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SHORT COMMUNICATION

Do pediatric residents prefer interactive learning? Educational challenges in the duty hours era

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Abstract

Background: The volume of information that physicians must learn is increasing; yet, trainee educational time is limited. Many experts propose using trainees' learning preferences to guide teaching. However, data regarding predominant learning preferences within pediatrics are limited.

Aim: Identify predominant learning preferences among pediatric residents in a Residency Training Program.

Methods: The Visual–Aural–Read/Write–Kinesthetic (VARK) questionnaire and Kolb Learning Style Inventory (LSI) were administered anonymously to 50 pediatric residents.

Results: Learning style assessments were completed by 50 pediatric residents. Residents were significantly more likely to be accommodating on the Kolb LSI, which is consistent with an interactive learning preference ($p<0.01$); 30% demonstrated a multimodal preference on the Kolb LSI (Figure 1). VARK assessments demonstrated that 45 (90%) respondents were kinesthetic, which is also consistent with a significant preference for interactive learning ($p<0.01$). Forty (80%) were found to be multimodal on the VARK (Figure 1). There was no association between learning preference and the residents' anticipated career choice or level of training.

Conclusions: The predominant learning preferences among a cohort of pediatric residents from a single training program were consistent with a preference for interactive learning, suggesting that some trainees may benefit from supplementation of educational curricula with additional interactive experiences. Continued investigation is needed in this area to assess the effectiveness of adapting teaching techniques to individual learning preferences.

Background

The Institute of Medicine recently recommended further restrictions on resident duty hours, making educational efficiency and effectiveness more important than ever (Institute of Medicine 2009). One strategy for optimizing the educational process involves targeting the specific learning preferences of individual trainees (Vaughn & Baker 2001, 2008; Armstrong & Parsa-Parsi 2005). Studies have described predominant learning preferences within various medical specialties, but little is known specifically about learning preferences in pediatrics (Linares 1999; Vaughn & Baker 2001; Armstrong & Parsa-Parsi 2005; Mammen et al. 2007). We undertook the current pilot study to determine the learning preferences within our Pediatric Residency Program, with plans to use these data as a basis for future investigation, curricular evaluation, and modification.

Methods

After Institutional Review Board exemption, 50 pediatric residents at three Post Graduate Year (PGY) levels completed two separate anonymous online learning preference inventories during an annual Departmental Clinical Skills Fair.

The inventories used were the Kolb LSI and the VARK questionnaire (Appendix). Analysis of Variance (ANOVA), Chi-Square analysis, and paired *t*-tests were performed for data analysis, with a $p<0.05$ considered significant.

Results

Fifty pediatric residents completed the learning preference assessments. Using the Kolb LSI, residents were significantly more likely to be accommodating when compared to the other three learning domains, demonstrating a preference for interactive learning ($p<0.01$). Twenty-four residents (48%) were predominantly accommodating learners, compared to 18 (36%) assimilating, 16 (32%) converging, and 7 (14%) diverging (Figure 1). Fifteen residents (30%) demonstrated a multimodal preference on the Kolb LSI.

Based on the VARK questionnaire, residents were significantly more likely to be kinesthetic learners, which also represents an interactive learning preference ($p<0.01$). Forty-five residents (90%) were kinesthetic, compared to 39 (76%) read/write, 33 (66%) aural, and 31 (62%) verbal (Figure 1). Forty residents (80%) were multimodal on the VARK.

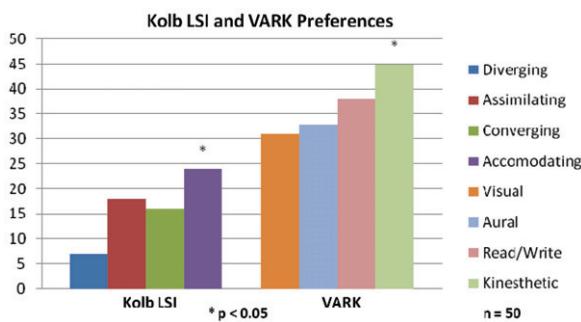


Figure 1. Demonstrates the frequency of learning preferences among pediatric residents on the Kolb LSI and VARK questionnaires.

There were no associations between learning preference and PGY level or anticipated career choice.

Discussion

Adult learners exhibit a range of learning preferences, and there are a number of instruments to assess these preferences. One well-validated instrument is the Kolb LSI, which is a questionnaire that allows learners to identify ways in which they prefer to learn (Hawk & Shah 2007). The Kolb LSI describes four discrete approaches to learning: diverging, assimilating, converging, and accommodating (Hawk & Shah 2007). Diverging learners prefer to observe and reflect on concrete experiences. Assimilators prefer abstract conceptualization and reflective observation, while convergers prefer to actively experiment in combination with abstract conceptualization. Accommodating learners traditionally prefer interactive learning and are described as “hands on,” with a predilection toward concrete and active experimentation (Hawk & Shah 2007).

Similarly, the VARK questionnaire includes questions to address the processing of information in multiple situations, categorizing learners as either visual, aural, read/write, or kinesthetic (Hawk & Shah 2007). Visual and aural learners prefer to use these respective senses to learn, while read/write learners prefer reading and writing. Kinesthetic learners prefer interactive learning and experimentation in a “hands on” manner.

Most adults demonstrate a predominant preference on these inventories, as was the case in this study (Linares 1999; Armstrong & Parsa-Parsi 2005; Hawk & Shah 2007; Mammen et al. 2007). Interestingly, among this cohort of pediatric residents, both learning preference inventories consistently revealed a significant preference for interactive learning, irrespective of PGY level or intended career. Examples of interactive learning include simulation-based education, standardized patient interactions, interactive case-based discussions, and hands-on patient encounters (Issenberg et al. 2005; Chander et al. 2009; Hochberg et al. 2010; McGaghie et al. 2010).

Increasing exposure to such interactive learning experiences may benefit accommodating and kinesthetic learners; however, as was the case in this study, learners may identify

more than one learning preference. A total of 30% and 80% of our residents were multimodal on the Kolb LSI and VARK, respectively. These data support the traditional practice of providing trainees with a variety of learning venues, though many customary learning opportunities may not be effective for the primarily accommodating or kinesthetic learner (Vaughn & Baker 2001).

While there are significant theoretical benefits to better matching of teaching techniques to learners' needs, the actual impact of such changes has been questioned (Cook et al. 2007). The subjective impression of learners is obviously important, but a disconnect often exists between learner perception and actual knowledge acquisition (Nadel et al. 2000). Therefore, the impact and importance of curricular modification based on learning preference is currently undetermined and represents an important area of future investigation.

We plan to use these pilot data to further investigate the relationship between individual resident learning preference and the perceived effectiveness of various elements of our curriculum. This information will enable us to better understand the importance of learning preference inventories in program evaluation and improvement. These inventories represent a potential mechanism for program adaptation, but further systematic evaluation is necessary to determine the overall influence of specific learning preference on trainee education.

Conclusions

Pediatric trainees within a single program were found to have a predominant preference for interactive learning, but many also displayed more than one learning preference. It is possible that identification of residents' learning preferences in this manner may assist educators in creating individually tailored curricula that could enhance both educational effectiveness and efficiency. Even though the implications of program adaptations of this nature are unclear, continued investigation in this area is warranted as educators struggle to create the most valuable and time-efficient educational experiences. If successful, curricular modifications based on learning preferences have the potential to improve trainee education and become a new educational paradigm.

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Appendix

The Kolb Learning Style Inventory Version 3.1 was utilized for this study and is available at www.haygroup.com.

The VARK questionnaire Version 7.0 was utilized for this study and is available at www.vark-learn.com.