

## **Online Training Supported by Learning Models Based on Multiple Intelligences and Learning Styles**

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### **New Methods to Meet New Learning Needs**

For years, instructors have presented information to learners in one format —lecture. That model has been identified as objectivist and is based on Skinner's behaviorist learning theories where the instructor sets the pace and controls the classroom. The benefit is primarily for linguistic learners.

Learners need non-lecture styles to learn effectively. They need styles with relevant interpersonal interaction, significant hands-on opportunities, well executed visual-spatial content, and more self-direction of the pace and path of learning. This is called constructivist at the K-12 level, and Andragogy at the adult level. In this model, the instructor facilitates the learning, identifies potential resources, and encourages students to set rules, goals, and objectives. This model is learner centered.

Helping people learn according to their multiple intelligences and learning styles (MI/LS) preferences is an accepted instructional strategy. Many instructional strategies have been developed, tested, and researched in distance learning programs which coupled the learning theories with a variety of technologies.

Many students intuitively learn how to learn when they realize they learn better from one resource or strategy over another. For many learners, this concept is too sophisticated or it flies in the face of the teacher authority. As children we liked to learn with hands-on methods, but the system quickly moved us to learn by listening. Parents try to help by pointing to "smart" students and suggesting that their offspring emulate the learning strategies that work for others. Following the path set by others won't work. Since we all learn differently, following the path set by others will not work.

In fact, we all learn differently. It's a wise parent and facilitative instructor who realizes this and helps the student identify their MI/LS and resources/strategies to meet it. A variety of materials at [www.TECweb.org](http://www.TECweb.org) will help determine styles.

Learners have access to a variety of instructional strategies/resources. In many cases, the learner selects the path to the strategy. The search for knowledge becomes the learner's intrinsic reward, rather than an extrinsic reward provided by external authority. This may make the learners more motivated because they find it easier to learn.

As you prepare for training sessions including e-learning and other forms of distance learning, it's important to have a basic knowledge of MI/LS and each intelligence and style is explained below. Finally a matrix shows how each type of technology meets specific MI/LS.

### **Gardner's Multiple Intelligences (MI)**

Multiple intelligences were identified by Dr. Howard Gardner a professor of education at Harvard University in "Frames of Mind" (1983). Intelligences include visual-spatial, bodily-kinesthetic, musical, inter- and intrapersonal, linguistic, logical-mathematical, naturalistic, and spiritual. It's tempting to equate learning styles and intelligences because there are similarities, but until we have a much better understanding of both, avoid mixing the models. The higher order is MI and LS adds definition to the way we use MI.

Gardner defines intelligence as "an ability or set of abilities that allow a person to solve a problem or fashion a product that is valued in one or more cultures." Gardner suggests that different intelligences may be independent abilities--a person can be low in one domain area but high in another. All of us possess the intelligences but in varying degrees of strength and skill.

Intelligence Quotient (IQ) theory (based solely on the linguistic and logical-mathematical intelligences) assumes that a person's intellectual potential is a fixed, genetically determined trait that can be measured early in life and will determine an individual's potential. Gardner's definition suggests a broad view of cognitive functioning and is in sharp contrast to intelligence as defined by IQ. In other words, Gardner's MI model broadens our perceptions of what is meant to be intelligent. The MI theory continues to show how learning can be changed so that all persons may achieve their maximum potential.

### **The Intelligences**

**Linguistic** - using words effectively. They have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words or to read books together. Tools include computers, games, multimedia, books, tape recorders, and lecture.

**Logical-Mathematical** - reasoning, calculating. Think conceptually, abstractly and are able to see and explore patterns and relationships. They like to experiment, solve puzzles, ask cosmic questions. They can be taught through logic games, investigations, and mysteries. They need to learn and form concepts before they can deal with details.

**Visual-Spatial** - think in terms of physical space, as do architects and sailors. They are very aware of their environment. They like to draw, do jigsaw puzzles, read maps, daydream. They can be taught through drawings, verbal and physical imagery. Tools include models, graphics, charts, photographs, drawings, 3-D modeling, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

**Musical-Rhythmic** - sensitive to rhythm and sound. They love music, but they are also sensitive to sounds. They may study better with music in the background. They can be taught by turning lessons into lyrics, speaking rhythmically, tapping out time. Tools include musical instruments, music, radio, stereo, CD-ROM, multimedia.

**Bodily-Kinesthetic** - use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, and touching. They communicate well through body language and can be taught through physical activity, hands-on learning, acting

out, role playing. Tools include equipment and real objects.

**Intrapersonal** - understanding one's own interests, goals. They tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners.

**Interpersonal** - understanding, interacting with others. They learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, and dialogues. Tools include the telephone, audio conferencing, time and attention from the instructor, video conferencing, writing, computer conferencing, E-mail.

**Naturalist** - demonstrates expertise in the recognition and classification of species of the environment. Value is placed on these individuals who can recognize members of a species that are especially valuable or notably dangerous and can appropriately categorize new and unfamiliar organisms.

**Existentialist** - learn in the context of where humankind stands in the "big picture" of existence. They ask "Why are we here?" and "What is our role in the world?" This intelligence is seen in the discipline of philosophy.

### **Canfield Learning Styles (LS)**

Many learning style models exist, The most well researched and easily accessible through straightforward language was defined by Dr. Albert Canfield. It reports in percentiles, and helps students and instructors understand that everyone has a different set of learning preferences. Instructors who take the Canfield instrument frequently have an "ah haaaa" experience as they realize why they haven't connected with students - their teaching style is out of phase with their students' learning styles.

Canfield divides learning styles into useful applications for e-learning. There is no one right or best LS. Our styles of learning, if accommodated, can result in improved attitudes toward learning and an increase in productivity, academic achievement, and creativity. We use some styles when learning, but we tend to prefer a small number of instructional methods. Students learn better, smarter, faster and retain more information when material is presented first in one's preferred learning style/multiple intelligence and then in their second or third preferences. By providing content in many ways, the learning experience is richer and the information is placed in many places in the brain which makes retrieval and application better.

For example, a student might have roughly the same preference for learning content through visual and hands-on materials. If the content is presented only to the visual preference, the student would not learn as completely as he/she would if the content was also presented by hands-on methods. All students learn differently due to a dominant or preferred LS.

The instrument is easy to use and self-scoring. It provides students with knowledge about their individual styles and how they differ from others. The instrument takes about 30 minutes to complete. It is important that instructors and students have the results of the instrument so that students can become more self-directed and independent in their learning activities.

### ***Conditions***

**Peer:** Working in teams; good relations with others; having friends; feeling positive about working and building something together. Clearly a high priority in an organization: Work logically and clearly organized; meaningful assignments and sequence of activities.

**Goal Setting:** Setting one's own objectives; using feedback to modify goals and procedures; making one's own decisions on objectives. This is an important element of being self-directed and proactive. They need to know how they fit in with the larger company goal.

**Competition:** Desiring comparison with others; needing to know how one is doing in relations to others. America fosters this - but competing does not automatically foster excellence. Competition is an extrinsic reward ... it is better replaced with an intrinsic reward system.

**Instructor:** Knowing the instructor personally; having mutual understanding; liking one another. Give plenty of eye contact and positive non-verbals.

**Detail:** Specific information on assignments, requirements, rules, etc. People who want minimal amounts of detail are conceptual thinkers. They need to understand the concept first ... and then will use the detailed explanation to remember the details that are important to their conceptual understanding. People who want details in a sequential order are linear thinkers. They build the details until they understand the concept.

**Independence:** Working alone and independently; determining one's own study plan; doing things for oneself.

**Authority:** Desiring discipline and maintenance of order; having informed and knowledgeable instructors and superiors.

### ***Content***

**Numeric:** Working with numbers and logic; computing; solving mathematical problems; etc. Provide with charts, spreadsheets.  
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**Qualitative:** Working with words or language; writing, editing, talking. Provide a report to them prior to a meeting or the need to make a decision. Lengthy question and answer periods will give them time to formulate the idea in their own words

**Inanimate:** Working with things; building, repairing, designing, operating. Provide a physical model or way to work with the idea in question

**People:** Working with people; interviewing, counseling, selling, helping.

### ***Mode***

**Listening:** Hearing information; lectures, tapes, and speeches.

**Reading:** Examining the written word; reading text in all media.

**Iconic:** Viewing illustrations, movies, slides, pictures, and graphs.

**Direct Experience:** Handling or performing; laboratory, field trips, practice exercises, hands-on, and simulations.

**Expectancy Score:** The predicted level of performance.

### Variance in One Class

It is useful to show a class all of the scores from the inventory as it helps them to understand that everyone learns differently and that no one way of learning is best (See Table 1). This also helps

instructors to think about the LS class mix and how to create activities and assignments that will meet a

variety of styles. It provides support for instructional designers who need to learn new ways to design

instruction for classes. Figures are shown in percentiles so that a score of 95 would indicate the 95th percentile and the learner would have a high need to have this style met. A score of 05 would indicate the fifth percentile – or a low need for the learner.

The Canfield is quite useful in e-learning as it shows scores for an instructor to provide structure, the independence level of the student, and the need for an authority figure by the student. If the student instructor percentile score is 25, this indicates a low need for an instructor to provide structure; 85 would indicate a much higher student need to have structure imposed from the outside. If the student's independence score is high, such as an 85 or 95, it indicates that the student is independent in learning and capable of working well in e-learning. A low score would indicate that the student is not an independent, self-directed learner and that the instructor will need to provide an intervention to help the student begin movement toward this goal. Students need time to move through the process of becoming independent learners.

If the student's authority figure is low, they are likely to function well in e-learning and collaborate well with other students. If the figure is high, they require an authority figure to provide the structure and set the rules. The instructor will need to provide an intervention that will reduce the student's need for authority.

These three scores are useful as indicators for the e-learning instructor of students who will do well in the environment, and those who need interventions to begin movement toward self-directed learning. It is always a temptation to want to help needy students and provide the structure and authority that they often demand in an instructor. These demands are usually another indication that the student is unable to be self-directed and independent in their learning.

**Table 1: Sample Class Learning Style Scores (All Figures are Percentiles)**

<b>Student Conditions</b>	<b>#1</b>	<b>#2</b>	<b>#3</b>	<b>#4</b>	<b>#5</b>	<b>#6</b>
Peer	65	75	88	82	47	47
Organization	20	60	30	99	99	82
Goals	45	52	35	12	15	03
Competition	75	07	37	37	05	10
Instructor	25	83	38	94	10	65
Detail	17	53	45	65	99	90

Independence	88	55	57	45	01	40
Authority	65	10	65	18	08	10
<b>Content</b>						
Numeric	72	72	52	53	22	90
Qualitative	30	40	90	60	30	30
Inanimate	30	12	55	20	90	90
People	52	62	95	14	71	05
<b>Mode</b>						
Listening	25	80	73	65	12	95
Reading	55	63	40	60	90	47
Iconic	25	25	07	80	01	08
<b>Direct</b>						
<b>Experience</b>	88	25	87	10	98	10
<b>Expectancy</b>	97	95	75	60	59	89

Table two shows the preferred learning style of the population by percent and age. Observe that the linguistic Intelligence increases with age according to Teele's (1995) research while the bodily-kinesthetic intelligence shows a reduction.

**Table 2: Teachers' Dominant Intelligences by Age (1995, Teele)**

<b>Ages:</b>	<b>20-25</b>	<b>26-35</b>	<b>36-45</b>	<b>46-55</b>	<b>56+</b>
Linguistic	3.51	3.94	4.22	4.58	4.37
Logical-Mathematical	3.07	3.13	3.06	3.26	3.41
Spatial	4.33	4.34	4.37	4.21	.15
Musical	3.17	3.36	3.33	3.38	3.33
Bodily-Kinesthetic	4.85	4.40	4.21	3.90	4.11
Intrapersonal	3.13	3.37	3.52	3.69	3.40
Interpersonal	5.80	5.43	5.27	4.95	5.08

### **Implications for Instruction**

Where do these lists of learning styles lead us? There are probably as many ways to "teach" as there are to learn. People do not see, hear, or experience the world in the same way. They have very different preferences for how, when, where and how often to learn.

Using multiple types of media (video, audio, data) ensures that all intelligences and learning styles are met and that significant methods for interaction are provided. This mix of media is available now in facilitated e-learning courses. With it all learning styles can be reached. It also includes an important component that enables students to become self-directed learners and reduce their sense of isolation.

The synergy of technologies available through e-learning based on multiple media and the Internet creates new learning opportunities for adapting learning to students intelligences and learning styles.

## **Instructional Design Matrix for Multiple Intelligences and Learning Styles Using Multiple Media**

An MI/LS instructional design matrix was designed by TEC to ensure the right mix of media to reach all learners using multiple media. The multiple intelligences and learning styles appear on the left column. The media appear at the top of the columns. If there is a medium to which you do not have access, mark through the column. Alternatively, you may be using a medium not shown here; use the "other" columns to add other media. As you do the instructional design for each element of the course or module, consider each MI/LS and use instructional methods that will reach students with all learning styles and multiple intelligences. Check off the styles as you finish the instructional design for each. The fewer blank boxes you have, the better you are meeting students' learning needs.

## Instructional Design Matrix for Multiple Intelligences and Learning Styles Using Multiple Media

<i>Multiple Intelligences</i>	Textbook	e-textbook	e-workbook	e-handout	Simulation	simulation w/others	Game	Game w/others	LMS	Internet resources	e-mail posts	Phone	Video conf.	Audio conf.	Webinar	Chat/IMing	Hands-on activities	Video scenarios	Video live satellite	Audio	Slides	CBT practice	Group work collaborate
Dr. Howard Gardner																							
Visual-Spatial	x	x			x	x	x	x					x				x	x	x	x		x	
Bodily-Kinesthetic					x	x	x	x					x		x		x					x	x
Musical-Rhythmic					x	x	x	x		x			x		x			x	x	x			
Interpersonal						x		x	x		x	x	x	x	x	x	x		x				x
Intrapersonal	x	x	x	x	x		x			x							x	x		x	x		
Linguistic	x	x	x	x							x	x	x	x	x	x		x	x	x	x	x	x
Logical-Mathematical			x		x	x	x	x	x								x					x	x
Naturalistic					x	x	x	x														x	x
Existential	x	x			x	x	x	x															
<i>Learning Styles</i>																							
Dr. Albert Canfield																							
<i>Conditions</i>																							
Peer						x		x			x	x	x	x	x	x	x	x	x				x
Goal Setting																							
Competition					x	x	x	x			x	x	x	x	x	x	x		x			x	x
Instructor									x		x	x	x	x	x	x		x					
Detail	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Independent	x	x	x	x	x		x		x	x							x	x		x	x	x	
Authority						x		x	x		x	x	x	x	x	x	x		x				x
<i>Content</i>																							
Numeric	x		x		x	x	x	x		x							x					x	
Qualitative	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Inanimate					x	x	x	x										x			x	x	
People						<b>x</b>		<b>x</b>			x	x	x	x	x	x	x		x				x
<i>Mode</i>																							
Listening					x	x	x	x				x	x	x	x			x	x	x			x
Reading	x	x	x	x	x	x	x	x	x	x	x					x	x				x	x	
Iconic					x	x	x	x										x	x		x	x	
Direct Experience					x	x	x	x									x					x	x

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### References

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