

Learning Style Awareness

A Basis For Developing Teaching and Learning Strategies

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Abstract

This research is intended to provide an overview of learning style theories and show how being aware of learning styles can benefit both teachers and students. Although a variety of learning styles currently appear in the literature, a case study involving students at the University of Louisiana indicated a prevalence of auditory learners. Despite this finding, educators must be prepared to accommodate all learning styles, even those being used by a minority of students. Our research concludes with a summary of teaching strategies applicable to a broad range of students.

According to Keefe (1991), learning is a change in learner behavior resulting from what has been experienced. Experiencing pain after touching a hot stove, for example, teaches us to be more careful in the future. Our behavior thus modified, we are said to have “learned.” Learning is more than just the sum of our life experiences, however. There are certain principles hidden deep within our minds that control the way we learn in unique ways.

Whether we wish to acknowledge them consciously, these governing principles establish our style of learning and define us as individuals. For educators, it is important to note that learning styles can be determined through direct student observation. What we discover is that learning styles function as teaching blueprints in some respects. They indicate a student’s preferred method of learning and guide the development of instructional strategies that incorporate the appropriate content and context.

Throughout history, teachers have used techniques that focus on methods of learning. Today, these techniques are being validated by an ever-increasing number of modern scientific studies (*Instructional Strategies*, 2001). As a result of this explosion of research, educators interested in producing teaching materials for their students can now look for general guidelines from accepted theories of learning. The professional literature abounds with these theories, which can be categorized as follows (Madhumita & Kumar, 1995):

1. cognitive or organizational
2. neuropsychological or neuron
3. behavior or associationist

Although this increased emphasis is welcomed, the sheer number of learning theories currently being researched has posed problems for educators simply looking to implement practical classroom strategies. Because learning theories are not mutually exclusive or necessarily complementary, educators are forced to borrow from many

different approaches. The following examples are just a few of the learning styles presently found in the literature:

- Howard Gardner (1993) of Harvard has identified seven distinct learning intelligences: *visual-spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical-mathematical*.
- Anthony Gregorc's ("Learning Styles," 2001) models describe how information is taken in (Concrete and Abstract) and how perceived information is used (Sequential and Random). When Gregorc's definitions are put together, they result in four combinations: *Concrete Sequential, Abstract Sequential, Abstract Random, and Concrete Random*.
- Kolb (1985) developed four learning modes to describe how people learn: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Most individuals learn using a combination of these learning modes. From the many possible combinations of learning modes, Kolb proposed four categories of learners: *accommodators, divergers, convergers, and assimilators*.
- Myers and Briggs adapted Carl Jung's theory of personality type, which focuses on the idea of opposite sets of characteristics in human personality (McCaulley, 1990). They created an instrument that consists of four scales representing four pairs of preferences: Extraversion (E) and Introversion (I); Sensing (S) and Intuition (N); Thinking (T) and Feeling (F); and Judging (J) and Perceiving (P). These preferences result in 16 learning types. A type is a combination of the four preferences. (e.g., ISFJ) The Myers-Briggs Type Indicator is used for assessing student learning preferences. The Keirsey Temperament Sorter (Keirsey, 2001) is based on another adaptation of Jung's theory. It is a 70-item test that can be taken and scored online.
- In her book *The Confident Student*, Kanar (1995) describes learning styles that are related to physiological factors: visual (seeing/picture), auditory (hearing), and kinesthetic (touching/physical).

Professional educators are often confused by the wealth of available information. Although most agree that learning styles exist and acknowledge the significant effect that learning styles have on the learning process, they are unable to form a consensus regarding the establishment of a single set of accepted principles. Our research focused on only three specific learning styles: visual, kinesthetic, and auditory.

Testing Instruments

The Center for New Discoveries has an online test that is immediately analyzed, and the results are presented to the person taking the test. This 36-item test uses the visual (picture), auditory (hearing), and kinesthetic (physical) styles of learning (*Learning Style Inventory*, 2001).

Another Learning Style Inventory (LSI) consists of 100 statements that elicit self-diagnostic responses (Dunn, Dunn, & Price, 1987). The data collected yield a profile of

each individual's preferred learning style. Learning style is evaluated in terms of selected elements, including the immediate environment (sound, light, temperature, design), emotionality (motivation, personality, responsibility, structure), sociological preferences (learning alone, with a colleague or adult, and/or in a variety of other ways), physiological characteristics (auditory, visual, tactual, and/or kinesthetic, time-of-day energy levels, intake, and mobility needs), and global versus analytic (determined through correlations among sound, light, design, persistence) (Dunn & Dunn, 1992, 1993).

Purpose of the Study

The purpose of our research is to assist business educators in determining the learning styles of their students and to create and implement instructional strategies designed to enhance student learning.

To do this, a study of computer science students was conducted. The objectives of this study were to:

- present an overview of learning style theories;
- provide a description of testing instruments, both online and hard-copy testing instruments;
- determine the learning styles of students in microcomputer courses;
- analyze the visual, kinesthetic, and auditory learning styles; and
- develop teaching strategies.

Procedures

After receiving permission from the university's Review of Research Involving Human Subject Committee, students in six business computer classes were given the 36-item LSI (2001) to test three different learning styles: visual (picture), kinesthetic (physical), and auditory (hearing). Each student participant gave written authorization allowing the results of his or her inventory to be used in this research.

Data Analysis

Of the 177 students taking the test, 111 were business majors, and 66 were not. Ninety-one were female, and 86 were male. There were 62 freshmen, 54 sophomores, 33 juniors, and 28 seniors.

Table 1 shows that approximately 42% were auditory learners, 25% visual, 13% kinesthetic, 10% visual/auditory, 5% kinesthetic/auditory, 3% visual/kinesthetic, and 3% visual, kinesthetic/auditory. Data show that some students scored equally in more than one style (i.e., visual/auditory, visual/kinesthetic/auditory).

Table 1. Results of Learning Style Inventory

	<i>N</i>	%
Auditory	74	42
Visual	44	25
Kinesthetic	23	13
Visual/auditory	17	10
Kinesthetic/auditory	8	5
Visual/kinesthetic	6	3
Visual/kinesthetic/auditory	5	3
Total	177	100

Table 1 results were recalculated to eliminate combined style results in Tables 2, 3, and 4. Fractions were used in cases where students scored equally in multiple styles (.5 in cases of two styles, .33 in cases of three styles.) Table 2 shows that the style with the highest percentage is auditory (50%), followed by visual (33%), and kinesthetic (17%).

Table 2. Results of Learning Style Inventory

	<i>N</i>	%
Auditory	89	50
Visual	58	33
Kinesthetic	30	17
Total	177	100

Table 3 shows the LSI results for business and non-business students. Learning styles of business students are auditory (28%), visual (23%), and kinesthetic (12%). Non-business students' learning styles are auditory (22%), visual (10%), and kinesthetic (5%).

Table 3. Results of Learning Style Inventory: Business and Non-Business Students

	Business		Non-Business		Total	%
	Students	%	Students	%		
Auditory	50	28	39	22	89	50
Visual	40	23	18	10	58	33
Kinesthetic	21	12	9	5	30	17
Total	111	63	66	37	177	100

The distribution of male and female results in Table 4 shows that the learning style with the highest percentage for males is auditory (27%), followed by visual (14%) and kinesthetic (8%). For females, the results indicate that the predominant style is auditory (24%), followed by visual (19%) and kinesthetic (8%).

Table 4. Results of Learning Style Inventory: Males and Females Students

	Male Students	%	Female Students	%	Total	%
Auditory	47	27	42	24	89	50
Visual	24	14	34	10	58	33
Kinesthetic	15	8	15	8	30	17
Total	86	49	91	51	177	100

Conclusions

A better understanding of learning styles can benefit not only educators but also their students. Students benefit by using knowledge about their particular learning style to better manage their learning. Educators benefit by developing lesson plans and materials that disseminate identical information across the spectrum of learning styles. (“When Learning,” 2001).

Information such as that supplied by the Learning Style Inventory is invaluable. The LSI is online, easy to take, provides immediate results, and supplies suggestions for improving learning. It may not provide all the answers, but it makes students aware of the learning process and may motivate them to study learning styles in greater detail.

Recommended Teaching and Learning Strategies

Although the learning style most prevalent among our research participants was auditory, other styles cannot be ignored when assessing teaching strategies.

Auditory

Background. Auditory learners enjoy listening and talking and have outgoing personalities and difficulty with written instructions. They must hear to understand and learn best by listening to an explanation (Kanar, 1995). These people do not necessarily make pictures in their minds, as do the visual learners, but rather filter incoming information through their listening and repeating skills. The auditory learner tells wonderful stories and solves problems by “talking” about them. Speech patterns will represent exactly how the auditory person thinks (e.g., “I hear you; that clicks; that sounds right; that rings a bell”). In school, the auditory learner learns by listening and can easily repeat statements back to the teacher. The auditory student likes class discussions

but can become easily distracted. Of the three styles, auditory is the most talkative (often talking to themselves) and has more difficulty writing (“When Learning,” 2001).

Strategies for teaching auditory learners. Teachers of auditory learners need to provide as much auditory stimuli as possible, such as verbal reinforcement, group activities, and class discussions. Additionally, they can use drills, have students read aloud, and let them put information into a rhythmic pattern—poem, song, or rap. Advice to auditory learners should include:

- Make tapes of class notes and then listen to them.
- Remember details by trying to “hear” previous discussions.
- Participate in class discussions.
- Ask questions and volunteer in class.
- Read assignments out loud.
- Whisper new information when alone.

Visual

Background. Visual learners have vivid imaginations, learn by seeing images, are quiet by nature, and find verbal instructions difficult. They prefer the visual sense, must see to understand, and learn best by reading and watching (Kanar, 1995). Visual learners actually think in images or pictures, as if they have a movie camera in their minds. They take in what they hear or read and translate it into images in their brains. When visual learners want to recall what they have learned, they simply glance upward and look at the images they have stored on their “picture screen.” Visual learners speak in terms of “I see; I get the picture” (“When Learning,” 2001).

In a classroom, the visual learner performs very well because all testing is conducted in a written “visual” format. This requires that visual images be made when recalling information. Good readers read the black and white text and then convert the information to pictures. This makes the memory process easier. The visual learner will easily conform to most classroom standards, such as sitting quietly, writing neatly, and organizing materials well.

Strategies for teaching visual learners. Teachers of visual learners need to provide as many visual clues as possible. Strategies include:

- Using video equipment.
- Providing assignments in writing.
- Using charts and pictures.

Teachers should use bright colors, encourage students to take notes, and draw pictures in their notes to associate with facts. Advice to visual learners should include:

- Occasionally change the color of ink in pens.
- Look at all the pictures, charts, and graphs in the textbook.

- Read all of assignment directions.
- Visualize new ideas or knowledge presented.
- Read the class topic before it is discussed in class.
- Visualize the details of what is read.

Kinesthetic

Background. Kinesthetic students prefer the tactile sense. They are poor listeners, learn by doing, express emotions physically, and have an outgoing personality. They must touch or feel to understand. They learn best by engaging in hands-on activities (Kaner, 1995). If they can touch and feel whatever they are learning about, the kinesthetic/tactile learner will process and remember the information quite well. As students in a classroom, these people are usually quite restless, have more difficulty paying attention, and “can’t seem to get focused” (a visual term). These learners like to speak about learning in terms of their feelings and say things like “I feel” or “I’d like to get a better handle on this information.”

Kinesthetic learners do not have the internal pictures of neatness and organization that visual learners make so easily in their minds. This is one of the reasons that kinesthetic learners have a more difficult time demonstrating what they know in traditional classrooms. It is normal for them not to be organized. These students often have a poor “sense” of time (“When Learning,” 2001).

Strategies for teaching kinesthetic learners. Teachers of kinesthetic/tactile learners need to provide many activities to allow students to participate in learning. They need to provide hands-on activities, provide for physical movement within the classroom, and encourage note taking. If possible, they should provide stories filled with action. Students should also be advised to summarize daily activities in their notes as a study aid.

Advice to kinesthetic learners should include:

- Learn by doing, touching, or practicing.
- Write notes to help remember things.
- Take notes during lectures and discussions.
- Underline important information in the textbook.
- Take frequent breaks where you stand up and stretch.
- Draw pictures of what is learned.
- Build projects to help explain ideas.

In addition to these strategies, the following general guidelines make for good teaching of all styles of learning (Vincent & Ross, 1998):

- Know the material well before beginning to teach.
- Write objectives and keep objectives in focus from planning to evaluation.
- Let the students know what the objectives are.
- Determine the learning styles of students before teaching.

- Educate students on their own learning style and how to cope.
- Match teaching style to the learning style of a majority of the students, giving attention to students with other learning styles.
- Begin lessons with attention grabbers.
- Motivate learners by introducing the subject in view of its future relevance to them.
- Provide an outline or a concept map to organize learning.
- Review previous learning, teach the current lesson, summarize information, and relate it to future learning.
- Use audiovisual aids and activities that allow student participation wherever possible (make the instruction vivid).
- Divide a complex task into smaller, achievable learning units.
- Vary activities to sustain the learner's attention.
- Use questions and answers to assess learning.
- Watch for nonverbal clues to determine status of learning.
- Give students time to think.
- Provide immediate feedback.
- Assign tasks that allow for self-learning; for example, library readings, case problems, group projects.
- Incorporate hands-on activities into the lesson wherever possible.
- Always remember that learning is best when accompanied by a pleasant feeling; for example, suitable environment, non-threatening atmosphere.

As educators learn new ways to address the various learning styles of their students, they are building on the strengths of their students and are ultimately contributing to success in the classroom as well as success in the professional world.

Contributors

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References

- Dunn, R., & Dunn, K. (1992). *Teaching elementary students through their individual styles: Practical approaches for Grades 3–6*. Boston: Allyn & Bacon.
- Dunn, R., & Dunn, K. (1993). *Teaching elementary students through their individual styles: Practical approaches for grades 7–12*. Boston: Allyn & Bacon.
- Dunn, R., Dunn, K., & Price, G. E. (1987). *Learning style inventory*. Lawrence, KS: Price Systems.
- Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.
- Instructional strategies* [Online document]. (2001). Grand Forks: University of North Dakota, Volcano World. Available: <http://volcano.und.nodak.edu/vwdocs/msh/lc/is/is.html>.
- Kanar, C. C. (1995). *The confident student*. Boston: Houghton Mifflin Company.
- Keefe, J. W. (1991). *Learning style: Cognitive and thinking skills*. Reston: National Association of Secondary School Principals.
- Keirse, D.W. (2001). *Keirse temperament sorter* [Online document]. Available: www.advisorteam.com/user/ktsintro.asp.
- Kolb, D. A. (1985). *Learning style inventory*. Boston: McBer & Company.
- Learning style inventory* [Online document]. (2001). Windsor, CA: Center for New Discoveries in Learning. Available: www.howtolearn.com/personal.html.
- Learning styles, the Gregorc styles [Online document]. (2001). Available: www.indiana.edu/~w505a/learningstyles.html.
- Madhumita, & Kumar, K. L. (1995). Twenty-one guidelines for effective instructional design. *Educational Technology*, 35(3), 58.
- McCaulley, M. H. (1990). The Myers-Briggs Type Indicator: A measure for individuals and groups. *Measurement and Evaluation in Counseling and Development*, 22, 181–195.
- When learning and testing styles don't match [excerpt]. (2001). *School Smart Kids!* [Online serial], 1(4). Available: www.howtolearn.com/ndil3.html.

Vincent, A., & Ross, D. (1998). Learning types: Carl Jung's theory and strategies for the classroom. *NABTE Review*, 25, 21–26.

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