MAGNA ONLINE SEMINARS

Learning Styles: Fact and Folklore for eLearning

Wednesday, May 06, 2009

1:00 PM – 2:30 PM (Eastern)
12:00 PM – 1:30 PM (Central)
11:00 AM – 12:30 PM (Mountain)
10:00 AM – 11:30 AM (Pacific)
(Times listed refer to daylight saving time.)

Presented by:

Les Howles
Allan Jeong, Ph.D.

Today's presenters:

Les Howles has more than 20 years experience as an instructional design and technology consultant in corporate, government, medical and academic settings. In addition to Howles Associates, Les is a senior e-learning consultant at the University of Wisconsin - Madison. He works with faculty, researchers, trainers and subject experts to develop instructional programs, multimedia applications and e-learning courses. He has a graduate degree in educational technology from the University of Oregon and undergraduate degrees in education and educational psychology.

Allan Jeong, Ph.D. is associate professor in the Department of Educational Psychology & Learning Systems at Florida State University. He received his Ph.D. in Curriculum & Instruction from the University of Wisconsin – Madison. Since 2001, he has been teaching Introduction to Distance Learning, Courseware Development, Learning Theories & Cognition, and Designing for Online Collaborative Learning.

He has developed tools that have culminated in two software programs, Forum Manager & Discussion Analysis Tool. His latest publication, "A Guide to Analyzing Message-Response Sequences and Group Interaction Patterns in Computer-Mediated Communication," presents an in-depth discussion of how he has used his software tools.

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Learning Styles: Fact and Folklore for eLearning

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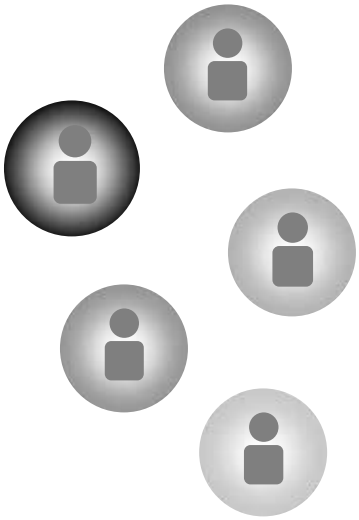
Learning Styles

Fact and Folklore for e-Learning

Les Howles and Allan Jeong

What learning "styles" interest **you** the most?



Lots of Learning Style Theories and Models

- Visual ↔ Verbal
- Intuitive ↔ Analytic
- Impulsive ↔ Reflective
- Holist ↔ Analytic
- Left brain ↔ Right brain
- Surface ↔ Deep
- Intuitive ↔ Sensing
- Sequential ↔ Global
- Active ↔ Reflective
- Extrovert ↔ Introvert
- Thinking ↔ Feeling
- Judging ↔ Perception
- Convergent ↔ Divergent
- Leveler ↔ Sharpener

- Activists
- Reflectors
- Theorists
- Pragmatists

- Theorist
- Humanitarian
- Organizer
- Innovator

- Meaning directed
- Reproduction directed
- Application directed
- Undirected

- Visual
- Auditory
- Kinesthetic
- Reading

- Synthesist
- Idealist
- Pragmatist
- Analyst
- Realist

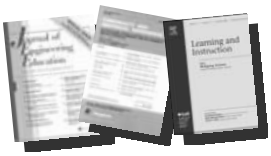
- Active
- Reflective
- Abstract
- Concrete

- Hierarchic
- Internal
- Liberal
- Conservative
- Judicial
- Executive
- Monarchic

The Appeal of Learning Style Theory

Over 650 books published in U.S. and Canada

Nearly 5000 articles in professional publications



Over 26,000 web resources on addressing learning styles

Dozens of workshops and seminars for educators and trainers

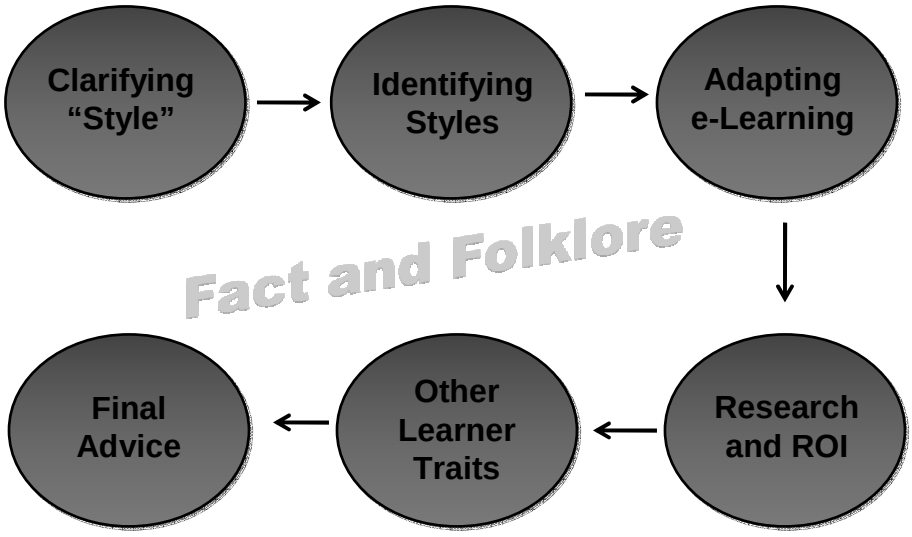
Empirical Research

Controlled Studies

Applying Learning Style Theory

Need for evidence-based instructional design

Agenda and Focus



What exactly is it?

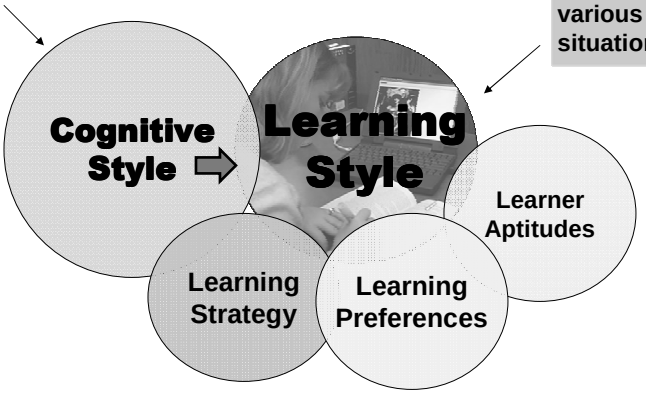
"In fact, "style" turns out to be a very slippery concept…"

Howard Gardner

Related But Different Concepts

Deep seated patterns of perceiving, thinking, remembering, problem solving

Persistent across various learning situations



Situational and flexible

What are they referring to?

"I've always been good at math and numbers."

"I use the 3QR method for memorizing terms for my physiology course."

"I like to listen to classical music when I study."

"I learned a lot from the graphics my biology professor used to teach chemeosmosis."

"I like to get the big picture of a topic before diving into the details."

"I like to think things through and understand it well before applying something I learn."

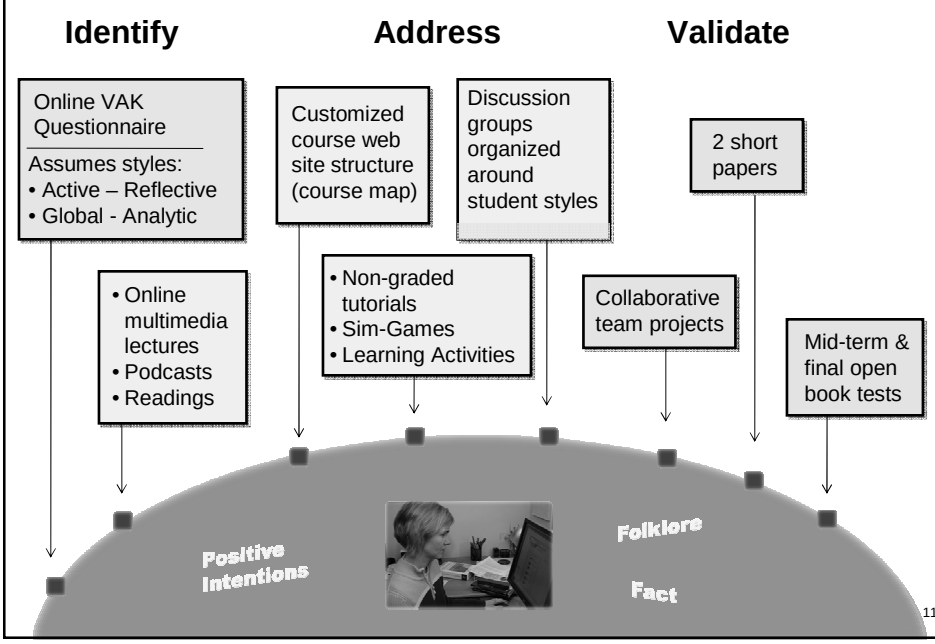




A Case Scenario

Instructor Diana tries to accommodate individual learner style differences in the design of her online course.

Learning Style-Based Instructional Design



An Evidence-Based Approach

Applying Learning Style Theory

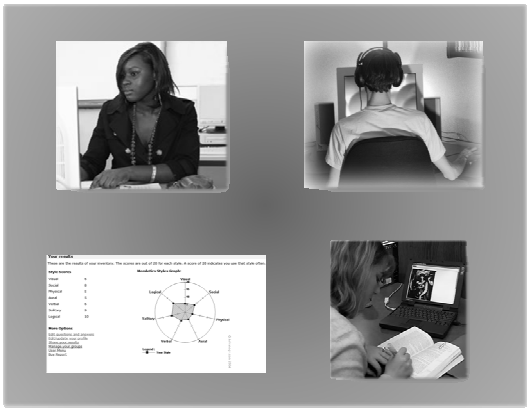
Identify individual learner styles that might affect learning of critical content → **Address** individual styles in the design of instructional activities and materials → **Validate** learning outcomes at individual and group levels **(ROI)**

How do **you** approach these?

What Practitioners Say

Learning Style
Survey Results

Identifying learning styles of students



"In many ways…the notion of learning styles itself and the various means to measure it are accepted without question."

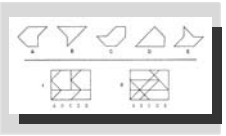
Coffield, Moseley, Hall and Ecclestone (UK Learning Skills and Research Centre)

Methods for Identifying Learning Styles

1
Teacher perceptions and judgments

2
Self-report questionnaires

3
Objective tests



Objectivity -- Validity -- Reliability

Identifying Learning Styles for e-Learning

Instructor Perceptions and Judgments

Observe learners and make inferences based on understanding of attributes of particular learning styles

Pros

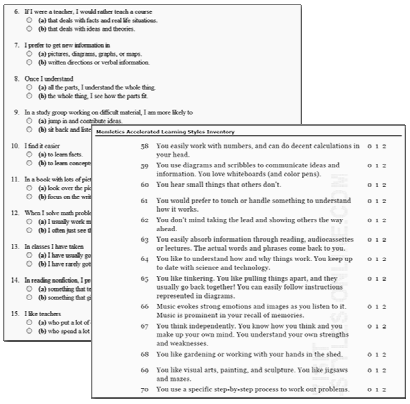
- Quick and easy
- Recognition of diverse learner traits

Cons

- Difficult to do in an online environment
- Not scientific and objective
- Need to know what to look for
- Can't perceive styles in covert behaviors (cognition)

Identifying Learning Styles for e-Learning

Self-Report Questionnaires



Sample Questionnaire

Pros

- Not subject to instructor/rater bias
- Some instruments are accessible online

Cons

- Subject to student exaggeration
- Difficult for instructors to access results
- Takes more time and input
- Students identify with a "style"
- Validity and reliability issues

Identifying Learning Styles for e-Learning

Validity and instructional impact of learning style questionnaires

Instrument	Style	Pedagogical Impact
Allison/Hayes' Cognitive Style Index (CSI)	Intuition - analysis	**No evidence**
Gregorc's Style Delineator (GSD)	Concrete – abstract /sequential - random	**No evidence**
Herrmann's Brain Dominance Instrument (HBDI)	Left – right brain (whole brain model)	**Some evidence**
Kolb's Learning Styles Inventory (LSI)	Kolb's experiential learning model	**Contradictory & mixed evidence**
Riding's Cognitive Style Analysis (CSA)	Holist – analytic Verbal - visual	**Inconclusive evidence**
Vermunt's Inventory of Learning Styles (ILS)	Cognitive, affective, Meta-cognitive processes	**Some evidence**
Meyers Briggs Type Indicator (MBTI)	16 Personality types	**Some but limited evidence**

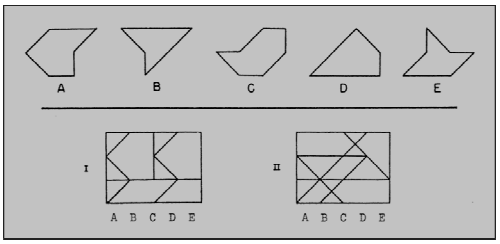
Pedagogical Impact

Little, mixed, or no evidence

* Source Coffield, Moseley, Hall and Ecclestone (2004, pp.22-35)

Identifying Learning Styles for e-learning

Objective Tests



Embedded Figures Test question sample

Pros

- Measures covert mental processes
- Less subject to instructor and learner bias

Cons

- Impact validity for learning not firmly established
- Cost and time
- Administrating tests to online learners lacks control

Identifying Learning Styles for e-learning

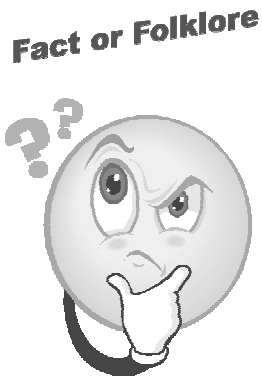
Practical Recommendations

Use **online self-report questionnaires** but recognize weak validity and reliability of most instruments.

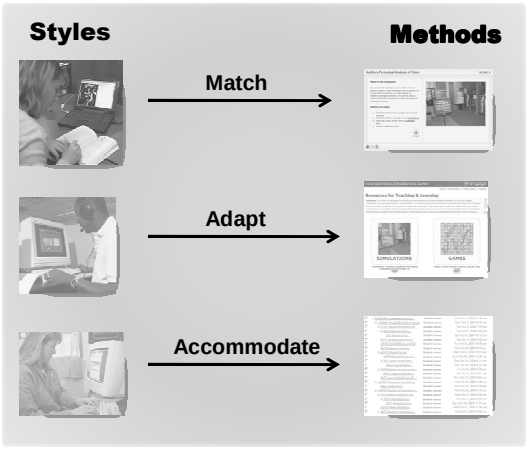
Deduce styles by **observing** how students' communicate in online discussion forums but recognize limitations.

Consider **objective tests** if available and if properly controlled via computer delivery methods.

Questions



Matching styles with instructional methods



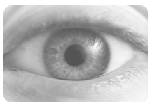
"Adaptation is only useful if some learners with a defined trait do better with one method and other learners with a complementary trait do better with another method."

David Cooke, MD

Evidence-Based Guidelines for Applying Learning Styles to E-learning Design

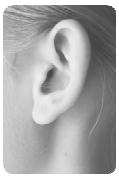
Type of Style	eLearning Design
Sensory Modality	**Multimedia materials**
Personality -Thinking	**Group discussions and collaboration**
Perception & Info Processing	**Content structure and organization**

Sensory Modality-Based Learning Styles - VAK



Visual

Superior at processing information that is presented visually (diagrams, charts, maps)



Auditory

Superior at processing information that is spoken or heard (dialog & discussion)

Kinesthetic

Superior at processing information through direct experience—moving, touching, and doing (active exploration)

Visual, Auditory and Kinesthetic Learners

Learners

"I like web sites that use pictures and graphics to explain things. I'm a visual learner. "

"I get bored just listening and reading and want to do something when learning. I'm a kinesthetic learner."

Instructors

"I include a variety of different media and learning activities in my online courses to address diverse learning styles."

"The diagrams in my course are most helpful for visual learners who process information best through their visual channel."

"My podcasts address the needs of auditory and verbal learners."

Learner Modalities - Fact and Folklore

Intuitively reasonable and simple to apply

Part of our professional culture

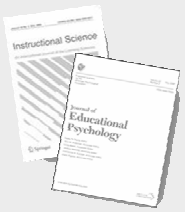
Some studies claim interactions

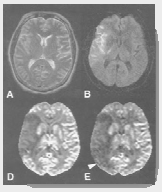
Matching Instructional Modality to Learner

Multimedia Examples

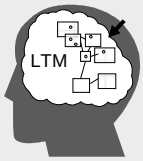
Learner Modalities - Fact and Folklore

Lack of consistent empirical evidence





Schemas, learning & meaning

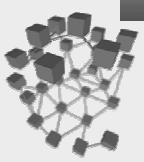


Meaningful learning occurs when new information is integrated into existing knowledge structures or schemas in long-term memory (LTM).

J. Sweller and D. Willingham

Visual/spatial abilities

- Spatial span
- Iconic visualization
- Spatial visualization



R. Clark

Most learners are multimodal

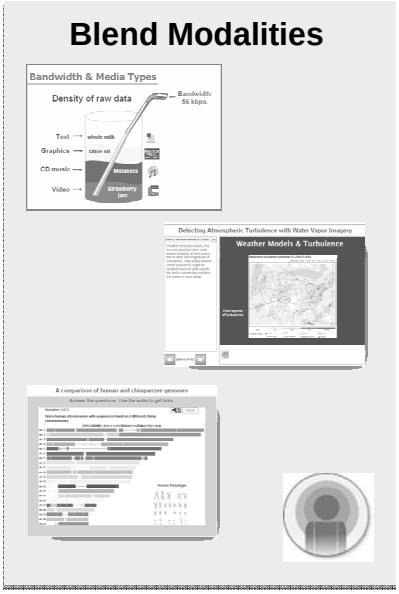
G. Kratzig and K. Arbuthnott

Modality Recommendations

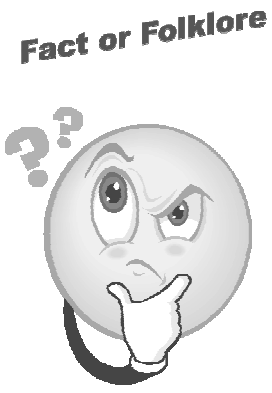
E-Learning Multimedia Design

Select the modality that best represents the content and supports the learning goals.

Apply good instructional message design that reduces extraneous cognitive load.



Questions



Reflective-Active Learning Style

Reflective

Understands information best by thinking about it quietly first

Prefers to work alone

Active

Understands information best by discussing and explaining to others and by applying it

Likes group work

Active – Reflective Learning Style

Which style do these quotes reflect?

"When I start a homework problem, I am more likely to try to fully understand the problem first."

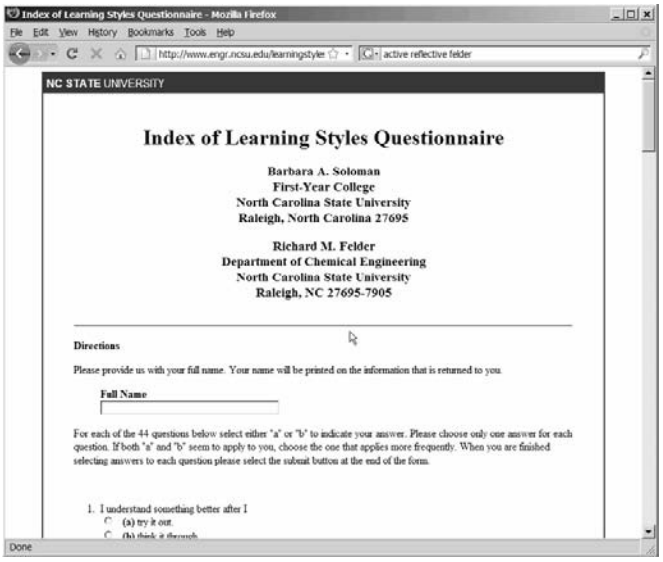
"I understand something better after I try it out"

"I would rather first think about how I am going to do it."

"I more easily remember something I have done."




Measure Learner Active-Reflective Style



Felder & Soloman Learning Styles Questionnaire

I understand something better after I

- **(a)** try it out.
- **(b)** think it through.

When I am learning something new, it helps me to

- **(a)** talk about it.
- **(b)** think about it.

In a study group working on difficult material, I am more likely to

- **(a)** jump in and contribute ideas.
- **(b)** sit back and listen.

In classes I have taken

- **(a)** I have usually gotten to know many of the students.
- **(b)** I have rarely gotten to know many of the students.

Source: http://www.engr.ncsu.edu/learningstyles/ilsweb.html

Felder & Soloman Learning Styles Questionnaire

When I start a homework problem, I am more likely to
- **(a)** start working on the solution immediately.
- **(b)** try to fully understand the problem first.

I prefer to study
- **(a)** in a study group.
- **(b)** alone.

The idea of doing homework in groups, with one grade for the entire group,
- **(a)** appeals to me.
- **(b)** does not appeal to me.

I more easily remember
- **(a)** something I have done.
- **(b)** something I have thought a lot about.

Source: http://www.engr.ncsu.edu/learningstyles/ilsweb.html

How to Identify Active and Reflective Learning Styles

I am more likely to be considered
- **(a)** outgoing.
- **(b)** reserved.

I would rather first
- **(a)** try things out.
- **(b)** think about how I'm going to do it.

When I have to work on a group project, I first want to
- **(a)** have "group brainstorming" where everyone contributes ideas.
- **(b)** brainstorm individually and then come together as a group to compare ideas.

Source: http://www.engr.ncsu.edu/learningstyles/ilsweb.html

How to Identify Active and Reflective Learning Styles

Results for:

```
ACT                X                                        REF
     11  9   7   5   3   1   1   3   5   7   9   11
                    <-- -->

SEN                    X                                    INT
     11  9   7   5   3   1   1   3   5   7   9   11
                    <-- -->

VIS                    X                                    VRB
     11  9   7   5   3   1   1   3   5   7   9   11
                    <-- -->

SEQ                X                                        GLO
     11  9   7   5   3   1   1   3   5   7   9   11
                    <-- -->
```


Empirical Findings on Effects in Online Learning

- Reflective learners do better in online courses
- What are its effects on student interactions in online group discussions?
- Findings are mixed

Designing Online Group Discussion

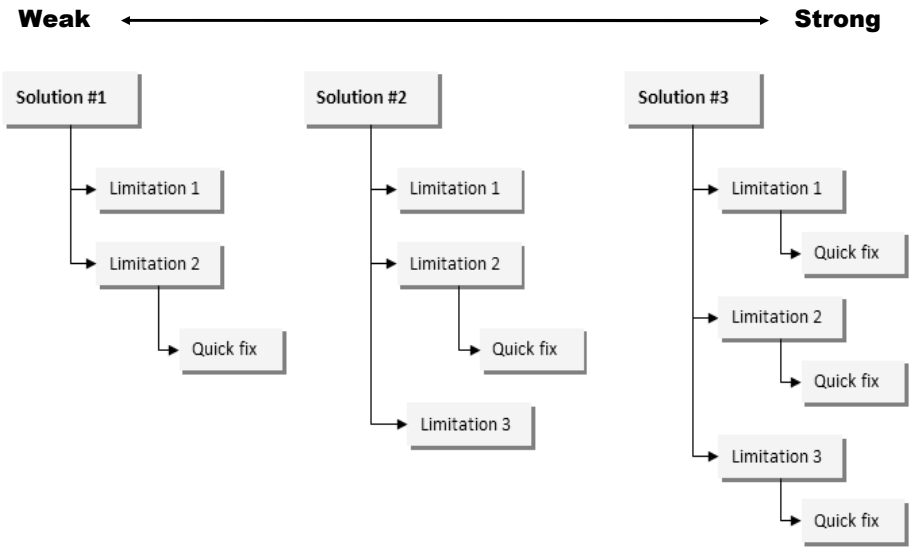
Active-Reflective Learners

Brainstorm problem solutions

Use threaded discussions

Manage differences in active-reflective learning styles to maximize quality in solutions

Case Example: Instructional Goals in Group Discussions



Case Example: Learners and Context

- Graduate students in online course “Introduction to Distance Education”
- Most students taking course at a distance, and are working professionals
- Course requirement for major in Distance Learning at Florida State University

Previous Research on Learner Traits in Online Discussions

- Nussbaum (2004) found learners that are less assertive, anxious, and open to ideas benefited from using “note starters”
- Odds of expressing disagreement increased 13%, 14%, and 17% for every unit decrease in learner’s level of assertiveness

Nussbaum, E. M., Hartley, K., Sinatra, G.M., Reynolds, R.E., & Bendixen, L.D (2004). "Personality interactions and scaffolding in on-line discussions." Journal of Educational Computing Research **30**(1 & 2): 113-137.

How to Implement Discussion Prompts

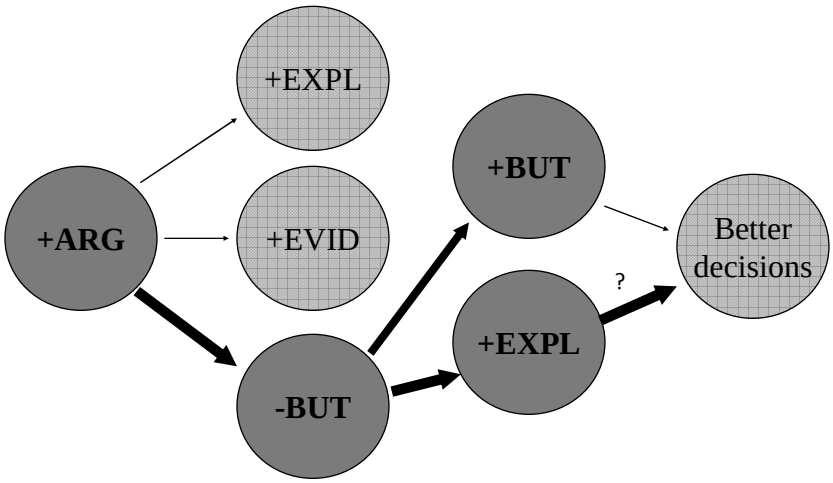
Label	Description of label	Example message by label
+	Identifies a message posted by a student assigned to the team supporting the given claim/statement	--
-	Identifies a message posted by a student assigned to the team opposing the given claim/statement	--
ARG#	Identifies a message that presents one and only one argument or reason for using or not using chats instead of threaded discussion forums). Number each posted argument by counting the number of arguments already presented by your team. Sub-arguments need not be numbered. ARG = "argument".	**-ARG1** One's choice of media makes very little difference in students' learning because the primary factor that determines level of learning is one's choice of instructional method.
EXPL	Identifies a reply/message that provides additional support, explanation, clarification, elaboration of an argument or challenge.	**-EXPL** As a result, media are merely vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition.
BUT	Identifies a reply/message that questions or challenges the merits, logic, relevancy, validity, accuracy or plausibility of a presented argument (ARG) or challenge BUT).	**+BUT** However, one's choice of media can affect or determine which instructional methods are or are not used. If that is the case, then choice of media can make a significant difference.
EVID	Identifies a reply/message that provides proof or evidence to establish the validity of an argument or challenge.	**-EVID** Media studies, regardless of the media employed, tend to result in "no significant different" conclusions (Melke, 1968).

Student instructions prior to discussions

How to Assess Performance in Online Discussions

☐	⊟ SUPPORT statement because...	Student names	Sat Oct 2, 2004 11:18 am
☐	⊟ +ARG#1 MedialsButAMereVehicle	Student names	Mon Oct 4, 2004 8:47 pm
☐	⊟ -EVID MedialsButAMereVeh...	Student names	Tue Oct 5, 2004 7:09 pm
☐	⊟ +But RelativityTheory...	Student names	Tue Oct 5, 2004 9:43 pm
☐	-But RelativityThe...	Student names	Sat Oct 9, 2004 10:12 am
☐	-BUT Whataboutemotions?	Student names	Tue Oct 5, 2004 9:53 pm
☐	+EVID DistEdEffectiveAsF2F	Student names	Tue Oct 5, 2004 10:40 pm
☐	-BUTMediaamerevehicle	Student names	Wed Oct 6, 2004 8:19 pm
☐	⊟ +EVID MooreConcurs	Student names	Wed Oct 6, 2004 10:07 pm
☐	+EXPLMediaSelectionCo...	Student names	Sun Oct 10, 2004 12:35 am
☐	⊟ -BUT WellChosenEffect...	Student names	Sun Oct 10, 2004 4:31 pm
☐	+But SupportingRes...	Student names	Sun Oct 10, 2004 5:37 pm
☐	⊟ -BUTMediaismorethenamere...	Student names	Fri Oct 8, 2004 5:30 pm
☐	+BUT SupportingEviden...	Student names	Sat Oct 9, 2004 8:51 am
☐	-BUT LearningNotSimplyAP...	Student names	Mon Oct 11, 2004 9:54 am
☐	⊟ +ARG2 Standards for teaching	Student names	Wed Oct 6, 2004 1:48 pm
☐	+But Clarification?	Student names	Sun Oct 10, 2004 5:39 pm

Which style produces higher level argumentation?



Findings: Reflective learners post 40% more responses

Mix Groups Using Stratified Random Assignment

Objective: Ensure each group has students with one or two characteristics

1. Rank order students from most to least active in learning style
2. Select first group by choosing highest and lower student, and two middle students. If all are same sex, move up or down one student from middle to readjust
3. Select remaining groups by repeating above procedure with reduced list.
4. Assign any left over students to the groups

Johnson, Johnson & Holubec (1994 p.27)

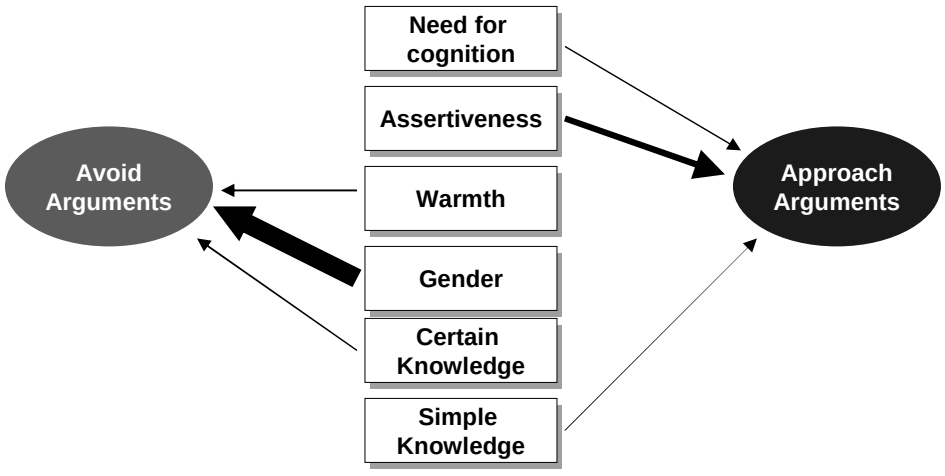
Use Message Tagging to Address Learner Styles

⊟ SUPPORT statement because...	Student names	Sat Oct 2, 2004 11:18 am
⊟ +ARG#1 MedialsButAMereVehicle	Student names	Mon Oct 4, 2004 8:47 pm
⊟ -EVID MedialsButAMereVeh...	Student names	Tue Oct 5, 2004 7:09 pm
⊟ +But RelativityTheory...	Student names	Tue Oct 5, 2004 9:43 pm
-But RelativityThe...	Student names	Sat Oct 9, 2004 10:12 am
-BUT Whataboutemotions?	Student names	Tue Oct 5, 2004 9:53 pm
+EVID DistEdEffectiveAsF2F	Student names	Tue Oct 5, 2004 10:40 pm
-BUTMediaamerevehicle	Student names	Wed Oct 6, 2004 8:19 pm
⊟ +EVID MooreConcurs	Student names	Wed Oct 6, 2004 10:07 pm
+EXPLMediaSelectionCo...	Student names	Sun Oct 10, 2004 12:35 am
⊟ -BUT WellChosenEffect...	Student names	Sun Oct 10, 2004 4:31 pm
+But SupportingRes...	Student names	Sun Oct 10, 2004 5:37 pm
⊟ -BUTMediaismorethenamere...	Student names	Fri Oct 8, 2004 5:30 pm
+BUT SupportingEviden...	Student names	Sat Oct 9, 2004 8:51 am
-BUT LearningNotSimplyAP...	Student names	Mon Oct 11, 2004 9:54 am
⊟ +ARG2 Standards for teaching	Student names	Wed Oct 6, 2004 1:48 pm
+But Clarification?	Student names	Sun Oct 10, 2004 5:39 pm

Facilitates both observational and quantitative performance assessment

Other Learner Traits to Consider?

Relative impact of traits on approaching arguments



Nussbaum, E. M., & Bendixen, L. D. (2003). "Approaching and avoiding arguments: The role of epistemological beliefs, need for cognition, and extraverted personality traits." Contemporary Educational Psychology **28**: 573-595.

Other Learner Traits to Consider?

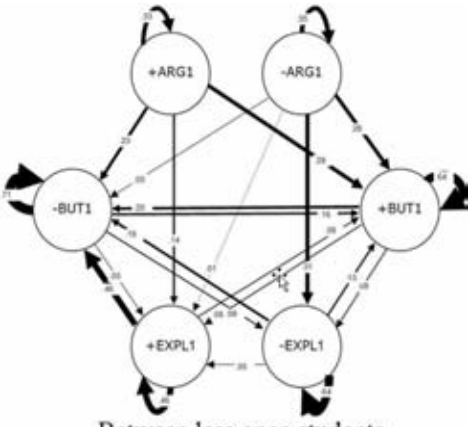
INTELLECTUAL OPENNESS (6FPQ: Openness to Experience [OP]) [.80]

+ keyed	Carry the conversation to a higher level.
	Am interested in many things.
	Prefer variety to routine.
	Want to increase my knowledge.
	Am open to change.
– keyed	Prefer to stick with things that I know.
	Am not interested in abstract ideas.
	Am not interested in theoretical discussions.
	Try to avoid complex people.
	Rarely look for a deeper meaning in things.

Source: International Personality Item Pool at http://ipip.ori.org

Other Learner Traits to Consider?

Intellectual Openness (Jeong, 2007)



Between less open students

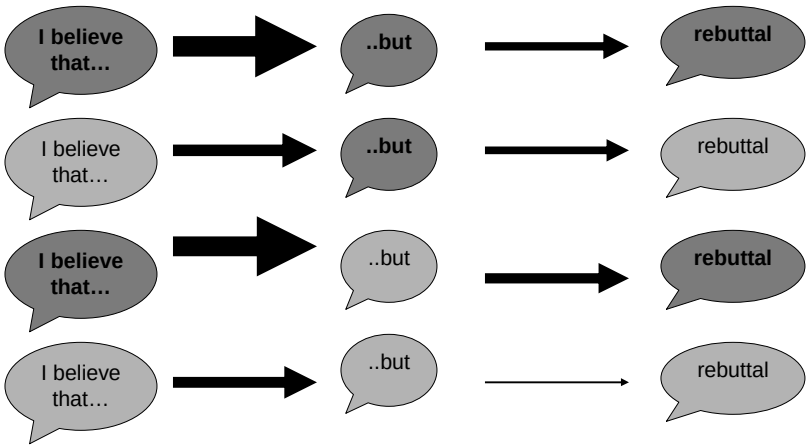
More open students tend to:

- Challenge arguments
- Rebut challenges
- Elaborate challenges less
- Elaborate explanations less

Jeong, A. (2007). The effects of intellectual openness and gender on critical thinking processes in computer-supported collaborative argumentation. *Journal of Distance Education*, *22*(1), 1-18 .

Other Learner Traits to Consider?

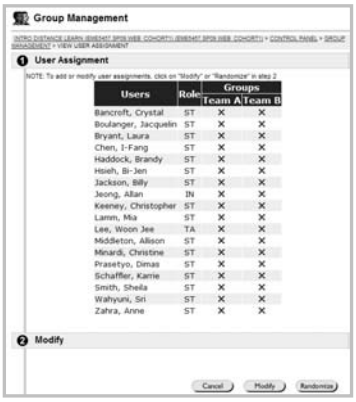
Gender & Argumentation (Jeong & Davidson-Shivers, 2006)



Blue = male students **Pink = Female students**

Cost benefits & Feasibility & Alternative Options

- How feasible are these techniques?
- Supporting tools and technologies?
- Alternative options?

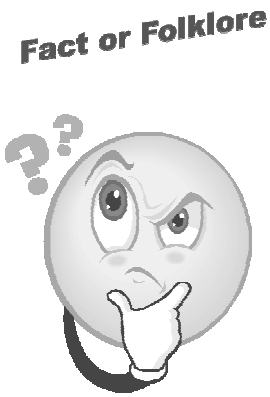


Random group assignment tool in Blackboard

Key Points to Remember

- Effects of learning style and personalities are not always obvious
- Understand the impact on learning *process* and outcomes
- Multiple styles can impact performance, but some are more important than others
- Use styles to identify ways to balance the instructional task

Questions

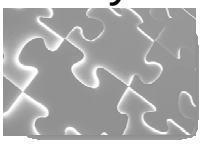


Holist - Analytic Learning Styles

Holistic

Inductive, expansive, unconstrained, divergent, informal, diffuse, creative

Analytic



Deductive, rigorous, constrained, convergent, formal, critical, synthetic

Similar "Styles"

Intuitive ---- Sequential
Diverger ---- Converger
Right Brain —- Left Brain
Field Dependent ---- Field Independent
Leveler ---- Sharpener

E-Learning Content Design

Holists

Require explicit structure and guidance, external motivation and social interaction.

Analytics

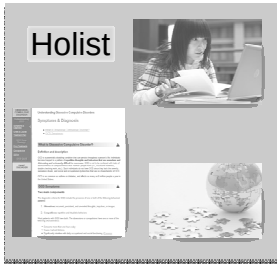
Internally directed, provide own structure and require less support and external motivation.

Superior learning and memory for material presented in a way that best matches an individual's cognitive framework and information processing tendencies.

Addressing Holist and Analytic Learners

E-Learning Design Examples

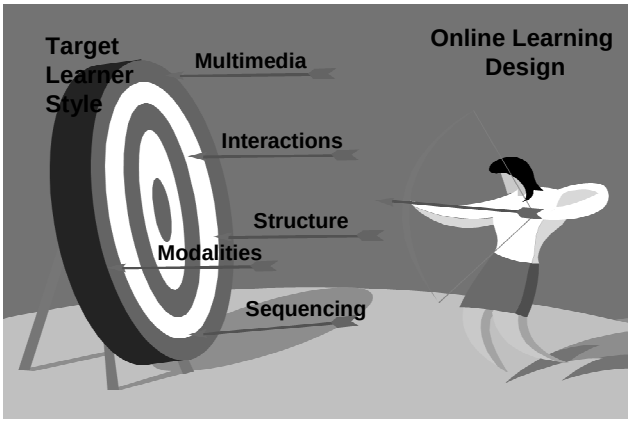
Design Recommendations



- Manipulating content structure, sequencing and navigational elements can often improve learning for the respective “styles”
- Aggressively addressing one style can degrade learning for another style
- Success in e-learning courses has a weak correlation with these styles

Applying Learning Styles - Fact and Folklore

Hitting the Mark



You need to be targeted and specific in your approach to applying learning style models.

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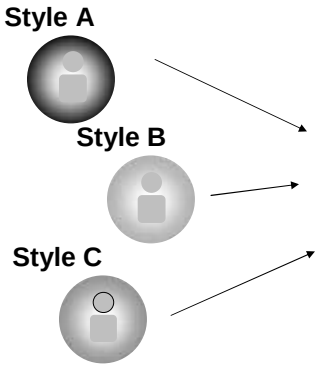
Research Consensus: 30 + years

Learner **Trait** ⟷ *Interaction* ⟷ Instruct. **Treatment**



Lots of "T's" but little "i's" when focusing on "styles"

Instructional Method 1

Instructional Method 2

Instructional Method 3

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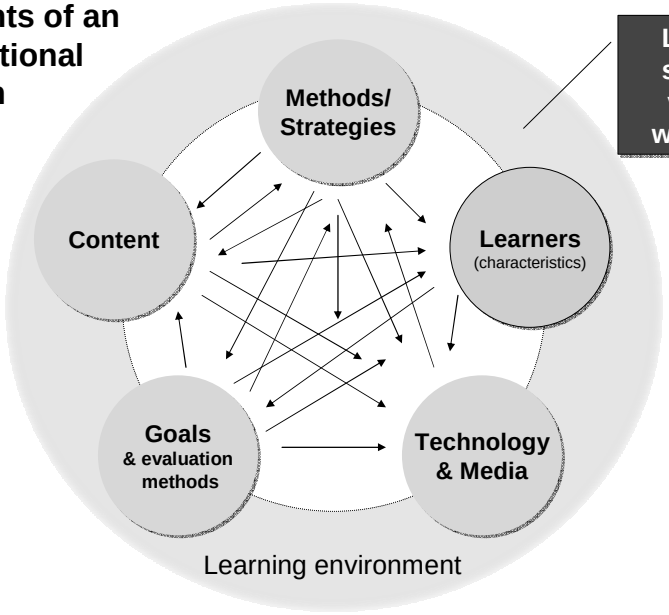
A Complex System

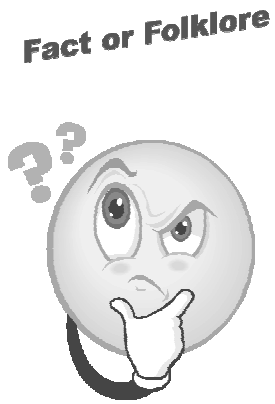
Elements of an Instructional System



Learning Styles Fact and Folklore

Questioning the utility of learning styles is **not** a denial of individual learner differences.

Questions



Empirical Research Fact

Other learner traits can interact with instructional design in significant ways.

E-Learning Design Challenge 1

Design a CSCL assignment to solve a complex problem

Identify a dominant learner characteristic

The groups that consists primarily of full-time students tend to produce poorer problem solutions than the groups consisting primarily of part-time adult students.

Learner Prior Knowledge

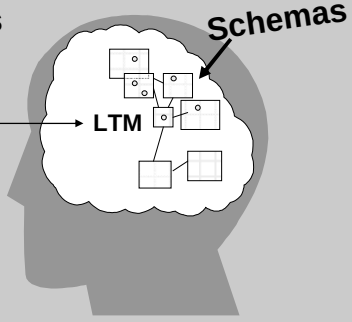
Low prior knowledge ——— **High** prior knowledge

Unable to integrate/assimilate new information into existing knowledge base (poor learning)

Connects/assimilates new knowledge with existing concepts and experiences (efficient learning)

Prior knowledge is about schemas

Meaningful learning occurs when new information is integrated into existing knowledge structures or schemas in long-term memory (LTM).



Learner Prior Knowledge

Principle:

Accommodate learner **prior knowledge** differences in online courses

- Combine low and high prior knowledge learners in work groups and teams.
- Provide access to advanced organizers, worked examples and supplemental learning materials.
- Provide more learner control for high prior knowledge learners.

E-Learning Design Challenge 2

Identify a dominant learner characteristic

Design a CBT tutorial on how to use the school library's databases

Over 60% of the students fail to complete the CBT tutorial. They say it is boring and requires too much effort to learn how to search the multitude of library databases.

Learner Motivation

Low Effort ——— **High** Effort

Not engaged mentally in assimilating/constructing new knowledge & skills (schemas)

Mentally active in assimilating/constructing new knowledge & skills (schemas)

Motivation = **Amount of Invested Mental Effort**

The amount of mental effort invested in a learning task is a reliable estimate of the learner's motivation or involvement in the task. (Pass, Tuovinen, van Merrienboer, Darabi)

Learner Motivation (mental effort)

Principle:

Address learner **motivational** differences in online courses

- Incorporate audio-visual media to gain **attention**.
- Contextualize or situate learning to make it more meaningful and **relevant**.
- Design tasks that are manageable to increase learner ***confidence***.
- Use simulation-games and other learning activities that include built-in rewards to increase **satisfaction**.

E-Learning Design Challenge 3

Identify a dominant learner characteristic

Include an activity on using a 3D CAAD to design mechanical parts

About 25% of students are error prone and slow in using the CAAD to produce 3D mechanical drawings. They say the interface is too cluttered, unstructured and difficult to use. The majority do not have this problem and find the interface very useable.

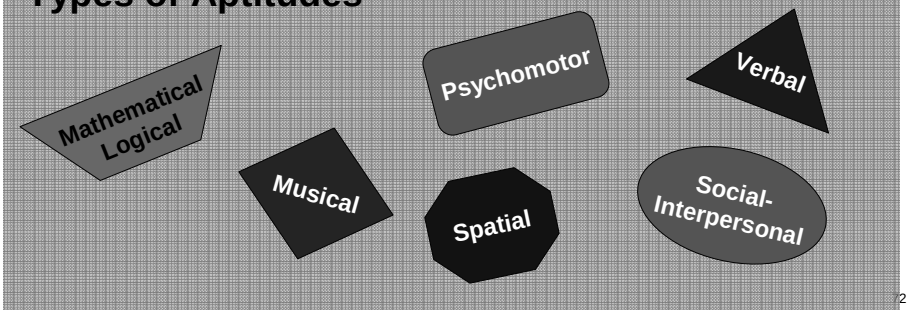
Learner Aptitudes

Low Aptitude ——— **High** Aptitude

Inability to proficiently perform certain types of tasks and work with certain kinds of knowledge

Quickness and ease in performing certain types of tasks and working with certain kinds of knowledge

Types of Aptitudes



Learner Aptitudes

Principle:

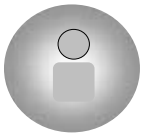
Address learner **aptitude** differences in online courses

- Allow flexibility in pacing for completing complex assignments.
- Provide access to just-in-time job/task aids and integrate focusers and enablers within complex data displays.
- Reduce task cognitive load by eliminating extraneous details.

Additional Learner Characteristics

Age (NetGen – Seniors)

Personality



Gender

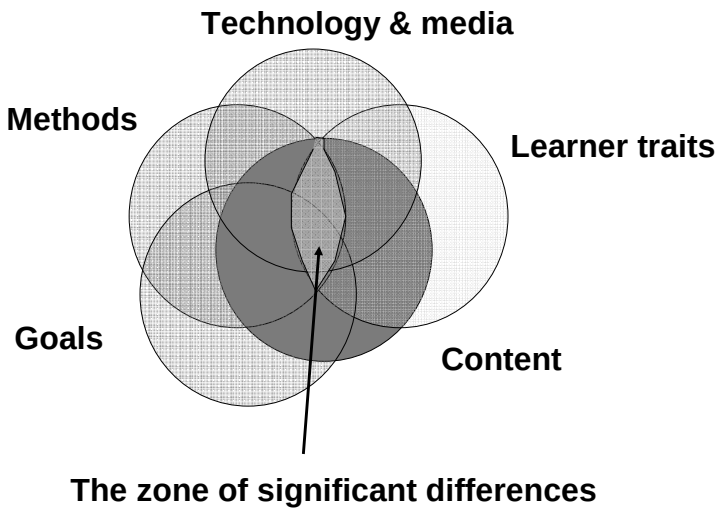
Disabilities

Culture

Others?

Adapting e-Learning for Individual Differences

Complex Interactions



Advice for e-Learning Designers

- Focus most on good instructional message design.
- Select instructional methods and modalities appropriate for content.
- Focus on developing schemas not just communicating content.
- Focus on what students **do** in the learning task.
- Don't discard learning styles entirely, instead fine-tune your schemas.
- Read learning styles research (abstracts).
- Supplement your learning "styles" paradigm with other learner attributes that are "tried and true."

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Extra Stuff

Putting VAK to the empirical test

Perceptual Learning Style and Learning Proficiency:
A Test of the Hypothesis

University of Regina, Canada
G. Kratzig and K. Arbuthnott
Journal of Educational Psychology, (2006)

What they did:

- Identified student learning styles (visual, auditory and kinesthetic)
- Measured memory and performance in visual, auditory and kinesthetic tasks (objective tests)
- Looked for correlations between LS inventory, self assessments and objective measures
- Conducted a meta-cognitive analysis of student approach to completing the learning style inventory

Testing VAK modalities and Learning

Research Questions	Findings
1 Do LS questionnaires correlate with visual, auditory and kinesthetic performance?	• Assessment of LS based on sensory modality has no correlation with learning and memory. • Many "kinesthetic" learners performed better with the visual treatment.
2 How accurate are individual beliefs about their own learning styles and competencies?	• Participants were very sure about their own LS type • Participants completed inventories based on inconsistent and partial criteria.

These findings have been replicated in other research

back

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ONLINE CL@SSROOM
IDEAS FOR EFFECTIVE ONLINE INSTRUCTION

APRIL 2009

Learning Styles and the Design of E-learning: What the Research Says

By Les Howles and Allan Jeong, PhD

Good teachers recognize that individual learner differences can affect the outcomes of educational experiences. The theory and practice of learning styles not only identifies individual differences that affect learning, but also prescribes ways to improve academic performance by matching learner "styles" with specific instructional approaches. At a time when new instructional technologies offer greater capabilities for adapting instruction to individual needs, the application of learning style theory to online learning design has broad appeal.

In this article, we briefly look at empirical research related to learning styles and its application to e-learning design.

Applying learning styles to instructional design

A learning style can be viewed as an individual's relatively stable and persistent pattern of acquiring information and building knowledge when approaching a learning task. If a learner is said to have a "visual" or a "reflective" learning style, that learner will likely express that style across a wide range of learning situations. It is believed that learning can be optimized when instructional strategies are matched to the strengths of students' learning styles. Accomplishing this requires accurately identifying the learning styles of all students in a course and providing prescribed learning options for individuals within different learning style groups throughout a curriculum.

Efforts to tailor instructional designs to multiple learning styles warrants some form of objective assessment to validate the "payoff" in terms of greater learning gains.

Empirical research

Instructors and designers who try to develop online learning for diverse learning styles often validate learning outcomes informally at best. When teachers cannot directly observe how individual students interact with different instructional approaches, it becomes difficult to pinpoint the instructional variables that make a positive difference in learning.

Researchers in numerous disciplines have conducted hundreds of controlled experiments to study how individual learner traits interact with different instructional approaches and methods. Since the early 1950s, at least 30 different "styles" describ-

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TIPS FROM THE PROS

Promoting Early, Active Discussion

In a study of student participation in threaded discussions, Scott Warnock, an assistant professor of English at Drexel University, found that students who post early in threaded discussions tend to do better (as measured by course grades) than those who procrastinate.

Those who post early also tend to take control of the conversation and check for reactions to their messages, Warnock says. "We've all sent out provocative messages and can't wait to see the response. That's exactly what I think is going on [in threaded discussions]. Students have said to me, 'I keep checking because I want to see [other students' responses].' If you haven't posted, you have no stake in the conversation, so you really don't care what anybody else says."

Although it would be helpful to share these observations with students, it may not be enough to get them to post early. To do that, Warnock suggests the following:

- **Use simple prompts.** Don't give students so much to think about that they have to read the prompt, log off, and think

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ONLINE CL@SSROOM
IDEAS FOR EFFECTIVE ONLINE INSTRUCTION

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ing distinct ways in which people think and learn have been developed.

Modality-based learning styles and multimedia instruction

The notion that individuals can be classified as auditory, visual, or kinesthetic learners is very much ingrained in the culture of education. It is often said that visual learners learn best when content is presented in the form of pictures, diagrams, flow charts, and videos. Auditory learners excel when content is presented in spoken words through dialogue and interactions with others. Kinesthetic learners learn better when given opportunities to engage in tactile hands-on activities in the process of absorbing new knowledge. Instructors are often encouraged to ensure that each individual's strongest modality is brought to bear during the learning process.

However, is there sufficient scientific evidence to support the claim that students will show superior learning and memory when content is presented in their strongest or preferred modality?

Dozens of well-conducted experiments over the last several decades paint a different and more complex picture when attempting to match learner sensory modalities with corresponding instructional treatments.

Cognitive psychologist Daniel Willingham (2006) points out that acquired knowledge is more often stored in the brain not as auditory or visual facsimiles, but rather in terms of meaning. Psychologists often refer to these stored knowledge structures as schemas. Willingham further points out that visual and auditory representations conveyed through instructional media cannot serve as substitutes for one another. In other words, different types of representation store and communicate certain information more effectively than others.

The validity and reliability of the instruments used to identify learning styles have also been seriously questioned by educational psychologists. Krätzig and Arbuthnott (2006) measured students' visual, auditory, and kinesthetic learning styles with a commonly used learning-style questionnaire. They found no significant correlations between a student's modality-based learning style and performance on objective psychological tests for auditory, visual, and kinesthetic memory abilities. Furthermore, student perceptions of their own learning styles did not strongly correlate with their actual memory abilities in the three modalities.

The consensus of most educational psychologists, including prominent educational psychologists such as John Sweller and Ruth Clark (2006), is that learners are multimodal and able to adapt and learn from content presented in different formats. Focusing on good instructional message design and selecting a presentation modality that best represents the instructional content will likely serve learners better than attempting to match different learners' preferred modalities.

Cognitive and personality-based learning styles

Several learning style models have been established to classify the cognitive and personality traits of individuals. These traits would seem particularly relevant to online dialogue and group work. Some studies have revealed possible relationships between these learning styles and how students interact in online environments.

Allan Jeong (2008) has found significant differences between learners with active and reflective cognitive styles in the way they engage in online discussions. Active learners

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tend to enjoy cooperative problem solving and other activities in which knowledge is discussed and explained and then immediately applied. Reflective learners tend to be more introspective and prefer to reflect on and test the given information before applying it. Jeong analyzed student message-response exchanges that fostered critical thinking and found that the exchanges between reflective learners produced significantly more responses than the exchanges between active learners. These findings indicate that groups dominated by active learners are likely to produce less critical discourse than groups with reflective learners only.

Studies often show that the quality of online discussions can be stymied by students' tendency to agree with one another rather than to generate counterarguments. Michael Nussbaum (2004) examined the personality traits of introversion and extroversion and how these traits influence the way students engage in online discussions. He discovered that by encouraging students to use introductory prompts at the beginning of a post (e.g., "My argument is...") the introverted and less assertive learners produced more counterarguments than before, resulting in richer discussions. The same prompts had little or no impact on the more assertive and extroverted learners.

Although these studies apply to only one type of instructional task (online group discussions), they illustrate a microlevel approach as opposed to a global approach to understanding how learning styles affect the process of learning. Educators tend to overgeneralize and oversimplify learning style concepts. Based on the research evidence, a more constructive approach would seem to require focusing on how learning styles affect the *processes* of learning associated with *specific* learning tasks.

Other learner traits

A number of non-style-related learner traits have been studied and documented in the research literature. Some of these include the learner's prior knowledge, motivation, aptitudes, gender, and cultural background. In traditional face-to-face learning environments, many of these attributes have been shown to strongly impact learning outcomes and interact with instructional design. One would expect similar trait-treatment interactions to occur in online learning environments.

Based strictly on empirical research, practitioners could be more effective by individualizing instruction around several of these non-style attributes rather than attempting to apply adaptive strategies based on popular learning style models. But would doing this take away the novelty and appeal from what appears to be a simple and compelling approach to understanding learner differences?

To learn more

So, what learner traits should we focus on most when attempting to adapt e-learning environments to diverse learners? The notion that individuals have "styles" that influence how they learn has great intuitive appeal. Our analysis of the learning styles literature and some of the courses of action prescribed above illustrates the need to think more critically and in more precise terms about learning styles.

For more information about learning styles, learner traits, supporting research, and strategies on how to address learner differences in e-learning, join us for our May 6 Magna Online Seminar, "Learning Styles: Fact and Folklore for E-learning." For information, visit *www.magnapubs.com/calendar/308.html.*

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Get Real. Pump Up Your Online Courses, Part 6

By Patti Shank, PhD, CPT

Many higher education institutions have considered the need to prepare students for the workforce after graduation. Some information technology programs, for example, have redesigned curriculum specifically to better prepare students for working in the real world. Information technology personnel increasingly need to deal with people and systems problems that require a team approach. This typically involves working with information technology, management, finance, and other business stakeholders. TechRepublic surveyed people who work in information technology in business settings near the end of 2008 to determine if undergraduate programs helped IT students gain the real-world insights and skills they needed to hit the ground running after graduation *(http://blogs.techrepublic.com.com/career/?p=434).* Of the 2,811 respondents, about a third felt that their school effectively prepared them for real-world IT work and projects.

Math, history, finance, economics, business, and other content areas may seem dry or dull out of context, but in the context of what is going on in the world, these topics can be (and should be) very compelling indeed. Our increasingly painful economic breakdown, for example, can be used to spark understanding and insights in a variety of subject areas.

One problem with online courses is that students (especially those who are new to online courses) can feel less engaged because of the lack of immediacy in student-to-student or student-to-teacher communications (as well as for other reasons). So anything that makes your content more compelling and engaging is a good thing. And since a real-world focus can also help students understand the how the content intersects with other content domains, a real-life focus can be very important indeed.

Adding a real-life focus

So what can you do to add more of a real-life focus to your online courses? I'll discuss a few options that I particularly like.

1. Real life. (Duh.) People who develop online courses and teach online too often think that everything students do in the course must take place online, but that's silly. Your students have the whole wide world around them, and it makes sense to use it. Staying inside the monitor limits the instructional experience. The real world itself is fascinating and can provide fodder for truly engaging online discussions (that don't need to be forced) and projects.

For example, if you are discussing the courts and the legal system, students can observe the court system from inside a courthouse. The list of how you can use the real world around your students' lives is only limited by your and your students' imaginations.

One of the hybrid courses I taught had a variety of field trips. I set up 10 of them and students were asked to sign up for and attend a minimum of six. (Those who couldn't make six were required to set up and document their own field trips.) Students told me that seeing the content we were discussing "in action" really helped them connect what they were reading and what we were discussing to their lives.

2. Real people. This is really an extension of number 1. Ask guest experts to be available in synchronous and asynchronous discussions for a short period of time. Know any experts who would capture students' attention? Interview them and record the interviews. Students themselves can record personal interviews and experiences, and these can be made available for other students. (Google "record to mp3" for free and inexpensive tools to facilitate this activity.) Recorded interviews can be a terrific source for meaningful discussions.

3. Current news. In the second article in this series (December 2008), I discussed using Really Simple Syndication (RSS) feeds to help students keep up with current events and trends in a specific field. RSS readers let you gather frequently changing online content automatically by "subscribing" to it. This is another great source to encourage and invigorate online discussions.

4. Domain-specific online communities. Most knowledge domains have lively online communities that students can examine to become aware of the field's hot issues. For example, ITFORUM *(http://it.coe.uga.edu/itforum)* postings and papers help instructional technologists (like me) keep up with research and practices in our field. Slashdot *(http://slashdot.org)* is a very popular computer science online community. Where do folks in your field go for timely information and discussion and to share resources?

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Four Generative Strategies to Promote Learning in the Online Classroom

By Dave S. Knowlton, EdD

Evidence is becoming more and more clear that simply delivering content online will not allow for substantive learning. Rather, substantive learning occurs only when students are required to interact in meaningful ways. Currently, approaches involving real-world collaboration, problem solving, and case scenarios are in vogue. But distance learners should have a fuller cabinet of approaches to create interaction. This article provides an overview of the notion of generative learning strategies. Generative learning was originally established by Wittrock in the late 1970s, and I have found that generative learning approaches can prompt learners to interact with content in meaningful ways. There are four categories of generative learning strategies.

Recall

Recall generative strategies are simply means to help learners remember important content. Teaching songs and rhymes can help students remember rules. Visual images help students "picture" items to be recalled. One prominent example of a recall generative strategy is mnemonics. Mnemonics are common in many educational settings: "HOMES" can help learners recall the names of the Great Lakes. The sentence "Every Good Bird Does Fly" can help music students remember the names of notes on a staff.

Within an online learning environment, designers and instructors should expose students to recall strategies if they are to be expected to remember content. For example, after learners read an online lesson that discusses the four steps of troubleshooting a faulty circuit, instructional designers might prompt them to create a mnemonic that will help them recall those steps.

Organization

The idea of an organizational generative strategy implies more than students repeating an existing organization from a textbook or lecture. Students should impose on content an organization that makes sense to them. By imposing their own organization, they are more likely to learn from their organizations because they are, in essence, rehearsing the information as they organize.

Organizational generative strategies come in two basic forms. The first form is text-based. Constructing outlines (i.e., organizing content with numbered points and lettered subpoints) and writing summaries (i.e., organizing content in paragraph form) are two examples. The second type of organizational generative strategy takes the form of graphical "concept maps." Venn diagrams, plot graphs, and even hand-drawn pictures are examples. For examples of other types of concept maps, readers might visit *http://classes.aces.uiuc.edu/ACES100/Mind/c-m2.html.*

Regardless of which type of organizational generative strategy is

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Are there developments or disagreements that would help your students understand how what you are teaching is impacting real lives? Use them in your courses!

Your turn

I'm hoping that some of my ideas spark some ideas of your own. Adding real life to your courses can engage students like almost nothing else can. If you want additional ideas about how to add real life to your online courses, consider searching for information about what other faculty in your field are doing to make their courses more relevant and real. For example, Lecture Fox *(http://lecturefox.com)* provides video, audio, and lecture notes from MIT, Yale, Harvard, and other university professors on physics, chemistry, computer science, and mathematics topics (and a few other topics and fields). Or spend a bit of time with other faculty in your own institution who teach similar material.

I realize that some faculty are unable to add online content to the courses they teach because others are responsible for adding content to the content management system. If this is true for you, consider setting up a course activity portal that you can personally control, as an adjunct to the course materials in your course management system. Pageflakes, a free and hosted portal development tool, provides a special version for teachers and instructors *(http://teacher.pageflakes.com)* that is worth looking at.

Patti Shank, PhD, CPT, is a widely recognized information and instructional designer and writer who helps others build valuable information and instruction. She can be reached through her website: www.learningpeaks.com. @

The Online Instructor Evaluation—Understanding It, Using It, Improving It

By Errol Craig Sull

We teach because, at our core, we have a passion for it: to share our expertise in a subject or two with students to help better prepare them for careers and life. Yet we are not self-employed, able to teach however, whenever, and whatever we choose. Rather, we must teach within our institution's guidelines, policies, and practices. Failure to do so can result in poor evaluations from the school and/or the students. This is something you can easily avoid.

To assure that your evaluations stay at an "Exceptional!" level or to more effectively react to some not-so-great evaluation comments, use the following tips—your school and your students will be glad you did:

Teach your class as your school expects you to teach it. We each have our own preferred teaching style and approach, yet often this must be bent, tweaked, and honed based on the online teaching environment and the policies and expectations of our school. The former becomes somewhat easy to accomplish, as you need merely teach through various online portals, links, and pages; the latter can take some getting used to as the school decides the frame in which you can teach. The requirements, procedures, best practices, and the like might be items you've never considered or don't agree with. It doesn't matter. You need to follow you all your institution's guidelines. If not, your evaluations will reflect this, something you don't need.

Be a constant and positive presence in the classroom. This can go a long way toward softening any negative evaluation points you might receive. Online teaching is virtually 24/7, and the only true, constant link the students have to the class is you—if they regularly find you there and also experience you as an upbeat, positive, enthusiastic faculty member, this goes a long way toward establishing you as an asset to your school. Does this mean other items you overlook or don't inject much effort into will be forgiven by your school? Not by a long shot.

Never teach to simply reach minimum expectations. The online instructor who merely "meets expectations" is doing the job on paper—but certainly is not establishing him- or herself as an extraordinary force in the classroom, someone the school would definitely consider a "keeper" in the event an instructor or two had to be let go or not given any classes due to low enrollment numbers.

Embrace all aspects of upcoming/ongoing school evaluations. A school will often tell you when you will be evaluated. This could be one or two courses in a semester, part of a course, or some components of a course. Two points here: (1) During this evaluation period, read various resources to help strengthen your abilities as an online instructor—always read everything that's offered and always implement at least some of what is offered. (2) If you are told you will be evaluated, for example, only on two specific weeks of your course or one component of your course, do not "go the extra mile" only for those two weeks or that one component. There is nothing to prevent the evaluator from looking at the rest of your course, and if it's obvious that it does not match your efforts in what is officially being evaluated, what does that say about you?

Disagree with school evaluation points in a professional, courteous, and intelligent manner. Dashing off comments that are surly, rude, curt, or abrasive about a point or more you don't agree with on your evaluation doesn't help your cause; it only adds negatives to your evaluation. If you have thought through the negative points raised and sincerely believe they are wrong, let the evaluator/school know by citing details that back up your contention in a polite, civil manner. Always end by thanking the evaluator for his/her input on your teaching. This approach labels you as a professional online instructor who takes his or her teaching seriously—and is always looking to improve.

Implement any justifiable "needs work" points of an evaluation. This is a "no-brainer" suggestion: you are being given feedback so you can improve, so you can be an even stronger asset to the school. No one is perfect, so it makes no difference if you are new to teaching or have been teaching for 20-plus years—anyone who teaches can become better, and one way to achieve this is to implement legitimate evaluation suggestions.

Student evaluations can be unfair—but listen closely to what they say. Student evaluations are the bane of many online instructors, for they can be used negatively to "get back" at an instructor for giving a student a low grade, because the student just doesn't like the instructor or does not take the evaluation seriously. Yet, overall, students have been shown to be fair in their evaluations of instructors, and there is much we can learn from their comments—not only suggestions to put us back on track, but ideas that we had not considered and can

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used, learners who organize content for themselves will learn more than learners who simply accept the organization of others. Two examples of organization generative strategies might help: After learners read an online text-based module about the organizational structure of the institution for which they work, they might be prompted to create a graphic that shows the hierarchy and "reporting paths" for employees at various levels. As a second example, after watching a podcast of a lecture about ethics in the accounting profession, accounting trainees might be prompted to identify five key points from the lecture and write a song to the tune of "Mary Had a Little Lamb" to help them remember those points. (While this second example does require learners to reorganize the content, it also serves as a recall strategy because the new content from the lecture is put in the form of a familiar children's tune.)

Integration

Integration is the process by which learners connect new information with their existing knowledge—connecting the new with the familiar. As students integrate new knowledge into their existing knowledge structures, they build on their own knowledge and construct a personal understanding of course content.

Writing paraphrases and developing metaphors are two examples of particularly powerful integration generative strategies. Initially, writing paraphrases may seem no different than summarizing, which was described earlier as an organization generative strategy. There are, however, key differences. Summarizing emphasizes a structure of the content, in that it is the content in a shortened form; paraphrasing, on the other hand, emphasizes the integrity of the content. The key to guiding students in writing paraphrases is to require them to use their own words to describe and clarify specific and narrow ideas. In using their own words, they integrate the content with their own language structures. In short, a student's "own words" is indicative of the student's "own knowledge."

Similarly, metaphors are very pervasive in our thinking; people often speak in metaphor and do not even realize it. Some content may be so abstract that instructional designers use metaphors to explain concepts. But as a generative strategy, learners should be creating metaphors as a means of integrating content.

Within the confines of the online classroom, we might require learners to paraphrase course content for a different audience. In one online training course that I helped design, for example, cable-repair technicians were required to explain the steps for connecting a DVD player to a television in a way that a 10-year-old could understand.

Elaboration

Elaboration strategies obligate students to connect new content with extended information—often coming in the form of real-world events or examples. When online courses provide students with opportunities to elaborate on information, they can go beyond what is revealed within the instruction. The extended information a student provides may be more personally relevant and interesting to that student.

Strategies for promoting elaboration include, but are not limited to, the following: (a) requiring students to identify real-world examples and manifestations of course content; (b) predicting results and implications of policies or procedures; and (c) synthesizing discipline-specific course content with content from other disciplines.

As an example, consider trainees who are taking an online course as a part of health inspector training. After these students read about the steps for properly cleaning a meat cutter, they might be required to write a paraphrase of the process that adds predicted sensory cues that are not included within the instruction (e.g., how much pressure do you think you'll have to apply when removing the rotary blade?).

This article has summarized four categories of generative strategies that have been developed and widely discussed in research literature. The notion of generative strategies and the various categories of generative strategies have come out of fields as diverse as computer science, cognitive psychology, and rhetorical theory. This article has offered practical examples of each category. For instructional designers of online classrooms, the categories and examples are merely illustrative. The larger point is that strong online classrooms should help learners do more than simply "take in" content. Learners must interact with content is active and meaningful ways.

Dave S. Knowlton is an associate professor in the Department of Educational Leadership at Southern Illinois University Edwardsville. @

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make our teaching stronger.

Keep an ongoing checklist of weak points as indicated by evaluations. When evaluations—school or student—point out weak points in an instructor's teaching, these often indicate school policies or requirements that have been overlooked or forgotten. "Meets expectations" components of an evaluation can become "Exceeds school expectations" or "Exceptional!" and long-comfortable teaching habits can be tweaked to meet the school's expectations. Making a checklist of these "needs improvement" items and regularly going over it will ensure that you incorporate appropriate changes.

Read thoroughly and keep copies of all updated policies. You may well start out teaching and continue teaching for your school with no problems in your evaluations, but then overlook a policy change sent out via email to all faculty—and your evaluations will suffer as a result. Don't let this happen. Read all school correspondence sent to you, especially any related to school policy. Keep these in an online folder and in printed form. This will give you better access to the school policies and a constant reminder to "do the right thing."

Don't forget to evaluate yourself ... honestly. This is one evaluation that too many online instructors neglect, yet it can prove so helpful in keeping your school evaluations in the "Exceeds school expectations" and "Exceptional!" categories. Make your own evaluation checklist based on both what the school expects of you and what you expect of yourself; once each class you teach is completed, rate yourself and use your honest self-evaluation to teach your next classes a bit better.

REMEMBER: Evaluations are a school's equivalent of an AAA TripTik—they offer detailed guidance and suggestions on how to make your teaching journey one that is smooth and enjoyable for all on the learning pathway.

Please let me hear from you, including suggestions and information for future columns. You can always reach me at errolcraigsull@aol.com. *And remember: please forward me your computer tips and suggestions to make teaching in the online classroom more efficient and productive.*

Errol Craig Sull has been teaching online courses for more than 14 years and has a national reputation in the subject, both writing and conducting workshops on it. He is currently putting the finishing touches on his next book, How to Become the Perfect Online Instructor. @

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about it for hours before responding. "I want them to be able to read the prompt, write 200 or 500 words, and sit back and see people respond to what they said," Warnock says.

- **Make it fun.** Warnock uses playful threads to prompt student interest. In a persuasive writing course, he made outrageous comments and had students use evidence to debunk his claims.
- **Make discussions valuable.** "Have the students to use the posts as evidence in their papers. This encourages them to read the posts and use the conversations in a way that is useful to their own writing projects," Warnock says.
- **Have students moderate.** This can take some of the pressure off the instructor and encourage participation. "Sometimes students respond better to each other than they do to the instructor," Warnock says.
- **Give students choices.** "I always have more threads than I require students to post to. I want them to read the threads, but I want them to feel some freedom to respond where they like," Warnock says.
- **Have students analyze discussion posts.** Students do a lot of meta-writing in Warnock's classes. He has them select a favorite post and favorite poster, which gives certain students further recognition for their comments. He also has students comment on their own posts—what they did and what they wish they had done differently—and rewrite them. "This makes them more aware and helps them stay in tune with the threads," he says.

Scott Warnock will present on this topic at The Teaching Professor Conference, which will take place June 5-7 in Washington, D.C. For more information, see www.teachingprofessor.com/conference/index.html. Contact Dr. Warnock at sw93@drexel.edu. @