

A Brief Introduction to Learning Styles¹

Keith Dorwick

Since the nineteen-sixties and before, educators have been aware that both students and teachers have different learning styles, different ways of knowing about the world; because students take in information in different ways and use different cognitive schemes, many educators recommend that teachers vary the tasks they assign to students to meet and address these various ways of knowing. Some of these ways of knowing will impact students in distance learning classes (or supplements to traditional classes) that are mediated over the Internet. Students (and teachers) may, for instance, prefer to take in knowledge via sight – for them, a lecture delivered by a professor talking in front of a classroom without any visuals may be difficult to follow, and rated as “boring” or “useless,” but so might a text heavy course that sends lots of text and has few or no visual images.² Other students, auditory learners, may find that same lecturer and that same lecture a rich and engaging experience. Some students grasp a particular concept as an intuitive whole, and find themselves frustrated by a step to step description given by the teacher, while others – who simply process information differently – need that step by step process to absorb the given idea.

There appears to be two major threads in the research that I have done to date on this subject, one descriptive and one prescriptive. The descriptive simply notes that both teachers and students learn things in different ways – this strand advocates that members of a given educational community (a class, or a reading group, for example) be aware that other members of the group will learn in different ways. The prescriptive thread not only notes that different learning styles exist, but also recommends that

¹ Work in Progress. Please send comments and references to kdorwick@uic.edu

² Including such images may well impact what hardware and connections a student may need to access a course, or cause difficulties for visually challenged students

teachers overtly design their teaching activities to address one or another dimension of the various criteria for differing styles. In this activist mode, teachers include, for example, tasks that address a variety of the senses in order to include various types of learners. By doing so, students may be better able to meet the goals of a given educational situation. The descriptive strand tends to describe tasks as addressing one or more of the various modes of a given scheme, while the prescriptive stand tends to describe students and teachers as being one or another kind of learner. That is, it is the learner (or teacher) who is seen as being intuitive or analytical, visual or auditory, abstract or concrete. In what I am calling the prescriptive description of learning styles, it is the learner, not the task, who is somehow an exemplar of a given style – if “so and so is a visual learner,” the onus to address that learner’s need is the responsibility of the teacher. Thus, Dennis Mills argues “Since we are not basically alike, when we approach a learning task or situation, we do not all benefit from the same approach. Each individual has his or her own unique learning strengths and weaknesses. It is vital for us a teachers to deliberately use a variety of methods to reach the students”

The descriptive strand, in contrast, tends to put the onus on the student – many of the texts that fall into this category are addressed to the learner, and it is the student who needs to translate one activity (that given by the teacher) into another mode. For instance, Neil Fleming (author of the VARK inventory, which divides students in visual, kinesthetic, reader/writers, and kinesthetic learners) remarks to teachers, “Remember that the questionnaire is not intended to 'box' respondents into a mind set that they have been 'diagnosed' or 'labeled'. Rather, it is designed to initiate discussion about and reflection upon learning preferences” (“Use”)

To the student, Fleming notes “Your VARK preferences can be used to help you develop additional, effective study skills. From the choices below, select your particular preference(s) to see how you should: 1) take in information; 2) study information for

maximum learning; 3) study for performing well on an examination” (Fleming). That is, the student should be aware of the ways in which she processes information and adjust those ways of knowing for her purposes.

Some of the early research in this field was done by Rita and Kenneth Dunn who identified “[five] dimensions that mark various preferences:

- 1.Environmental preferences regarding sound, light, temperature, & class design;
- 2.Emotional preferences addressing motivation, persistence, responsibility & structure;
- 3.Sociological preferences for private, pair, peer, team, adult or varied learning relations;
- 4.Psychological preference related to perception, intake, time, & mobility; and
- 5.Psychological preferences based on analytic mode, hemisphericity, & action

By assessing students and learning environments along each of these levels, Dunn and Dunn describe ways in which all different kinds of students can be accommodated.” (Center for Teaching and Learning)

Because of the breadth of the five areas, Dunn and Dunn’s work became the basis for much of the later work in the field done since their original research in the late sixties. Dunn and Dunn address whether students needed or liked to consume food or not while studying; looked at whether students liked to work in bright or dark conditions; whether or not students worked via deduction or induction. Perhaps the most important of all these is the examination of perception – many of the most common assessment inventories used by educators have identified the fact that different students prefer to take in content via different sensory modes and that teachers may well wish to include input that uses a number of different senses.

Besides their taxonomy, there are several other major theorists whose work is centered around learning styles (this list does NOT include all contenders by any means, but only several who showed up on practitioner’s web pages and articles time and

again): Richard Felder's "Index of Learning Styles"; Howard Gardener's "Multiple Intelligences"; Anthony F. Gregoric's "Style Delineator"; David Kolb's "Cognitive Profile"; and Neil Fleming's "VARK Inventory," a subset of Dunn and Dunn, and one that is quite widely referenced in this area.

Before talking about these particular schema in detail, I would like to discuss a caveat which should be kept in mind for all of these assessment tools: while these preferences may seem innate, in fact, for many students and teachers, other modes are often present, sometime seeming simultaneously as one or other way of thinking best suits the task(s) at hand. Indeed, most people are multi-modal; that is, while they may have a preference for one mode over another, they are able to switch to and work with modes as required. Some people, however, seem particularly single-mode on one or more continua. Students with a particularly strong orientation will not find it easy to switch modes, and they may have to be shown how or even why a particular way of thinking and learning might be valuable. Much of what we call "student resistance" may well stem from a mismatch between a student's preferred styles and that of the teacher. Since the resistance of the student (on the one hand) and the inability of the teacher to see exactly what is the problem (on the other) both stem from strong abilities in their own ways of seeing and of knowing, these differences can be quite strong.

As I have noted, Felder's work comes up time and time again: according to Felder, students (and teachers) may exhibit the following sets of preferences, each of which is paired or contrasted with its opposite:

SENSORY

- Preferentially selects sensory information (what is seen, heard, touched, etc.)
- Looks at what's happening
- Likes facts and data
- Is more likely to be practical than innovative
- Likes solving problems by standard methods
- Dislikes surprises
- Is patient with details but doesn't like complications

- Has trouble with time-bound tests (can't read as fast as intuitors)
- Experimenters, physicians, accountants, are often sensors

INTUITIVE

- Preferentially selects intuitive information (abstractions, possibilities, hunches)
- Looks for meanings and connections
- Likes theory and models.
- Is more likely to be innovative than practical
- Likes innovation
- Dislikes repetition
- Is impatient with details but doesn't mind complications
- May have trouble with any test (starts solving problems before they read them completely)
- Theoreticians, psychologists, economists are often intuitors

VISUAL

- Prefers to receive external information via pictures, diagrams, symbols
- Get more out of what they see than out of what they hear or read
- "I don't see what you're saying"
- "Show me what you mean"
- "I get the picture"

VERBAL

- Prefers to receive external information via words, either written and spoken
- Get more out of what they hear or read than out of what they see
- "This paragraph doesn't sound right"
- "Explain it to me"
- "OK, I hear you"

INDUCTIVE

- Begin with observations and data, then infer governing rules or principles
- Look at pieces of the puzzle to decide what the big picture is
- Work from particulars to generalities
- Likes to infer principles
- Wants to know: 1) what will the results to be derived help me explain
- 2) what are the results
- 3) how do I derive them

DEDUCTIVE

- Begin with rules or principles, then deduce consequences and phenomena
- Work backward from the results
- Work from generalities to particulars
- Likes to deduce consequences
- Wants to know: 1) What are the result to be derived
- 2) how do I derive them

- 3) how do I use them

ACTIVE

- Prefers to process information while doing something active (talking, moving)
- Thinks out loud
- Likes experimentation, applications
- "Let's try it out and see what happens"
- May jump into tasks prematurely
- Works well in groups

REFLECTIVE

- Prefers to process information introspectively
- Thinks silently
- Likes theory, fundamental understanding
- "Let's think about this"
- May never get started
- Works better alone

SEQUENTIAL

- Learns one step at a time
- Functions well with partial understanding
- Good at analysis and convergent thinking
- May miss the big picture

GLOBAL

- Learns in large chunks (aha!)
- Doesn't function well with partial understanding
- Good at synthesis and innovators
- Fuzzy on details
- May appear slow, do poorly on tests early in the semester
- Once they've got it, can figure out truly complex solutions almost instantly, but be completely incapable of explaining how they did it

Of course, as always. these are preferences, not absolutes and students will have a preference for one style over another; any of 32 combinations are possible (Architectural Engineering WWW Server, University of Kansas) but even students with a strong preference for Global thinking will also be able to work with Sequential thought if it is required of them.

While Felder's taxonomy is prevalent in educational circles, Howard Gardener's "Theory of Multiple Intelligences" recently became quite popular in the non-academic press, especially since his description of a eighth sense or intelligence, the natural.

Here are the original seven intelligences:

Linguistic Learner

- likes to: read, write and tell stories.
- is good at: memorizing names, places, dates and trivia.
- learns best by: saying, hearing and seeing words.

Logical/Mathematical Learner

- likes to: do experiments, figure things out, work with numbers, ask questions and explore patterns and relationships.
- is good at: math, reasoning, logic and problem solving.
- learns best by: categorizing, classifying and working with abstract patterns/relationships.

Spatial Learner

- likes to: draw, build, design and create things, daydream, look at pictures/slides, watch movies and play with machines.
- is good at: imagining things, sensing changes, mazes/puzzles and reading maps, charts.
- learns best by: visualizing, dreaming, using the mind's eye and working with colors/pictures.

Musical Learner

- likes to: sing, hum tunes, listen to music, play an instrument and respond to music.
- is good at: picking up sounds, remembering melodies, noticing pitches/rhythms and keeping time.
- learns best by: rhythm, melody and music.

Bodily/Kinesthetic Learner

- likes to: move around, touch and talk and use body language.
- is good at: physical activities (sports/dance/acting) and crafts.
- learns best by: touching, moving, interacting with space and processing knowledge through bodily sensations.

Interpersonal Learner

- likes to: have lots of friends, talk to people and join groups.
- is good at: understanding people, leading others, organizing, communicating, manipulating and mediating conflicts.
- learns best by: sharing, comparing, relating, cooperating and interviewing.

Intrapersonal Learner

- likes to: work alone and pursue own interests.
- is good at: understanding self, focusing inward on feelings/dreams, following instincts, pursuing interests/goals and being original.
- learns best by: working alone, individualized projects, self-paced instruction and having own space.

(Special Needs Opportunity Windows)

The natural, of course is the “capacity to observe, interpret, and construct meaning from the natural world” (Burton).³ The intrapersonal learner, for instance, may not be a good candidate for an online class that uses threaded discussion areas, or in which participation in group projects is a heavy part of the assessment – the linguistic learner, on the other hand, may be well suited for courses that generate and transmit large amounts of text.

The next style under consideration, Gregoric’s Style Delineator may be of particular use in online courses and especially in courses that use hypertext that is heavily linked:

Concrete: This quality enables you to register information directly through your five senses: sight, smell, touch, taste, and hearing. When you are using your concrete ability, you are dealing with the obvious, the “here and now.” You are not looking for hidden meanings, or making relationships between ideas or concepts. “It is what it is.”

Abstract: this quality allows you to visualize, to conceive ideas, to understand or believe that which you cannot actually see. When you are using your abstract quality, you are using your intuition, your imagination, and you are looking beyond what is to the more subtle implications. “It is not always what it seems.”

Although all people have both concrete and abstract perceptual abilities to some extent, each person is usually comfortable using one more than the other. The person whose natural strength in the concrete, for example, may communicate in a direct, literal, no-nonsense manner. The person whose natural strength is the abstract may use more subtle ways to get a point across.

³ This citation is from a PowerPoint presentation by Dr. Burton that is a clear explication of the eight multiple intelligences; it is currently located at: <http://www.educ.andrews.edu/burton/html/index.htm>

There are two ordering abilities in Gregoric's model:

Sequential: Allows your mind to organize information in a linear, step-by-step manner. When using your sequential ability, you are following a logical train of thought, a traditional approach to dealing with information. You may also prefer to have a plan and to follow it, rather than relying on impulse.

Random: Lets your mind organize information by chunks, and in no particular order. When you are using your random ability, you may often be able to skip steps in a procedure and still produce the desired result. You may even start in the middle, or at the end, and work backwards. You may also prefer your life to be more impulsive, or spur of the moment, than planned. (Mills).

As with the other learning style inventories, an online course may not be a congenial environment for students (or teachers) who are heavily concrete. If the ability to gather in information through the senses matters, and if the course does not provide multimedia options and materials, the course may be perceived as dry or "academic" in the pejorative sense. Given the high preponderance of abstracts who have made careers in academe, the mismatch is likely to be a concrete student with an abstract teacher.

More importantly, however, online courses which are presented as a series of threaded discussions, MOO discussion areas, multimedia simulations, charts, etc. may present as highly hypertextual. As such, learners and instructors who are high on the Random scale in the Gregoric may find themselves drawn to the Web, to hypertexts, and to integrated learning environments presented in multiple frames such as CourseInfo® and eCollege.® Sequential students in such an environment may become frustrated with the complicated navigation systems inherent in such environments. One such student remarked:

While part of me is really attracted to the comparatively non-linear, project-oriented approach of this course (it certainly echoes the hypertextuality of the

technology), another part of me (i.e., the "me" who is busy with many projects beyond this course) occasionally feels disoriented by this structure.⁴

Even if a course is designed to be totally linear (i.e., each module of the course representing one week of the educational experience), as students and teachers alike move through the environment, it will, of necessity – if it is used at all – become more and more hypertextual, as students post here and not there, or reply today to something that was posted five days ago. Such attempts at linear course designs, by the way, are natural choices to faculty used to teaching the f2f course which is usually presented as a linear experience – today students read x, tomorrow they read y – and in which discussions are remembered as linear: “yesterday we were talking about b.” But faculty or students who become stressed or frustrated by a non-linear course design are likely to score high on the sequential end of this scale.

Similar to the Gregoric, the Kolb “Cognitive Profile Model,” one that seems much more mainstream than the Gregoric, also distinguishes between concrete and abstract learners (and learning). However, rather than Random and Sequential learning, Kolb identified experimental and reflective learning – whether one experimented to see what would happen or simply watched what was going on around the learner. He characterized the four different kinds of learners and their primary activities in the following way:

Activists	Pragmatists	Theorists	Reflectors
“feel”	“do”	“think”	“watch”
Concrete Experience	Active Experimentation	Formation of Abstract Concepts	Reflection and Observation

⁴ Note that, like many individuals, this student places herself on the middle of the Random/Sequential axis of the Gregoric schema.

However, that chart is misleading: Kolb doesn't see different kinds of learners, each one complete unto herself. Instead, the learner plays all four of these roles at different times in the accomplishment of any given task. We move from our concrete experience to reflecting on what we've seen and heard in the real world. Then we form abstract conclusions that come from our reflections, and finally we form an experiment to test our theories. We move through various kinds of learning as we need to. However, as Kolb was aware, there are certainly preferences that we each have as learners and again, as one might expect, there are large numbers of reflectors and thinkers at a research university (Plant, Kelly).⁵ And again, as educators, our task is twofold: to help our students develop additional critical thinking skills while recognizing that they might not think as we do, nor wish to.

And we come to the last of our learning styles assessments: Neil Fleming's VARK Inventory. VARK stands for Visual, Auditory, Read/Write, and Kinesthetic. These modes are fairly self-explanatory except that they represent the ways in which individuals prefer to take in knowledge, and NOT the individuals themselves. Thus, it is not appropriate to talk of a visual learner (if one is using the VARK inventory), but instead a visual task, such as looking at a flower, or a picture on a website. That is not to say that individuals do not themselves have particular and favorite modes – many academics, for instance, are quite comfortable with the read/write mode and more students may be as Internet chat rooms and e-mail become yet more prevalent – but Fleming hoped that the Inventory “sought to be advisory rather than diagnostic and predictive.” The active learning site includes tools for students to transfer one task, their

⁵The Plant website includes a graph of the Kolb learning cycle and I am convinced the arrows are drawn in the wrong direction (concrete experience to experimentation to abstract thought to reflection). Surely it should be concrete experience to reflection to abstract thought to experiment.

assignments, from modes that are not favored to modes that are, especially for study purposes (“Study Strategies”).

All of these assessment tools, or inventories, ultimately come down to the same thing (though their exact criterion differ, of course): that humans are individuals with different ways of knowing and of being – and that educators can pay attention to those differences in planning the courses and activities that they will lead as teaching staff here at UIC.

Work Cited:

Architectural Engineering WWW Server, University of Kansas. “Learning Styles.” July 30, 1999. <<http://www.arce.ukans.edu/arce/intro/learnsty.htm>>.

Burton, Larry D. “Natural.” **Multiple Intelligence Theory**. July 30, 1999. <<http://www.educ.andrews.edu/burton/html/slide6.htm>>.

Center for Teaching and Learning. “Brief Summary of Select Learning Style Models.” **CTL Learning Styles Site**. July 30, 1999. <<http://web.indstate.edu/ctl/styles/model2.html#DUNN>>.

Fleming, Neil. “How to Understand and Use the VARK Results.” **The VARK Active Learning Site**. July 2, 1999. <<http://www.active-learning-site.com/use.html>>.

_____. “The Active Learning Site ___ Study Strategies.” **The VARK Active Learning Site**. July 2, 1999. <<http://www.active-learning-site.com/study.htm>>.

Kelly, Curtis. “David Kolb, The Theory of Experiential Learning and ESL.” The Internet TESL Journal, Vol. III, No. 9, September 1997. July 30, 1999. <<http://www.aitech.ac.jp/~iteslj/Articles/Kelly-Experiential/>>.

Mills, Dennis W. Applying What We Know: Student Learning Styles. July 2, 1999. <<http://csrnet.org/csrnet/articles/student-learning-styles.html>>.

Plant, Nicholas J. “Kolb’s Learning Styles Inventory.” Information Systems Practice I. July 30, 1999. <<http://www.csm.uwe.ac.uk/~njplant/isp1/kolbetal.htm>>.

Special Needs Opportunity Windows. “Seven Styles of Learning.” **Learning to Learn: Thinking and Learning Skills**. July 30, 1999. <<http://snow.utoronto.ca/Learn2/styles4.htm>>.