

Chapter 7

Students' Learning Styles and Learning Effects

ABSTRACT

This chapter introduces the concept of learning style and Memletics learning style inventory, and uses open-source data mining software WEKA to cluster the students of experiment classes in four high schools according to the values of seven dimensions in the Memletics learning style inventory that are calculated based on the survey result about their learning styles. The clustering result demonstrates that verbal and physical are always positively associated with exam scores, visual dimension usually has negative association with score exams; the association of learning style with exam scores remains almost static, and the high, medium, and low sum of dimension values of learning style corresponds to high schools in developed, developing, and undeveloped area in China, respectively. The findings are analyzed. The implication of learning style for intelligent instruction of English subject as a foreign language is suggested.

INTRODUCTION

Since Thelen (1954) first proposed the concept of learning style, learning style has been paid great attention by the researchers in education, pedagogy, cognitive science, psychology and educational technology, and has been applied in the design of personalized or individualized learning. However, the definition of learning style is obscure. Some researchers regard learning style as a stable behavior style in one individual's learning process, just like intelligence and personality, and as an indicator of individual difference. Some

researchers regard learning style as an individual approach to deal with all kinds of problems with similar strategy, just like cognitive style.

Keefe (1979) defined learning styles as the “composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment.” Stewart and Felicetti (1992) define learning styles as those “educational conditions under which a student is most likely to learn.”

Reid (2002) defined learning styles as “natural, habitual, and preferred way(s) of absorbing, pro-

cessing, retaining new information and skills” and categorized styles into six types: visual, auditory, kinesthetic, tactile, group, and individual. Thus, learning styles are not really concerned with what learners learn, but rather how they prefer to learn.

Everyone has his or her own individual learning style, just as the individual signature. It reflects the individual physiological and psychological characteristics, and also the individual traits influenced by the environment. Learning style is the learner's usual and habitual learning trend and method, and is influenced by the personal factors and environmental factors. The personal factors include the psychological and physiological characters, age, gender, interest, emotion, character and motivation, etc. The environmental factors include social, educational and cultural backgrounds. Therefore one's learning style is not fixed. It may change over time under new circumstances. One person's learning style is expressed in different aspects. The different learning styles are not isolated with each other, but interrelated with each other.

According to the above definitions of learning style, there is not bad or good learning style. There is just difference of learning approaches among different learning styles. Learning style has something to do with learning effect and learning motivation, and is the psychological basis for personalized teaching and learning. Therefore the educators and researchers should pay attention to the learning style of the students.

There is disagreement on how to best measure learning styles (Coffield, Moseley, Hall, & Ecclestone, 2004), and there are a few learning style definition and measurements, such as David Kolb's model based on the experiential learning theory (Kolb, 1984, 1985), Peter Honey and Alan Mumford's model (Honey & Mumford, 2006), Neil Fleming's VAK/VARK (Visual, Auditory, Reading-writing, Kinesthetic or Tactile) model expanding upon earlier neuro-linguistic programming models (Fleming, 2001; Hawk & Shah, 2007; Leite, Svinicki & Shi, 2009).

Memletics learning style inventory designed by Memletics Company (<http://www.advanogy.com>) can be used freely for educational and other non-commercial purpose. The learning style questionnaire can help someone to discover his/her own learning style. According to this inventory, the learning style of every person is composed of seven dimensions: visual, aural, verbal, logical, physical, social, and solitary. Seven different learning styles are recognized by this inventory in accordance with seven types of intelligence indicated by Gardner (1983, 1983). Every dimension is measured by a scale between zero and twenty. The meaning of every dimension is defined as the following.

- **Visual:** One prefers using pictures, images, and spatial understanding.
- **Aural:** One prefers using sound and music.
- **Verbal:** One prefers using words both in writing and speaking.
- **Physical:** One prefers using the body, hands and sense of touch.
- **Logical:** One prefers using logic, reasoning and systems.
- **Social:** One prefers learning in groups or with other people.
- **Solitary:** One prefers learning alone by himself/herself.

The scales of all seven dimensions can be calculated by the answers to the questionnaire with 70 statement sentences that attempt to describe the subject's learning style. For each statement there are three answers to be selected: the description sounds nothing like me, partially like me, or exactly like me. The corresponding value is 0, 1, or 2. So for each dimension in the learning style there are ten corresponding statements. The scale in one dimension is the values' sum of answers to ten corresponding statements. One high scale for one dimension in the learning style, for example, 19 for visual dimension, means that

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