslie Shelton, Joan Sheldon Conan, and Holly Fulghum-Nutters (1992) Honoring Diversity: A Multidimensional Learning Model for Adults Sacramento, CA, California State Library Foundation.

The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development (5<sup>th</sup> edition) Malcolm S. Knowles (Gulf Publishing, Houston, Texas 1998)

Adult Education in a Multicultural Society. Beverly Cassara (ed). 1994

The Complete Guide to the Learning Styles Inservice System Rita S. Dunn, Kenneth J. Dunn

Handbook of Adult and Continuing Education Sharan B. Merriam & Phyllis M. Cunningham, editors, 1999

How to Implement and Supervise a Learning Style Program Rita Dunn, 1996

The Making of an Adult Educator Malcolm S. Knowles. 1989

The Profession and Practice of Adult Education: An Introduction Sharan B. Merriam, Ralph G. Brockett (Contributor) Jossey-Bass. 1996

Teaching & Learning Through Multiple Intelligences Bruce Campbell, Dee Dickinson, Linda E. Campbell. 1996

Thinking Styles. Robert J. Sternberg. 1997

### **Articles about Learning Styles**

Educational Resource Information Center (ERIC)

Applying Learning Styles Research to Improve Writing Processes. Nathan B. Jones ED400791

Learning Styles and the Classroom. Arthur J. More ED468479

Learning Styles. ED323249

Learning Styles: A review of the literature. Linda Swanson ED387067

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Learning Styles: Implications for Curriculum and Instruction.  
Harley J. Ast. ED302280

The Importance of Learning Styles: Understanding the  
Implications for Learning. Course Design, and Education.  
Contributions to the Study of Education No. 64 Ronald R. Sims,  
Serbrenia J. Sims (ed). ED386130

### Websites about Learning Styles

[http://www.learnativity.com/learning\\_styles.html](http://www.learnativity.com/learning_styles.html)

<http://agelesslearner.com/intros/adultlearning.html>

### References on Andragogy

Knowles, M. (1975). Self-Directed Learning. Chicago: Follet.

Knowles, M. (1984). The Adult Learner: A Neglected Species (3rd Ed.). Houston, TX: Gulf Publishing.

Knowles, M. (1984). Andragogy in Action. San Francisco: Jossey-Bass.

### Relevant Web Sites on Andragogy

[www.nl.edu/academics/cas/ace/resources/malcolmknowles.cfm](http://www.nl.edu/academics/cas/ace/resources/malcolmknowles.cfm)

[www.infed.org/thinkers/et-knowl.htm](http://www.infed.org/thinkers/et-knowl.htm)

[www.newhorizons.org/future/Creating\\_the\\_Future/cfut\\_knowles.html](http://www.newhorizons.org/future/Creating_the_Future/cfut_knowles.html)

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**APPENDIX A**

**PRETEST ANSWERS**

1. Learning style is a consistent pattern of behavior that determines how an individual can concentrate, absorb, or retain new or different information or skills.
2. Auditory, Visual, Kinesthetic-Tactile
3. No one style is preferred. No one type is better or worse than any other type
4. So that instruction may be geared toward meeting the individual learning needs of each student. This allows the instructor to gear teaching styles to the learning styles of the students.
5. VPI instruction is individualized in reference to the student needs, learning style, diagnostic, and prescriptive information.
6. Determine your own style. Instructors often tend to use the way they learn in their approach of teaching others.
7. Differences in any of the following aspects (listing 3)
  - Motivation
  - Control
  - Interests
  - Willingness to learn
  - Persistence
  - Responsibility
  - Sociability
8. True
9. Barriers (listing 3)
  - Many other responsibilities
  - Lack of time
  - Lack of money
  - Lack of childcare
  - Scheduling problems
  - Transportation problems
  - Insufficient confidence
  - "Having" to learn, if told by boss, but not interested or ready

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10. Aspects that motivate adult learners (list three)

- To meet external expectations (boss states that you must upgrade to keep job)
- To make or maintain social relationships
- Pure interest
- Learn to better serve others – learning First Aid to protect others
- Professional advancement

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**APPENDIX B**  
**POST-TEST ANSWERS**

1. Yes, with age, maturity and life experiences
2. Sound, Light, Design, Sociological, Structure, Persistence, Motivation, Perceptual, Intake, Mobility, Time
3. Visual, Auditory, Kinesthetic
4. Self Concept, Experience, Readiness to Learn, Orientation to Learning, Motivation
5. Personality Types
6. Logical/Mathematical and Verbal/Linguistic
7. Imaginative, Analytic, Common Sense, Dynamic
8. Any three of the following:
  - Identifies preferred learning style
  - Emphasizes the opportunities of different styles present in problem solving and decisions
  - Is used in training design
  - Offers an ice breaker in group dynamics and team building
  - Can be used in determining career path
9. Any three of the following
  - Adults are autonomous & self directed
  - Adults are goal oriented
  - Adults are relevancy oriented (problem centered). They have a need to know why they are learning something
  - Adults are practical and problem solvers
  - Adults have accumulated life experiences
10. Visual learners can self accommodate by doing any of the following:
  - Sitting up front in classes to see the board; any visuals
  - Utilize flash cards in learning material
  - Review written notes, captions in assignments, chapter introductions and summaries
  - Use charts, graphs, other visuals to enhance learning

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