

Cognitive and Learning Style in Medical Education

IAMSE Webcast
April 5th, 2005

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Purpose:

1. Distinguish learning style, cognitive style and instructional preference.
2. Describe the contribution of style & preference to education.
3. Review style & preference findings relevant to medical education
4. Outline common failings in style & preference research.

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Preference vs. Style

- Preference is a self-reported habitual **choice** among various modes of information access or delivery.
- Style describes **how** the information is delivered, received or processed; the form or manner of the informative act.

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Types of Style

- Affective
- Cognitive
- Learning

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Affective Style

- Physical, social and environmental elements that, if congruent with preference, will assist in motivation maintenance.
- Examples
 - Levels of light, heat, ambient sound
 - Interaction levels
 - Sensory input modality (auditory, visual, tactile)

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Cognitive Style

- Consistencies in perception, memory, thinking and judgment
- Examples:
 - Reflectivity vs. impulsivity
 - Leveling vs. sharpening
 - Use of multiple differentiated concepts vs. few generalized concepts

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Learning Style

- Conscious, intended strategies used to achieve defined ends.
- Examples:
 - Content mastery vs. efficient examination success
 - Passive repetition (note reading) vs. active application

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What do we know about style and preference in medical education?

1. There are reliable cognitive style differences across medical specialties.
Myers, 1974; Wunderlich & Gjerde, 1978; Goodenough et al, 1979; Jewett et al, 1987; Friedman & Slatt, 1988, Curry, 1991, Hilliard, 1995; Stilwell et al, 2000.
 - among the specialties family medicine, surgery and psychiatry are consistently differentiable. Myers, 1974; Wunderlich & Gjerde, 1978, Goodenough et al, 1979; Linn & Zeppa, 1980; Jewett et al, 1987; Friedman & Slatt, 1988; Curry, 1991, Hilliard, 1995.

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What do we know....continued

2. Within a specialty cognitive style is associated with practice type (university vs. community care). Curry, 1991.
3. Learning style differs across specialties. Curry, 1991; Hilliard, 1995.
4. Instructional preference differs across specialties. Curry, 1984; Curry, 1991.

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What do we know....continued

5. Age and gender affect cognitive style, learning style and instructional preference. Curry, 1991, Paul et al, 1994; Hilliard 1995; Stilwell et al, 2000.
6. Cognitive style has an effect on academic performance. Hart et al, 1981; Scott, 1981; O'Donnell, 1982; Sobral, 1995; Davies et al, 1997, Lynch et al, 1998.

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What do we know....continued

7. Surface learning styles are common across all years of medical school. Coles, 1985; Newble & Gordon, 1985; M rrenson, 1986, Leiden et al, 1990, Hilliard, 1995; Lonka & Lindblom-Ylänne, 1996; Vu et al, 1998.
8. Surface learning styles are negatively related to performance. Vu, 1979; O'Donnell, 1982; Tooth et al, 1989; Hilliard, 1995; Lahtinen et al, 1997; McManus et al, 1998; Slotte & Lonka, 1999.
9. Achieving, deep or strategic learning styles are positively related to performance. Vu, 1979; O'Donnell, 1982; Tooth et al, 1989; Hilliard, 1995; Lahtinen et al, 1997; McManus et al, 1998; Slotte & Lonka, 1999.

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Applying Style & Preference in Medical Education

1. Self knowledge is key to self regulation
 - Provide comprehensive, detailed and interpreted information to each first year student about their own cognitive and learning styles and help them notice and consider their instructional preferences.
 - Help students become aware of their thinking; use strategies and situated motivation in their learning.

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Applying.....continued

2. Let the instructors know what range of style exist in a class and help them develop alternative instructional strategies.
 - Compile the individual learner results into a group composite.
 - Work with both basic science and clinical faculty to modify teaching/ learning/ examination structures and formats for outliers and for those not successfully coping.

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Applying.....continued

3. Work on style and preference flexibility with both learners and faculty.
 - Individuals demonstrating stress or failure in novel situations may not have developed sufficient style flexibility to bridge between their modal styles and the style presented or required in the new situation.

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Applying.....continued

4. Problems with year to year retention are affected by style.
 - Achievement in first year predicts performance throughout the remaining four years.
 - Student achievement in first year is impacted by learning style.
 - Style inflexibility and significant mismatch of style to learning situation will result in frustration and failure.
 - Alternate task presentation and specific coaching on more effective style strategies and tactics will help.

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Applying.....continued

5. Recruitment to underserved specialties and underserved geographic regions can be assisted by attention to style.
 - Study styles of exemplars then recruit for that style complex.
 - Current students informed about their own styles can self select more accurately into specialties and practice types.

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Applying.....continued

6. Recruitment from specific cultural groups can be assisted by style concepts.
 - There is evidence that cultural differences in style contribute to the under-representation of culturally diverse population in North American professional schools. (Tamaoka, 1986; Aragon, 1996; Sanchez, 1996)
 - Schools that support style flexibility will have more success with divergent styles.

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Applying.....continued

7. Cognitive style interacts with testing conditions.
 - Field dependents are sufficiently diverted by non-salient cues within test items or circumstances to significantly under-perform compared to field-independents.
 - Specific coaching is indicated.

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Style Research Flaws that Need Correction

1. Conceptual confusion
2. Over-generalization based on measurement of one isolated construct, often assessed on only one occasion and with only one instrument.
3. Assigning participants to treatment conditions before completely assessing them for complex constructs.

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Research Flawscontinued

4. Using median or modal scores to divide participants into two equal groups rather than selecting participants from only the extremes of the contrasting bipolar ranges.
5. Insufficient independence between instructor and researcher/ evaluator.
6. Little variation in the interventions purportedly matched to style.

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Research Flawscontinued

7. Only one or sometimes no independent measure of behavior change.
8. No attempt to control for interacting and confounding variables such as gender, IQ, ability or initial capability in target behavior, time-on-task, and teacher expectation.

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Bottom Line:

1. Most teaching/ learning interventions can be improved by better applying the basic sciences of education.

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Bottom Line.....continued

2. There are specific knowledge, skills and attitudes required to master the basic sciences in education.
3. As with anything else, information and an opportunity to practice with feedback are essential to mastery.

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Bottom Line.....continued

4. The basic educational sciences apply to each step in the educational cycle:
 - A. Communicate clear learning objectives
 - B. Justify those objectives by tight connection to post-instruction application
 - C. Match learning objective with appropriate instructional and assessment modalities
 - D. Provide detailed feedback to learners on mastery results
 - E. Provide guidance on where to focus next (next learning objectives)
 - F. Provide encouragement to maintain engagement

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Bottom Line.....continued

5. Attention to issues of style and preference can assist both teachers and learners in each of those basic educational skills.

Thank you for your interest

Further information on style and preference can be found in the following basic references:

1. Individual differences in cognitive style, learning styles and instructional preferences in medical education. Chapter 8 (pages 359-378) in International Handbook for Research in Medical Education (Eds) Norman, G., van der Vleuten, C. and Newble, D. 2002. Amsterdam: Kluwer
2. The Perfect Learner: an expert debate on learning styles. *Training*, May 2002, pages 28-36.
3. Review of Learning Style, Studying Approach and Instructional Preference Research in Medical Education. Chapter 9 (pages 239 – 276) in International Perspectives on Individual Differences (Eds) Riding, R and Rayner S. 2000. Stamford, Connecticut: Ablex Publishing Corporation