Surgery Resident Learning Styles and Academic Achievement

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OBJECTIVE: To determine if surgical residents share a preferred learning style as measured by Kolb's Learning Style Inventory (LSI) and if a relationship exists between resident learning style and achievement as measured by a standardized examination (AME). Also, core faculty learning styles were assessed to determine if faculty and residents share a preferred learning style.

DESIGN: Kolb's LSI, Version 3, was administered to 16 surgical residents and the residency program's core faculty of 6 attending physicians. To measure academic achievement, the American Medical Education (AME) examination was administered to residents.

SETTING: The Hospital of Saint Raphael, General Surgery Residency Program, New Haven, Connecticut. Both instruments were administered to residents during protected core curriculum time. Core faculty were administered the LSI on an individual basis.

PARTICIPANTS: Surgical residents of the Hospital of Saint Raphael's General Surgery Residency Program and 6 core faculty members

RESULTS: Analysis of resident learning style preference revealed Converging as the most commonly occurring style for residents (7) followed by Accommodating (5), Assimilating (3), and Diverging (1). The predominant learning style for core faculty was also Converging (4) with 2 Divergers. The average score for the Convergers on the AME was 62.6 compared with 42 for the next most frequently occurring learning style, Accommodators.

CONCLUSIONS: In this surgical residency program, a preferred learning style for residents seems to exist (Converging), which confirms what previous studies have found. Additionally, residents with this learning style attained a higher average achievement score as measured by the AME. Also, core faculty share the same preferential learning style as this subset of residents. (Curr Surg 62:344-347. © 2005 by the Association of Program Directors in Surgery.)

KEY WORDS: learning styles, Kolb, AME, LSI

INTRODUCTION

To prepare surgical residents as efficiently and effectively as possible, the instructional process should focus on how they learn as well as on what they learn. This focus is particularly important in light of the recent issue of reduced clinical work hours; the amount of information to assimilate and the time to do so are moving in diametrically opposite directions. New courses and course information are being developed to compensate. However, if this information is delivered in the traditional, instructor-centric style with the instructor as the sole source of knowledge, opportunities to meaningfully engage learners who have different learning style orientations may be lost, which may impact the academic success of those residents. The purpose of this study was to investigate the learning styles of surgical residents and faculty at an East Coast urban teaching hospital. Understanding learning styles could help address the following questions:

1. What is the interaction of resident learning styles and academic achievement as measured by standardized examinations?
2. What are the learning style preferences of surgical residents compared with faculty who teach them, and what are the implications?

REVIEW OF LITERATURE

Many studies in the field of education have examined the influence of cognitive factors on academic achievement, and yet only about 50% of the variance in learning as measured by standardized test scores can be accounted for by cognitive factors.[1,2] Moreover, at the college level, traditional cognitive predictors—Scholastic Aptitude Test (SAT) and high school grades—seldom account for more than 16% of the variance in learner performances.[3] Yet, studies examining the influence of noncognitive factors such as learning styles on learning and academic

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achievement have not received a fraction of the attention given to predictions from intelligence and other cognitive capacities.

This lack of attention is also true in the field of medical education and especially true in the field of surgical education. The results of one of the earliest studies on learning style analysis, is a 1981 pilot study in Anesthesia Education, using Kolb's Learning Style Inventory (LSI), which categorizes learner types as Converging (problem solving), Accommodating (practical involvement), Diverging (passive observation), and Assimilating (theoretical formulation). The results suggested that anesthesiologists as a group might share a preferred learning style.[4] Subsequent research investigated anesthesiology residents' preferred learning style as a predictor of success and concluded that department faculty clearly preferentially select and train residents with a particular learning style. Not only did 1 learning style predominate, but also those residents were more likely to be considered outstanding by the faculty. The authors suggested that any given type of residency program has a learning style distribution characteristic of that specialty.[5] Additional evidence from several other studies supports a relationship between learning style and career choice in medicine resulting in learning style patterns observed in different types of residency programs. Students who fall into LSI categories Accommodating (doers) or Diverging (reflectors) frequently chose surgery as their career choice, whereas Convergers (pragmatists) chose internal medicine and Assimilators (theorists) academic medicine.[6] Sadler et al[7] studied 108 family practice residents and found the most common learning style was Accommodating. In an effort to match learning environment with student learning needs, Linn and Zeppa[8] developed a scale for assessing medical student learning styles and found that students who learn best from clinical experiences, from active participation, and with fewer didactics (Accommodating) frequently choose surgery as a career. These studies show that certain types of medical careers (and residency programs) tend to attract different learning styles. And the authors caution there could be profound implications for a resident entering a program that doesn't favor his/her particular learning style (Baker, et al., 1986).

Another early study of learning styles and surgeons presented a review of the available literature and concluded that the Accommodator learning style as described by Kolb is most commonly found among surgeons and prospective surgeons.[9] However, a later study of 39 surgical residents and attendings from a university setting and private practice revealed a definite prevalence of Convergers (46%) over the other styles.[10] These data were confirmed in a later study of 52 basic surgical trainees at 2 British teaching hospitals where the predominant learning style was Converger (60%).[11]

For many years surgical residency curricula were guided primarily by tradition. For example, the apprenticeship model has been one of the fundamental components of surgical training. This model has involved assisting at operations, performing operations with expert assistance, and operating without assistance. However, more difficult procedures are performed more regularly and safely today. And residents are required to learn these performance skills in an environment of reduced work hours, which limits their experiences with complicated procedures. In the past, resident training consisted primarily of didactic conferences and resident readings. Restricted work hours have made it difficult to schedule conference sessions at times when all residents can participate. In addition, competence is no longer determined by the number of cases performed or the number of patients seen. Residents are now evaluated on 6 specific core competency areas through competency-based goals, objectives, and measurable outcomes.

As such, medical educators have begun to reassess their methods to optimize teaching effectiveness and efficiency and to better meet the needs of their residents, which includes investigating a variety of mechanisms for content delivery (simulations, e-learning) and examining theoretical models of how people prefer to learn (learning styles, personality profiles) to create an education environment that optimizes resident learning.

Business and industry along with social psychologists have led the way in identifying specific needs and learning styles of adult learners. Learning style refers to how learners acquire and use information. And one of the most common instruments for measuring learning style is Kolb's LSI. Application of data from instruments like the LSI may point the way to structuring teaching activities that better meet the needs of learners.

Research studies to date indicate that surgeons as a group might share a preferred learning style, but a lack of data exists investigating the interaction of learning styles and academic achievement as measured by standardized examinations such as the yearly In-Service Training Examination (ABSITE) or other standardized assessment measurements.

DESIGN, METHODOLOGY, AND INSTRUMENTS

Learning Style

Kolb's LSI, Version 3, was administered to 16 surgical residents and 6 attending physicians who comprise the residency program's core faculty and who have the greatest interaction with residents. The LSI consists of nine 12 sentence fragments (eg, "When I learn. . ." and "I learn by. . .") each followed by 4 words phrases. The person is asked to rank order the words phrases from 1 to 4, with the number 4 beside the item that best describes how he or she learns best. For example, in the item "I learn by. . .feeling, doing, watching, thinking," a response of 4 associated with "doing" would lead a person toward a learning style identified as "Converging." This instrument identifies 4 statistically prevalent learning styles—Converging, Diverging, Assimilating, and Accommodating. It is based on experiential learning theory, whereby knowledge is created through acquiring and transforming experience. Two modes are available to acquire experience, concrete experience (CE) and abstract conceptualization (AC), and 2 modes of transforming experience, reflective observation (RO) and active experimentation (AE).

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