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Assessing experiential learning styles: A methodological reconstruction and validation of the Kolb Learning Style Inventory

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ABSTRACT

To understand experiential learning, many have reiterated the need to be able to identify students' learning styles. Kolb's Learning Style Model is the most widely accepted learning style model and has received a substantial amount of empirical support. Kolb's Learning Style Inventory (LSI), although one of the most widely utilized instruments to measure individual learning styles, possesses serious weaknesses. This study transforms the LSI from a type (categorical measure) to a degree (continuous measure) style of learning style measure that is not only more parsimonious but is also easier to use than the existing LSI. Two separate studies using samples of engineering and computer science graduate students (Study 1) and undergraduate and graduate students pursuing quantitative degrees (Study 2) culminating in a corroborative multi-sample validation were employed, producing a methodologically sound option to the existing LSI. Implications for future research and guidance for learning and teaching methods are discussed.

1. Introduction

Some suggest that the nature of education is in the midst of a transformation (e.g., Kolb & Kolb, 2006). Education has traditionally been viewed as the means to convey information — students were viewed as identical empty vessels to fill with information (Freire, 1998). Is such an approach to education able to produce knowledge? Several suggest that the use of the traditional pedagogical method of lecture may add relatively little to students' knowledge since it does not acknowledge individual differences and since it ignores the role of experience in knowledge formation (e.g., Bringle & Hatcher, 2003). Furthermore, reliance on lecture may be turning students into passive underachievers (Guyton, 2000) — students who may possess many facts, but are unable to apply such information to real-world issues (Bransford & Nye, 1989). A move to an experientially based education explicitly acknowledging different learning styles (what has been called transformational learning (Pedrosa de Jesus, Almeida, Teixeira-Dias, & Watts, 2006)) has been forwarded as a more effective alternative to traditional pedagogy (e.g., Jacoby, 1996).

Coffield, Moseley, Hall, and Ecclestone (2004) identified 71 learning style models. The most influential learning style model is Kolb's model (Kayes, 2005). An appeal of Kolb's Experiential Learning Model is its focus on the experiential learning process rather than on fixed learning traits (Turesky & Gallagher, 2011), providing for an acknowledgement and incorporation of personal change and development in the model (Healey & Jenkins, 2000). Furthermore, the model lends itself to a number of theoretical perspectives, including cognitivism, phenomenology, and adult learning (Holman, Pavlica, & Thorpe, 1997). Moreover, numerous studies lend empirical support to the model (e.g., Abdulwahed & Nagy, 2009; JilardiDamavandi, Mahyuddin, Elias, Daud, & Shabani, 2011; Massey, Kim, & Mitchell, 2011). Consequently, the model is broadly employed in a wide variety of educational settings (Duff, 2004).

Learning based on experience, often labeled as experiential learning (Kolb, 1984), is viewed as an integral part of how humans learn, grow, and develop. Kolb (1976) proposed the Experiential Learning Model to conceptualize experiential learning as a means to better understand the different ways that individuals learn experientially. In order to measure and validate empirically the various learning styles involved in experiential learning, Kolb developed the Learning Style Inventory (LSI). The LSI identifies four distinct learning styles: diverging, assimilating, converging, and accommodating. Such "typing" or classification of individual learning styles was a methodological breakthrough in late 1970s, and, as a seminal work, sparked considerable research over the past three decades on the phenomenon of learning based on experience.

As with any influential research, the work of Kolb has not been without critique. Several questions have been raised concerning his theory and the LSI used to assess learning styles. In response, Kolb has refined the LSI scale over the years. Despite the various refinements of Kolb's inventory, however, the instrument still appears to

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possess several weaknesses which limit its use, including low reliability, questionable validity, and low predictive powers. Furthermore, the instrument presupposes that individuals can only possess one learning style. At present, no instrument succinctly and efficiently measures Kolb's learning styles.

The purpose of this paper is to produce a revised instrument to measure learning styles for use by educators and researchers which is valid, easy to administer, and acknowledges that individuals can simultaneously possess more than one learning style. An empirically robust scale useful in easily and effectively measuring not only one's primary learning style but additional styles as well will provide educators with a tool to assess students' learning styles which, in turn, will permit educators the ability to develop and implement optimal experience opportunities in their classes. Such a scale will also permit education researchers to easily compare and relate empirically the learning style inventory with other related measures or constructs. Moreover, psychometrically speaking, if the number of items comprising the scale can be reduced while keeping the structure of the scale intact, education researchers will possess a more powerful empirical measurement tool.

The remainder of the paper is structured as follows. First, experiential learning will be explored. Second, Kolb's Experiential Learning Model and the LSI, including its refinements and challenges, will be examined. Third, the study is presented and results are reported. Finally, the implications of the study as a methodological basis for future research and pedagogy are discussed.

2. Experiential learning

Experiential learning is based on self-efficacy. Bandura (1986) observed that individuals tend to attempt undertakings that they believe they can complete successfully and tend to avoid undertakings that they believe exceed their capabilities. Hence, self-efficacy can be expected to affect an individual's choices and the activities in which they engage. The most important factor affecting self-efficacy is personal experience (Bandura, 1991). Experiential learning is based on the importance of personal experience in the educational process. Individuals can possess an unlimited amount of information, but may be unwilling to engage in tasks, where that information can be employed productively when they have no experience in doing so. Experiential learning provides students the opportunity to directly apply the information they possess in order to build self-efficacy and learn from the experiential undertakings.

Experiential learning, therefore, differs from the mere conveyance of information.

> Learning is the process whereby knowledge is created through the transformation of experience. This definition emphasizes several critical aspects of the learning process as viewed from the experiential perspective. First is the emphasis on the process of adaptation and learning as opposed to content or outcomes. Second is that knowledge is a transformation process, being continuously created and recreated, not an independent entity to be acquired or transmitted. Third, learning transforms experience in both its objective and subjective forms. Finally, to understand learning, we must understand the nature of knowledge, and vice versa (Kolb, 1984, p. 38).

Experiential education is "education that occurs as a direct participation in the events of life" (Houle, 1980, p. 221). Dewey (1938) is perhaps the most famous proponent of experiential education. He proposed that experience should be a central component of the educational process. For an experience to be educational, Dewey believed that the experience must possess continuity and interaction. Continuity refers an "experience chain," where one experience leads to additional experiences prompting an individual to learn more. Interaction refers to the degree to which an experience relates to the goals of an individual. In experiential education, students' personal experiences come to the forefront. An educator's role, therefore, changes from transmitter of information to organizer and facilitator of meaningful experiences oriented around students' individual needs. After reviewing existing research, Kolb and Kolb (2006) conclude that experiential learning is an effective educational approach. Specifically, they note that experiential learning is effective in increasing students' meta-cognitive abilities, enhancing their ability to apply information to actual situations, and giving them the ability to become self-directed learners.

3. Kolb's Experiential Learning Model

Perhaps the most well-known approach to experiential learning is Kolb's. Although educational achievement depends on students' abilities and aptitudes, it also relies on their individual learning styles (Kolb, 1984), where learning style is "the consistent way in which a learner responds to or interacts with stimuli in the learning context" (Loo, 2002, p. 252). Kolb's Experiential Learning Model defines learning as "the process whereby knowledge is created through the transformation of experience" (Deryakulu, Büyüköztürk, & Özçınar, 2009, p. 703) and reflects the influence of Piaget, Lewin, Dewey, and Jung (Koob & Funk, 2002). The Experiential Learning Model is based on six propositions:

1. Learning is best conceived as a process, not in terms of outcomes.
2. Learning is a continuous process grounded in experience.
3. Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world.
4. Learning is a holistic process of adaptation.
5. Learning results from synergistic transactions between the person and the environment.
6. Learning is the process of creating knowledge (Kolb & Kolb, 2006, p. 47).

The Experiential Learning Model is also based on the existence of four learning modes — concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Although all four modes are a part of learning, individuals are thought to develop preferences for specific modes over time (Koob & Funk, 2002). These modes can be depicted along two continuums or dimensions — perceiving, the extent to which an individual emphasizes abstractness over concreteness (AC–CE continuum), and processing, the extent to which an individual emphasizes action over reflection (AE–RO continuum). An individual's learning style represents a combination of the two independent dimensions. The four resulting learning styles are divergers (CE/RO), assimilators (AC/RO), convergers (AC/AE), and accommodators (CE/AE) (see Fig. 1). Next, each style will be briefly reviewed.

The *diverging* learning style describes individuals who learn by way of concrete experience and reflective observation (Sugarman, 1985). Individuals with a diverging learning style experience a situation and then later look at the situation through many perspectives, learning from each (DiMuro & Terry, 2007). The strengths of individuals with this learning style lie in their imaginative and creative abilities and their ability to relate with others (Turesky & Gallagher, 2011). These individuals are more inclined to work in groups, have strong communication skills, and are open to personal feedback (Kolb & Kolb, 2005).

The *assimilating* learning style is based on learning abilities that use abstract conceptualization and reflective observation (Sugarman, 1985). Individuals who learn via this style take in a wide variety of information and arrange it in the most logical form (DiMuro & Terry, 2007). These individuals prefer information that is logical, valid, and well thought through (Kolb & Kolb, 2005). The strengths of individuals with this learning style lie in their ability to systematically plan, organize, analyze and engage in inductive reasoning (Turesky & Gallagher,