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## Student Learning Styles

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The central assertion of learning styles theory, that students learn better when they receive instruction in the format that accommodates their preferred learning style is, after a generation of implementation, still an unproven assertion: “Although the literature on learning styles is enormous, very few studies have even used an experimental methodology capable of testing the validity of learning styles applied to education. Moreover, of those that did use an appropriate method, several found results that flatly contradict the popular meshing hypothesis” (Pashler et al., 105).

A key learning styles assumption is that if students learn using methods that complement their preferred learning style, processing the concepts takes less cognitive capacity (which is limited in working memory) and more attention can be given to the actual concepts, resulting in improved performance.

### What is a Learning Style?

“A learning style is the way students begin to concentrate on, process, internalize and remember new and difficult academic information” (Dunn, 8). It is “a biologically and developmentally determined set of personal characteristics” grounded in cognitive style theory and brain lateralization theory (Dunn, 9). So, learning styles are not made up pseudo-science, but rather a highly developed characterization of how students learn that has not yet been validated by conventional scientific research methods. “Given responsive environments, resources, and approaches, students achieve statistically higher achievement and attitude test scores in congruent, rather than incongruent treatments” (Dunn, 10). Learning styles can change as one ages, but the degree and nature of change is highly individual.

Despite mixed evidence on the effectiveness of the implementation of learning styles theory, as general descriptors of how students learn (Visual—having concepts represented with pictures, graphs, flow diagrams, etc.; Aural—hearing concepts explained/talking them through; Read-Write—reading about the concepts before using them; Kinesthetic—starting by using the concepts and learning them through trial and error), learning styles theory is useful to remind us to use variety in presentation, engagement and assessment methods, which is something that does improve student performance (Cuthbert, 246). Student learning styles may be as individually unique as a fingerprint but significant value can still accrue from using variety with different styles of learning in mind, and having students think about their learning processes in these terms as well (Yenice).

There are many different learning styles models, but VARK is used in this article because it is representative. Also, the VARK learning style category labels are intuitively descriptive of the essence of each category, making them easier to use.

## How May Learning Styles Theory Impact University Instruction Methods?

The table below outlines presentation methods that correspond to the four VARK categories (Hawk, 8; VARK).

Visual	Aural	Read-write	Kinesthetic
Learn best from maps, charts, graphs, diagrams, brochures, flowcharts, highlighters, different colors, pictures, word pictures, different spatial arrangements, designs, whitespace, patterns, shapes and the different formats that are used to highlight and convey information, such as drawing on the board with terms and lines/arrows between them to indicated interrelationships between the parts. Counterintuitively, it does NOT include still pictures or photographs of reality, movies, videos or slide shows (these are in the Kinesthetic list).	Learn best from lectures, group discussion, radio/podcasts, email (chat style, with non-formal language and abbreviations), using mobile phones/tablets, speaking, web-chat and talking things through. Often want to sort things out by speaking first (even talking out loud to themselves), rather than sorting out their ideas and then speaking. They need to say it in their own words, even though it may be a repetition of what someone else has said.	Learn best using text: all forms of reading and writing but especially manuals, reports, essays and assignments. Strongly prefer slide presentations, Internet searching, lists, diaries, dictionaries, thesauri, and quotations. Most slide presentations are suited to read/write learners as they seldom have narration or visual symbols.	Learn by trying things out or problem solving right away, rather than reading and thinking it through first, and learning from mistakes and successes. Prefer demonstrations, simulations, videos and movies of "real" things, labs, collections of samples, case studies, practice and practical applications. The key is the concrete nature of the example—can it be grasped, held, tasted, or felt? Assignments should specify the details of who will do what and when. A case study or working example of what is intended or proposed will help.

Provide variety in presentation methods

<http://unbtls.ca/teachingtips/varietyincontentpresentation.html> , and assignment and assessment formats <http://unbtls.ca/teachingtips/varietyinassessmentmethods.html> . Try different lecture methods, discussion, reading assignments, audio-visual materials, and hands-on activities. Provide opportunities for students to work in groups as well as alone. Provide assignment options: written papers, oral reports, class presentations, multimedia portfolios, video projects.

Have exams that require a variety of cognitive skills: questions that ask for specific information (recall), that require focused analysis, responses to scenarios, problem solving and other types of practical application of theoretical principles.

## Helping Students Use Learning Styles Ideas to Their Advantage

Tell students how knowing about learning styles can help them understand their own learning processes, identify their learning needs and develop new and more effective learning behaviours. Ask students to notice what they do when they are trying to learn something new. For example, when trying

to learn a new software application, assemble a piece of furniture or use a new device, do they read the manual? Learn through trial and error? Ask someone to show them? Also ask students to consider what kinds of learning activities or assignments they find most rewarding and what kinds they most dread. Share anonymous profiles of the different learning styles and our own preferences. Students then see that not everyone learns in the same way, and they have strong and weak methods.

Recommend that students identify their learning styles using online questionnaires such as VARK <http://www.vark-learn.com/english/page.asp?p=questionnaire> , and the North Carolina State University Index of Learning Styles Questionnaire: <http://www.engr.ncsu.edu/learningstyles/ilsweb.html> and explanation of results: <http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSpage.html> Emphasize that these questionnaires are not intelligence tests and are designed primarily to help students become more aware of how they learn and to manage their own learning. Advise them to use their own judgment and ignore any results that do not seem right to them.

Students see how instructors are trying to address their needs and they become more connected to the course. Knowing a student's learning styles and preferences help instructors craft responses to questions when students request individual help. "We believe that student performance improves as a result of our use of the learning style instruments, although we have no empirical data of our own to support that belief" (Hawk, 14).

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