

The Preferred Learning Style among Residents and Faculty Members of an Internal Medicine Residency Program

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Objective: To determine the preferred learning style, as defined by David Kolb, and predictors of the different learning styles among residents and faculty members at an internal medicine residency program.

Design/Setting: A cross sectional study of internal medicine residents and faculty members at Morehouse School of Medicine was performed using the Kolb Learning Style Inventory (LSI) version 3.1.

Measurements: The Kolb LSI is a questionnaire of 12 sentences, each with four phrases for sentence completion that are to be ranked according to how they apply to the subject.

Results: Forty-two out of 59 questionnaires that were given out to residents and attending physicians were properly completed and returned. Assimilating style was the predominant learning style among residents (42%) and attending physicians (55%). There was no significant association between age, gender or medical education status, and learning styles.

Conclusions: The understanding of residents' learning styles may facilitate instructional rapport between residents and attending physicians, thereby improving residents' academic performance.

Key words: education

© 2008. From Morehouse School of Medicine, Atlanta, GA (Adesunloye, Aladesanmi, Ivonye, assistant professors of medicine); and Mayo Clinic, Rochester, MN (Henriques-Forsythe, pulmonary and critical care fellow). Send correspondence and reprint requests for *J Natl Med Assoc.* 2008;100:172-175 to: Dr. Bamidele A. Adesunloye, Assistant Professor of Medicine, Morehouse School of Medicine, 720 Westview Drive, Atlanta, GA 30310; phone: (404) 616-8201; fax: (404) 616-6201; e-mail: badesunloye@msm.edu

INTRODUCTION

Learning style is the process by which a person understands and retains information, thereby gaining knowledge or skills. Several learning style models have been proposed, but the Kolb model is based on experiential theory to emphasize the important role of experience in learning. In this model, an individ-

ual's learning style evolves from a complex interaction among hereditary equipment, past life experience and the demand of present environment.¹ As such, learning is a dynamic process that results from synergetic transactions between a person and the environment.²

We set out to determine the learning styles of the residents and faculty members in the internal medicine department at our institution using the Kolb Learning Style Inventory (LSI). The LSI, a 12-item assessment tool, was developed by David A. Kolb and modified over the years. The four learning modes described in Kolb's model are abstract conceptualization (AC, "thinking"), concrete experience (CE, "feeling"), active experimentation (AE, "doing") and reflective observation (RO, "watching"). These four learning modes are then translated into four learning styles; converging, assimilating, diverging and accommodating. In a learning situation, convergers like to experiment with practical application of new ideas; assimilators prefer lectures, reading and analytical models; divergers are open minded and prefer to work in groups; accommodators prefer learning from "hands-on" experience.

METHODS

We sought approval from the institutional review board (IRB) prior to embarking on this study. The protocol was reviewed by the IRB and the study was found to be exempt from the human subjects' research regulations. Residents and attending physicians in the department of internal medicine at our institution were the study population. Thirty-one residents and 11 faculty members completed the survey. Participants were asked to complete the LSI version 3.1. The questionnaires were handed out during morning report, grand rounds, noon conferences and at the primary care clinic sites. Fifty-nine questionnaires were distributed and 42 questionnaires were fully completed and considered suitable for inclusion in the study. Additional demographic information, including gender, age range, job title (resident or attending physician), postgraduate year level, medical education status (trained within or outside the United States) and information on future career plans were

obtained using a supplemental questionnaire. Sixty-four percent of the subjects were in the 30–39-year age range. Other sample characteristics are as shown in Table 1.

Data Analysis

Statistical Package for Social Sciences® (SPSS) version 15.0 was used for data analysis. Cross-tabulation was used to examine any relationship between gender, medical education status or title, and the four learning styles. Kruskal-Wallis test was run to detect any relationship between age groups and learning styles, and between postgraduate year levels and learning styles. Spearman's correlation was chosen for the analysis of relationship between age groups and learning modes, and between postgraduate year levels and learning modes.

RESULTS

A total of 42 subjects participated in this study. Males and females were equally represented. Thirty-one were medical residents at different stages of their training, and the remaining 11 subjects were attending physicians. The majority of residents and attending physicians were assimilators (Figure 1). Forty-two percent of the residents and 55% of the attending physicians belong to this group. Among the remaining residents, 32% (n=10) were convergers, 10% (n=3) were divergers, and 16% (n=5) were accommodators. Twenty-seven percent (n=3) of the attending physicians were convergers, 18% (n=2) were divergers, and there was no accom-

modator in this group.

Using cross-tabulation, there was no statistically significant relationship between gender, medical education status or title, and the four learning styles (Table 2). There was no difference between the age groups or the postgraduate year (PGY) levels and the learning styles. Similarly, there was no correlation between the age groups or the PGY levels and the learning modes. We found that the mean score on AC increased with the age of the subjects, while the mean score on AE decreased (Figure 2), but this was not statistically significant.

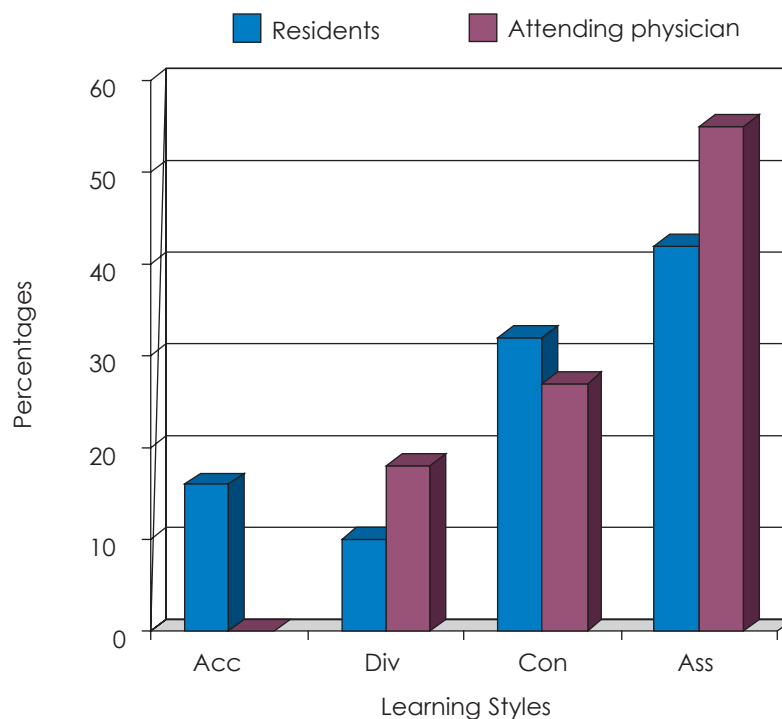
DISCUSSION

This study revealed that most residents and attending physicians in our department of medicine share the

Table 1. Demography

Characteristics	N (42)	%
Men	21	50.0
International Graduates	31	73.8
Age		
20–29	12	28.7
30–39	27	64.3
40–49	2	4.8
50–59	1	2.4
Residents	31	73.8

Figure 1. Percentage distribution of subjects by learning styles



same learning style, the assimilating style. The finding is consistent with Kolb's suggestion that the professional career is one of the forces that shape a person's learning style.² It could also be that people with similar learning styles were drawn to the same career as shown in other studies. Contessa et al. found that the majority of their surgical residents share the converging learning style with their attending physicians.³ A larger study by Lin-ares revealed a similar finding, with both nursing students and their faculty members sharing the converging style.⁴ In contrast, Kosower and Berman reported that the majority of their pediatric residents and the attending physicians have different learning styles, but this was a low-powered study because of the small sample size.⁵ A unique discovery of our study is the lack of a statistically significant association between medical school education in or outside the United States and learning style (medical education status), which to our knowledge has never been reported previously in the literature. Apart from the change in mean score on AC and AE with age as shown in Figure 2, we did not find any significant relationship between age or PGY level and the learning modes. The change in the value of AC and AE with age might be due to environmental factors that modify learning style over time. The potential teacher-learner disconnect as a result of this generational differences will be an interesting subject for further research.

Although the need to develop skills in all four learning modes has been suggested by Kolb, there are benefits in studying preferred learning styles for different reasons. The identification of preferred learning styles may help medical graduates in their choice of specialties and medical educators to develop learning experiences that are considerate of individual differences among residents. People with similar learning styles communicate better.⁶ When teachers and students share the same learning style, instructional rapport is expected to be at its best and educational performance is expected to

improve. But within the same vocation people will still have different learning styles, as shown by the distribution of our study participants into the different learning styles. Teachers have to be mindful of this variability in learning styles and should include teaching methods that accommodate all groups of students.

Whether a particular learning style is associated with better performance on standardized test is debatable because of conflicting reports.^{3,7-9} Furthermore, performance is influenced by a variety of other factors other than learning style. Such factors include the learning approach, learner's flexibility, teaching style and the assessment requirements. A student's learning approach is partly determined by the learning style and motivated by the student's primary intention in a specific course of study.¹⁰ A student whose intention is just to complete the course because of lack of interest or fear of failure may adopt the surface approach to study for the assessment test. On the other hand, the deep approach is motivated by interest in the subject or its vocational relevance. Unlike the student who uses the deep approach, a student who uses the superficial approach may have substantial factual knowledge necessary to pass an assessment test but will surely lack deep understanding of the subject.

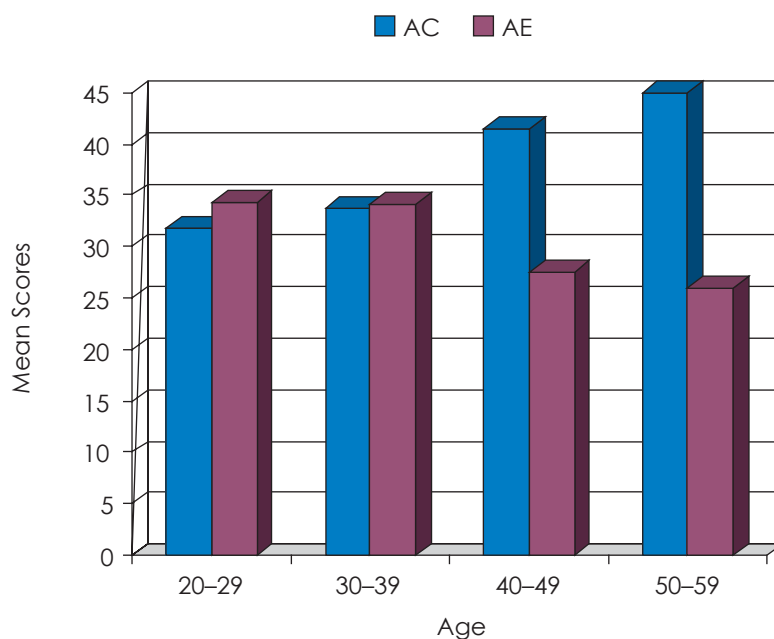
The multiple-choice question format of assessment employed by most certifying boards encourages the surface approach and may also favor the convergers as theorized by Kolb. Likewise, the didactic teaching method used in most residency curricula might preferentially favor the assimilators who prefer listening to lectures.¹¹ To address disparity in academic performance in one state-supported medical school, a combination of test-taking instructions and learning support group was found to be effective.¹² In another study, both internal medicine residents and faculty members identified faculty involvement, interaction and reflection in discussion as factors that are positively associated with learning.¹³

The key to educational and professional success is

Table 2. Pearson Chi square of gender, medical education and title versus learning styles

Predictor Variables	Learning Styles	P Values
Gender	Accommodating	0.91
	Diverging	
	Converging	
	Assimilating	
Medical Education	Accommodating	0.60
	Diverging	
	Converging	
	Assimilating	
Title	Accommodating	0.45
	Diverging	
	Converging	
	Assimilating	

Figure 2. Change in abstract conceptualization and active experimentation mean scores with age



the ability to adapt one's learning style and learning approach to the demand of different situations. Faculty members also need to be aware of their own learning styles so as not to develop teaching styles that only favor residents who share similar learning styles with them. Our intention is to increase awareness among residents and faculty members about this resource that can facilitate the learning and teaching experience in a residency program. The next step in this area of medical education research should involve using the learning styles to further understand interactions between faculty and residents and outcome studies evaluating learning styles in the context of resident performance in patient care. The limitation of this study is its sample size and the inability to generalize the findings because it was conducted in a small minority institution.

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