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Using learning styles to evaluate computer-based instruction

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Abstract

This study compared two instruments while evaluating the effects of learning style on performance when using a computer-based instruction (CBI) system to teach introductory probability and statistics. The Gregorc Style Delineator (GSD) and the Kolb Learning Style Inventory (LSI) were used to measure learning style. Results indicated that there was an effect of learning style when using the GSD: students identified as Concrete Sequential learned significantly less than students identified as Concrete Random. There was no effect according to LSI styles. Lack of an ordering preference dimension in the LSI is discussed as a possible explanation. Findings from other studies evaluating CBI and recommendations are also discussed.

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1. Introduction

The idea that people have particular dispositions that influence their behavior in certain situations is not a new one. Early in the 20th century, Thorndike (1913) recognized the importance of individual differences in learning scenarios. In 1937, Allport formally introduced these predilections as styles, expanding on Jung's theory of psychological types (Allport, 1937). Sternberg asserts that "the core definition of style – that is, its reference to habitual patterns or preferred ways of doing something (e.g., thinking, learning, teaching) that are consistent over long periods of time and

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across many areas of activity – remains virtually the same” (Sternberg & Gri-gorenko, 2001, p. 2).

Most instructors do not plan their lessons to accommodate all learning styles, although research on styles has found that the match between a teacher’s instructional style and the learning style of a student affects performance in a classroom environment. Gregorc (1984) found that individuals learned with ease when the learning environment was compatible with their learning style, but learning was thought of “as a challenge, hard, or distasteful” when there was a mismatch (p. 54). Dunn, Griggs, Olson, and Beasley (1995) conducted a meta-analysis of studies over a 10-year period involving 3181 students and concluded that matching teaching style with students’ learning styles resulted in a measurable increase in performance. In a similar vein, Federico (1991) found that students learn more efficiently when pedagogical procedures are adapted to the students’ individual differences. As computer-based instruction becomes more prevalent in learning environments, it seems logical to extend the matching findings – one would expect the performance of individuals to vary according to the match between their learning style preferences and the environment provided by the CBI system. If so, this provides an opportunity to facilitate the optimal pairing of instruction and learning styles.

1.1. Learning style instruments

Although there are instructors and researchers that have realized the importance of learning styles, the community has not settled on one single instrument to measure a person’s learning preferences. This could be because there has not yet been one that integrates all relevant individual differences. Bokoros, Goldstein, and Sweeney (1992) conducted a factor analysis on five cognitive style instruments. They found three underlying factors: decision making functionality, information-processing functionality, and an attentional focus dimension. The first factor involves high-level cognitive processes that control cognitive operations and arriving at decisions. Factor 2 involves “a receiving function, ordering and encoding sensory input” (Bokoros et al., 1992, p. 104). The third factor determines the general focus of attention, whether one prefers external stimuli or one’s own thoughts and ideas. Of the five instruments, two measured learning styles: the Gregorc Style Delineator (GSD) and the Kolb Learning Style Inventory (LSI). As these two are the focus of this investigation, a description of each will be provided, including the Bokoros et al. (1992) loadings and examples of research where each have been used.

1.2. Gregorc Style Delineator (GSD)

The GSD was “designed to aid an individual to recognize and identify the channels through which he/she receives and expresses information efficiently, economically, and effectively” (Gregorc, 1982a, p. 1). There are two dimensions within the model: Perception and Ordering (Gregorc, 1982b). The Perception dimension deals with how one grasps information, either Abstractly or Concretely. The Ordering dimension involves the way one prefers to arrange and refer to information:

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