

Understanding the Learning Styles of Students: Implications for Educators

by *James Poon Teng Fatt*, Lecturer, Nanyang Business School, Nanyang Avenue, Singapore 63978

Introduction

As education is an expensive investment in the future of students, much emphasis is on the curriculum and values of education to meet the needs of industry. There is also an awareness of the interaction between students, teachers and course materials, but what about the emphasis on the process of student learning?

That students learn is taken for granted because students are assumed to be academically capable of understanding lessons and assignments. The majority of them pass anyway. To those unfortunate few who fail, the blame is on their academic standard or the teaching methods, but what about the way students learn? Because the way teachers teach is best left to the teachers alone, can we allow our students to learn their own way while we teach our own way?

Ideally, the way teachers teach should match the way students learn. The concern of educators should be the students' style of learning. Educators can then adapt their teaching styles to suit the learning styles of students. The aim is to understand from the heterogeneous mix of student learning styles the group learning style so that teachers can best adapt their teaching style and materials to suit the students' group learning style.

Defining Learning Style

Learning styles are characterised as cognitive, affective, and psychological behaviours that indicate how learners perceive, interact with, and respond to the learning environment (NASSP, 1979). Learning style may also be defined as the tendency to adopt a particular strategy in learning. Most students have a preferred learning style but some may adapt their learning styles according to the tasks. Those who adapt are referred to as having a 'versatile' learning style (Pask, et al., 1977).

Understanding Learning Styles

Elements of learning style appeared in the research literature as early as 1892. The term 'learning style' was probably first used by Thelen (1954) in discovering the dynamics of groups at work. The concept of learning styles that has grown in managerial circles was based on David Kolb's theories. Kolb saw learning as a circular process where learning is viewed as a series of experiences with cognitive additions: concrete experience, reflection and observation, abstract concepts and generalisations, and active experimentation (Honey and Mumford, 1986).

Honey and Mumford (1986) extended David Kolb's theories into a psychological framework of four basic learning styles: activist, reflector, theorist, and pragmatist. An activist is a dynamic learner; a reflector, an imaginative learner; a pragmatist, a commonsense learner; and a theorist, an analytical learner. A person need not have predominantly a preferred style but can also function with other learning styles at different times in different situations. Using Mumford's approach, one can establish the preferred style of a group.

Also, based on David Kolb's theories, McCarthy (1990) links learning to the way the brain works. According to McCarthy (1990, p.31), "People have major learning styles and hemispheric (right mode/left mode) processing preferences. All of us feel, reflect, think and do, but we linger at different places along the way. These lingerings form our learning style preferences; complex patterns of individuality, developed over time, that bias what we see and how we see it."

According to Bloom's (1956) Taxonomy of Educational Objectives, knowledge involves the recall of specifics and universals, methods and processes, and pattern, structure or setting. Knowledge objectives emphasise remembering and relating. Also, abilities and skills refer to organised ways of dealing with materials and problems but abilities and skills objectives emphasise the organising of material to achieve a purpose.

Improving the teaching skills of educators requires an understanding of how students learn. Initially, schools and universities should adopt a theory of learning upon which to base the classroom approach. Various learning theories exist and caution should be exercised during selection. An approach could be adopted that focuses on intellectual and ethical development or on inference and judgement. The quality of teaching is measured by how effectively and extensively the teaching style of teachers reinforces the selected learning theory. However, since teachers usually do not know which style is most effective, the measurement of teaching is left to the students (Benke and Hermanson, 1988).

Understanding the Kinds of Thinking

Left versus right brain

Ornstein (1977) attributed different forms of consciousness to two sides of the brain: left brain and right brain. The left brain is involved with analytical and logical thinking as well as words and language. The right brain is involved with artistic endeavours such as visualising, intuition, creativity, and imagination. Any individual may predominantly process with the left brain or the right brain, or be a mixed brain or an integrated brain processor.

It is useful to be aware of the characteristics associated with the processing methods. For instance, left brain processors like to deal with problems logically and are active and verbal people. Right-brain processors prefer to deal with issues intuitively and are good at visualising (Milne, 1989).

Many theories about time management skills centre on methods that utilise the left brain, or the logical and analytical hemisphere of the brain. New approaches in time management are now focusing on the right, or intuitive, side of the brain. While traditional time management theories have promoted organisation and structure, for right-brain-dominated individuals, a less structured and informal environment is more effective in increasing productivity.

Convergent versus divergent thinking

The distinction between divergent thinking and convergent thinking was popularised by Hudson (1966). Divergent thinking (which de Bono (1971) describes as lateral thinking) is productive or imaginative while convergent thinking is logical and analytical. De Bono compares problem solving to digging holes. In logical thinking, one digs a deeper and deeper hole in the wrong place. He suggests lateral thinking as digging exploratory holes before deep digging. In divergent thinking, one allows emotions and intellect the freedom to explore possibilities. It is broad focused and imaginative, unlike the narrow focus in the more practical fast-paced convergent thinking. Researchers have revealed that creative persons are higher in divergent thinking abilities, producing a variety of differing ways of answering a problem, rather than convergent thinking, arriving at a single best answer (Glisan and Hawer, 1990).

Are students more divergent or convergent in their thinking? An understanding of this can help teachers in assigning appropriate tasks to suit the thinking styles of their students.

Cognitive Styles

Cognitive styles are defined as 'information processing habits representing the learner's typical mode of perceiving, thinking, problem solving, and remembering' (Messick, et al., 1976). Reflective individuals tend to be analytical, cautious, accurate, and slow in their approach to problem solving. Individuals with an open approach see all possible solutions while those with a focused approach desire fast solutions.

Kinaesthetic, visual, and auditory modes of thinking

People use their five senses to gather information and then channel it through three separate routes, called representational systems, to make sense of it. These systems are visual, auditory, and kinaesthetic (touch, feelings, taste, and smell). Individuals have a preference for one of these systems, and communication to these people can be improved by relating it to their unique models of the world. People with a visual

preference see the world by constructing or remembering mental images. Individuals with an auditory preference prize sound and can make decisions based on what they have heard or read. Those with a kinaesthetic preference relate to the world through feeling or feelings (Madonik, 1990).

Problem solving

The importance of problem solving cannot be overlooked. The students of this century are expected to be more knowledgeable than those of the past and must deal with more complex situations. As a result, education is at a crossroads. It may well be that the textbook-based, rule-intensive, lecture and problem style of teaching will soon end. When students fail on the job, it is often because they lack the ability to cope with various situations. This represents perhaps the greatest challenge to education. Problem-solving skills and the fundamentals of problem-solving methodology should be discussed in classes. Teachers can assign cases that cannot be solved by reading the assigned texts. The purpose of classes is not just to teach but rather to teach students how to learn. Learning is more than just the mechanical application of rules (Bandy, 1990).

Assessing Learning Styles

One way to determine the learning style of students is to use a questionnaire such as the one from Educational Media Corporation, Minneapolis (1981). The questionnaire comprises four parts:

1. Left/right brain orientation (27 items)
2. Auditory/kinaesthetic/visual modes of thinking (30 items)
3. Convergent/divergent thinking (18 items)
4. Problem solving style - open/focused/reflective (9 items)

It can be modified to suit local conditions. T-tests are then used to test the difference between score means. An application of this can be found in 'Learning Styles in Accounting Education', a paper presented at the Third South East Asian University Accounting Teachers' Conference on Accounting for Socio-Economic Development, Kuala

Lumpur, Malaysia, 26-28 May 1993. Based on small classroom samples totalling about 71 accountancy students in Nanyang Technological University, the study found that the students were convergent and analytical in thinking, kinaesthetic, and reflective in problem solving.

Implications for Educators

After administering the questionnaire, teachers will be able to determine the group learning styles of their students and consequently adjust their teaching methods to suit the following:

1. Students with logical or analytical skills are meticulous and well organised, and excel at planning, projecting costs, or performing similar tasks requiring precise attention to detail.
2. Students who practice convergent thinking focus on the Here and Now and develop special solutions to particular concerns.
3. Students who practice the kinaesthetic mode of thinking prefer to learn by doing. They prefer a trial and error method of learning. Explanations, visual presentations, and discussions can be confusing to them.
4. Students who adopt a reflective approach to problem solving are able to consider possible solutions to find the best answers to problems. This is ideal for most people in most situations.

What must teachers do?

Generally, educators train students to generate ideas logically and then systematically examine the ideas for their usefulness. For students who are analytical, it is effective to teach them by inquiry in order to stimulate analysis. For students who are convergers, hypothetical-deductive reasoning involving "What if..." and a one solution type answer is most suitable. For kinaesthetic students, a trial and error or hands-on approach is best. For the reflectors, teaching should be slow-paced with role-plays, videos and feedback. Reading, observing, and displaying data and visual aids are more suitable for

visual students while lecturers, seminars, discussions, and use of tapes suit the auditory students.

What must students do?

For students who are analytical, a problem-solving approach is suitable, as they may dislike lectures. Convergents usually prefer specific problems as they are generally unimaginative and have a narrow view and lack interest. Plenty of tasks are welcome to kinaesthetic students. Finally, reflective students are slow in decisions, cautious, and non-assertive; they are low risk takers and participate less in class. Hence, project work is most suitable. In contrast, the visual and auditory students feel comfortable with visual and oral methods.

Concerning learning styles

Students need to be made aware of their learning styles. They may take for granted that their learning styles are habitual. They may not even know their own learning styles or the learning styles of other students. Their awareness of learning styles may encourage them to realise the importance of appropriate learning styles for different disciplines or subjects and that such styles may hopefully be changed to suit changing learning situations. According to Pask (1977), knowing one's learning style is important in learning. Therefore, students should be made aware of their learning styles. Educators should take on this responsibility to ensure this. A survey of this kind may be just what educators need to assess the learning styles of their students and then make available the results to the students.

The influence of the teaching style of teachers on students' learning styles may be explored to possibly match the two. Teachers may either adopt discovery learning methods or structured methods in teaching, depending on perhaps the personality of the teacher. Whatever, students will suffer if the teaching method is not matched to the students' style of learning.

Teachers may adapt their teaching styles to suit the students' learning styles. These learning styles may not be the preferred learning

styles of the students' choice but they are useful in a work environment. As one of the purposes of education is to prepare students to meet the demands of the working world, this perhaps may be considered an added responsibility of the schools and universities. Students are to be trained not only academically but also psychologically to better contribute to society.

Concerning teaching styles

In lectures and classes, visual students may prefer reading and observing, and more data for their interpretation or more visual aids such as movies, film strips, diagrams, pictures, graphs, etc. to help them assimilate the content of the subject. Kinaesthetic students prefer hands-on experience to create and develop what they learn, and the trial and error method of learning. Auditory students may prefer more listening to lectures and seminars, and participating in discussions. Auditory learners like to listen to tape recordings of material and have a chance to ask questions about what they have learned or do not understand.

Teachers should provide students with the chance of learning in a way that suits their learning styles so that they can learn better and be more comfortable in their own learning styles instead of having to adapt themselves to the differing teaching styles of teachers. Pask (1976) suggests that extreme teaching styles could be disadvantageous to students with mismatched learning styles. Teachers need only to consider the group learning style and teach according to this style instead of having to adapt to the varied learning styles of the students. Just as it is unwise for students to adapt to the varying teaching styles of the teachers, it is unwise for teachers to adapt to the varied learning styles of the students. Besides, according to Pask (1977), students' strategies vary from task to task and are influenced by their underlying and relatively stable learning style. It may also be difficult to change a student's learning style. Rather, teachers may find it easier to change their teaching styles to the group learning styles of the students just for the benefit of the students.

Teachers show their personalities through the way they teach. By knowing the group's learning style, teachers can be more versatile in their method of teaching by combining a strong structure and developing argument with illustrations, anecdotes or humour. Each teacher will have his or her own balance of these but teaching to the needs of the group's learning style will help students assimilate better. The effectiveness of the teacher lies in manifesting the knowledge of students' learning styles in the conduct of the lesson.

Designing Assignments

The learning environment in terms of the types of assessment or examinations can be looked into. Some tests, for instance, may be adverse to students of a particular learning style. Visual students may fare better in tests that demand visual interpretation of diagrams, etc. Auditory students may prefer oral examinations. Kinaesthetic students may prefer task-oriented assignments.

Students assessed as less analytical can be trained in problem-solving skills. A lecture approach is more suitable for non-analytic learners while inquiry is more suitable for analytical learners. With students who are more reflective than impulsive, teachers should place less emphasis on response speed. Teachers should allow the reflective students time to read in advance, to analyse data and present their reports, give them fewer datelines, allow them to observe role plays, videos, and then discuss in order to give and receive feedback. Because reflective students are slow in decision-making, cautious, non-assertive, and low risk takers, it is not surprising that they lack direct participation in class. Giving the students more time to prepare and extending classroom times may give more flexibility to the students to react to the assignments.

Questions demanding independent thought should be included in examinations or assessments because higher education should demand this more. When students perceive the way marks are allotted for independent thinking, they will realise the importance of changing their learning styles to match the demands of higher education for more independent thinking.

Students who are convergers prefer to focus on specific problems through hypothetical-deductive reasoning by coming up with a one-solution type to a problem. Their narrow interest and less imaginative nature affect their brain storming potential. Teachers may need to develop in students their ability to effectively brainstorm for ideas instead of relying on available information to assimilate.

The way students write their essays, reports, letters, or handle their assignments may reflect their thinking styles. They may generalise without giving details or write off the point or fail to relate evidence to their argument. What teachers fail to realise when they comment on such results is that students may fail to realise that their shortcomings are due to their thinking styles rather than their inability to apply what has been taught. Teachers who realise the thinking styles of the students may be in a better position to understand the students and make the necessary adjustments to help them realise their thinking styles or correct them.

Using a Case Approach

Case analysis and discussion can be used in teaching students. "The case method refers to the use of cases as educational vehicles to give students an opportunity to put themselves in the decision maker's or problem solver's shoes. Through repeated personal analysis, discussion with others, definition of problem, identification of alternatives, statement of objectives and decision criteria, choice of action and plan for implementation, the student gains an opportunity to develop analytical and planning skills in a laboratory setting. In medical analogy, the case provides the corpse for the student to practice on." (Leenders and Erskine, 1978, p.11)

Unlike science which can be taught by lectures and practical problem solving carried out in laboratories, subjects like accountancy and the arts and social sciences can involve situations where the variables are less controllable and the formulae and equations less defined. The problems are generally more often complex, so cases can help to reflect that complexity whereby students engaged in studying the cases can actively participate (hence, learning by doing and

exposing to situations) and develop their analytical thought process (hence, suitable for convergent and analytical students). Besides, a good case analysis involves considering alternatives in decision making. This can help to develop freethinking and creativity in exploring alternatives, which interests reflectors.

Cases often require students to reflect on a situation. The students can then be asked some convergent questions such as “When exactly did this incident happen?” and “What is the bottom line here?” Convergers can apply their ideas by focusing on the situation. Being reflectors, they can reflect on the situation and create theories about it.

Designing Courses

Courses are usually designed by course designers or co-ordinators. More often than not, the courses reflect the learning styles of course designers rather than the learning styles of the students for whom the courses are meant.

Course designers may need to strike a balance between the learning styles of students and the desired styles for survival in society. Can students who are found to be convergent and analytical in thinking meet the society’s need for creativity? This is especially relevant in the growing awareness of entrepreneurial skills where creativity is the springboard from which ideas and inventions flourish and where rapid decision-making, risk taking, and assertiveness are important assets. What is the price for being too careful, methodical, and thoughtful in a fast changing world? Can students who are found to have a predominant kinaesthetic mode of thinking be encouraged to put forth their ideas into action, to do rather than contemplate? This is another relevant issue in a commercial and enterprising world where action dictates progress.

Further Research

Any study on learning styles could be extended by examining the impact on students’ performance relative to the teachers’ style of teaching. This can provide more depth to the study. One may also wish to examine the relationships between learning styles and personality

traits to better understand the characteristics of students, which dictate their learning styles. Learning style is only one aspect of student learning. An understanding of the personality traits of students may help educators to understand how students cope with the demands of academic learning. Students may adopt different learning strategies for different subjects or in different learning environments. How students react to the varying situations depends on the make-up of the students, that is, their personality traits.

Conclusion

No education programme can afford to neglect the learning needs of students. In meeting the demands of the 1990s, what we need is personalised education to match the learning environment with the learners' learning styles. Training students to be at their best is no longer an easy task. It is an on-going challenge for educators to meet the ever-increasing demands in the years ahead.

References

- Ames, C. and R. Ames (eds.) (1984) *Research on Motivation in Education*. New York: Academic Press.
- Bandy, Dale (1990) "Accounting Education at the Crossroads." *CPA Journal*. Vol. (60:8), pp.12-13. 82, August.
- Benke, Ralph L., Jr. and Hermanson, Roger H. (1988) "Measuring Quality Teaching - II." *Management Accounting*. Vol. (69:8), pp.40-41, February.
- Bloom, Benjamin S., Englehart, Max D., Furst, Edward J., Hill, Walter H., and Krathol, David R. (1956) *Taxonomy of Educational Domain of Educational Objectives: The Classification of Educational Goals*. NY: David McKay.
- De Bono, E. (1971) *The Use of Lateral Thinking*. Harmondsworth: Penguin.
- Flaherty, John J. and Stein, Judy (October 1991) "Solution-Focused Audit Reporting." *Internal Auditor*. Vol. (48:5), pp.58-61.
- Glisan, George B. and Hawes, Jon M. (1990) "Solution-Focused Audit Reporting." *Internal Auditor*. Vol. (48:5), pp.58-61.
- Henderson, R.W. (1986) "Self-regulated Learning Implications for the Design of Instructional Modules." *Contemporary Educational Psychology*, 11, pp.405-427.
- Honey, Peter and Mumford, Alan (1986) *The Manual of Learning Styles*. UK: McGraw-Hill.
- Hudson, L. (1966) *Contrary Imaginations*. London: Methuen.
- Lawrence, Gordon (1993) *People Types and Tiger Stripes*. Gainesville: Centre for Applications of Psychological Type.
- Leenders, M.R. and Erskine, J.A. (1978) *Case Research: The Case Writing Process*, 2nd ed. The University of Western Ontario School of Business Administration, London.

McCarthy, Bernice (1990) "Learning Styles and the Brain." *Journal of the Association for Supervision and Curriculum Development*. Vol. (48:2), p.31, October.

Madonik, Barbara Haber (1990) "I Hear What You Say, But What Are You Telling Me?" *Canadian Manager*. Vol. (15:1), pp.18-20, March.

Messick, S. & Associates (1976) *Individuality in Learning*. San Francisco: Jossey-Bass.

Milne, Tony (1989) "Left Hand, Right Brain, Wrong Career?" *Personnel Management*. Vol. (21:1), pp.40-43, January.

National Association of Secondary School Principals (1979) *Student Learning Styles - Diagnosing & Prescribing Programs*. Roston, Va: NASSP.

Ornstein, R.E. (1977) *The Psychology of Consciousness*. 2nd ed. NY: Harcourt Brace, Jovanovich.

Pask, G. (1976) "Styles and Strategies of Learning." *British Journal of Educational Psychology*. Vol. 46, pp.128-148.

Pask, G. et al. (1977) *Third Progress Report on SSRC Programme HR 2708*. System Research Limited, Richmond, Surrey.

Poon Teng Fatt, James (1993) "Learning Styles in Accounting Education," Proceedings of the Third South East Asian University Accounting Teachers' Conference on Accounting for Socio-Economic Development, Kuala Lumpur, Malaysia, pp.237-254, 26-28 May 1993.

Poon Teng Fatt, James (1993) "Learning Styles in Training: Teaching Learners the Way They Learn." *Journal of Industrial and Commercial Training*. Vol. (25:9), pp.17-23.

Sizer, Theodor, R. (1985) *Horace's Compromise: The Dilemma of the American High School*. Boston: Houghton Mifflin Company.

Thelen, H. (1954) *Dynamics of Groups at Work*. Chicago: University of Chicago Press.

Welsh, Patrick (1987) *Tales Out of School*. New York: Penguin Books.

Zimmerman, B.J. and D.H. Schunk (eds.) (1989) *Self-regulated Learning and Academic Achievement*. New York: Springer.

Zimmerman, B.J. and M. Martinez-Pons (1990) "Student Differences in Self-Regulated learning: Relating Grade, Sex, and Giftedness to Self-Efficacy and Strategy Use." *Journal of Educational Psychology*. Vol. (82:1), pp.51-59.

Zisko, Suzanne E. (1988) "Motivating CPAs to be Marketers: A Realistic Endeavour?" *CPA Journal*. Vol. (58:3), pp.72-73, March.