TEACHING AROUND THE CYCLE

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We all have characteristic strengths and preferences in the ways we perceive and process a new piece of information, approach a new learning experience, and/or solve problems. In brief, each of us has different learning styles.

And so do the students at school. For example, some students prefer learning the theory first, then applying it; some other students prefer knowing the application first, then studying the theory. Some students tend to focus on the main ideas; others take care of the details. Some students prefer to learn by reading or discussing; others tend to learn by doing or trying things out.

It is doubtless that students learn best through their preferred learning styles. However, it is not wise for a teacher to teach exclusively in their preferred styles, since they may not develop the mental dexterity they need to reach their potential for achievement in school. On the other hand, if a teacher teaches exclusively in their less preferred styles, they will probably find their hard time of learning.

Thus, ideally, a teacher should teach in various styles. In practice, however, the teacher's preferred learning styles usually influences the way he or she explains things to students. This, of course, will cause a level of discomfort for those who prefer dif-ferent styles. Traditional teaching that focuses almost exclusively on formal presen-tation of course material will also have the same effect.

To avoid that undesirable situation a teacher should consciously assimilate other learning styles and try to teach in different styles. By teaching in various styles,

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a teacher can be sure that the learning needs of his or her students are met at least part of the time. This is, more or less, what we mean by “teaching around the cycle”.

There are several learning style models that provide good frameworks for teaching around the cycle. Two of them that we shall discuss here are of Kolb’s and Herrmann’s, adapted from Richard Felder’s *Matters of Style (*ASEE Prism 1996).

Kolb’s Learning Style Model

In this model, students are classified by their preference for (1) *concrete experience* or *abstract conceptualization* in the ways they take information in, and (2) *active experimentation* or *reflective observation* in the ways they internalize the information. With this classification scheme, we have four types of learners (see Table 1).

Learners of the first type prefer concrete experience and reflective observation. They usually ask “why?” and respond well to explanations of how course material re-lates to their experience, their interests, and their future careers. To be effective with this type of students, the teacher should be able to function as *a motivator*.

Learners of the second type prefer abstract conceptualization and reflective ob-servation. They often ask “what?” and respond to information presented in an organ-ized, logical fashion and benefit if they have time for reflection. In order to be effect-ive, the teacher should be an *expert*.

Learners of the third type prefer abstract conceptualization and active experimentation. They normally ask “how?” and respond to having opportunities to work actively on specified tasks and to learn by trial-and-error in an environment that allows them to fail safely. To be effective with this type of students, the teacher should function as a *coach*.

Learners of the fourth type prefer concrete experience and active experimentation. They frequently ask "what if?" and be interested in applying course material in new situations to solve real problems. To be effective, the teacher should stay out of the way, maximizing opportunities for the students to discover things for themselves.

Preferences	Abstract Conceptualization	Concrete Experience
Reflective Observation	Type 2: **What?**	Type 1: **Why?**
Active Experimentation	Type 3: **How?**	Type 4: **What if?**

Table 1. *Kolb's Learning Style Model*

To teach around the cycle, a teacher should explain the relevance of each new topic (1st type), present the basic information, methods and procedures associated with the topic (2nd type), provide opportunities for practice in the methods and procedures (3rd type), and encourage exploration of applications (4th type). By doing so the teacher reaches all types of learners.

Herrmann Brain Dominance Instrument

This model classifies students in terms of their relative preferences for thinking in four different types or quadrants that are based on the task-specialized functioning of the physical brain (see Table 2).

Students who prefer to think in analytical, logical, critical, factual and quantitative fashion use dominantly their cerebral left brain (Quadrant I). Those who tend to think in detailed, organized, planned, structured and sequential forms use frequently their limbic left brain (Quadrant II).

Students who prefer to think in emotional, interpersonal, kinesthetic, sensory and symbolic fashion have dominant limbic right brain (Quadrant III). Those who think in holistic, innovative and visual forms must have strong cerebral right brain (Quadrant IV).

Brain	Limbic	Cerebral
Left	Organized, Sequential	Analytical, Logical
Right	Emotional, Interpersonal	Holistic, Innovative

Table 2. *Herrmann Brain Dominance Instrument*

Many teachers, especially science and engineering professors at universities, are left brain thinker (analytical, logical, sequential and verbal), and so most teaching usually focuses on left-brain Quadrant I analysis and Quadrant II methods and procedures associated with that analysis. Important skills representative of Quadrant III (such as communications and teamwork) and Quadrant IV (such as creative problem solving and design) are usually neglected.

Since 20 to 40 percent of students have stronger right brain (Quadrant III and IV) than left brain (Quadrant I and II), such imbalance of teaching is a disservice to them. To accommodate all students with different preferences for thinking, a teacher

should provide more opportunities for students' creativity, innovation and teamwork. This can be done by introducing activities such as experiments, question formulation, design, modeling and optimization, and allowing students to work in teams.

Concluding Remarks

Recently I asked my students — through a questionnaire — about their preferred learning styles. It turned out that 50% of the students preferred asking "why?", 35% asking "what if?", 10% asking "what?" and only 5% asking "how?". I also found that 58% of them were left brain dominant, while the other 42% were right brain dominant.

These results indicate that teaching "what" and "how" only will not be effective. Rather, teaching should stress more on "why" and "what if", meaning that we should give our students motivation and opportunities for self-discoveries.

When we teach, we should also balance the functions of the left and right brain. For this, creative problem solving and teamwork should be introduced proportionally, since they are as important as logical reasoning and sequential procedures.

Realizing that an objective of teaching is to help students learn and build their skills in both their preferred and less preferred learning styles, a teacher should always try to accommodate student learning or thinking preferences at least part of the time.

One way to fulfill this task is by teaching around the cycle as suggested above. Of course there are other models that can be used for teaching around the cycle. Kolb's or Herrmann's, however, seem to be adequate for a first experiment.

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