

RESEARCH

Learning Styles and Teaching Perspectives of Canadian Pharmacy Practice Residents and Faculty Preceptors

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Objective. To characterize and compare learning styles of pharmacy practice residents and their faculty preceptors, and identify teaching perspectives of faculty preceptors.

Methods. Twenty-nine pharmacy residents and 306 pharmacy faculty members in British Columbia were invited to complete the Pharmacists' Inventory of Learning Styles (PILS). Faculty preceptors also were asked to complete the Teaching Perspectives Inventory (TPI).

Results. One hundred percent of residents and 61% of faculty members completed the PILS, and 31% of faculty members completed the TPI. The most common dominant learning style among residents and faculty preceptors was assimilator, and 93% were assimilators, convergers, or both. The distribution of dominant learning styles between residents and faculty members was not different ($p=0.77$). The most common dominant teaching perspective among faculty members was apprenticeship.

Conclusion. Residents and preceptors mostly exhibited learning styles associated with abstract over concrete thinking or watching over doing. Residency programs should steer residents more toward active learning and doing, and maximize interactions with patients and other caregivers.

Keywords: residency, learning styles, teaching perspectives, faculty preceptor

INTRODUCTION

There is a perception that for pharmacy practitioners to continue to advance their roles, it will require increasing their comfort with forming therapeutic relationships with patients, closer interprofessional cooperation, and more action-oriented activities (eg, immunizations, physical assessments, education).¹ Studies of pharmacy students' learning styles in which "watching" and "abstract thinking" dominate²⁻⁴ do not portend success in intensively socially integrated roles. If faculty members are similar to students in their preferences, efforts to change learning styles will be more difficult and require more deliberate efforts.

Learning styles are commonly understood to be "characteristic cognitive, affective, and psychosocial behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment."⁵ Considerable research has characterized learning styles and their application in pedagogical settings, including among healthcare professionals.⁶⁻¹²

The manner in which learning is undertaken has an impact on achievement of learning outcomes. Knowledge of learning styles can help students and instructors optimize learning encounters,¹³⁻¹⁷ and learning styles can change based on training experiences.¹⁸

Teaching styles also vary, and the relationship between teaching and learning is complex. When there is misalignment between learning and teaching styles, learning may be undermined and manifest as poor student performance, low student attendance, discouragement, or boredom.^{16,19} This may negatively affect educators' performance because of a sense of alienation or a negative attitude toward students and education.¹⁶ There is no simple recipe for aligning teaching and learning styles, and educators should not attempt to teach exclusively to students' preferences.^{7,19} Efforts by instructors to balance a variety of teaching styles that align well with their students' learning styles can increase rapport between teachers and students, and increase student comfort and willingness to learn.^{10,11,20-22} For example, in experiential learning, instructors should use apprenticeship or developmental teaching perspectives more than a transmission perspective. However, it is less clear whether this improves student performance.^{4,23,24}

Various instruments to measure learning styles have been validated^{16,17,22,23,25,26} and shown to reliably

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characterize health professionals' learning styles.²⁷⁻³⁰ A pharmacy-specific variant of Kolb's Learning Style Inventory, the PILS, has sufficient reliability and validity to be used in the context of pharmacy education.^{4,15,31} Instruments to measure teaching styles are not as numerous. Pratt and Collins' TPI^{32,33} has been validated and widely used to characterize the teaching perspectives of educators.^{33,34}

Although there are some studies of pharmacy students' learning styles in comparison to faculty members,²⁻⁴ there are none that evaluate the learning styles of pharmacy practice residents in relation to the learning and teaching styles of the faculty members who teach and precept them. This study compared the learning styles of pharmacy practice residents and their faculty preceptors. The investigators also assessed whether residents differed from undergraduate pharmacy students, and whether they exhibited learning styles that embraced active learning and affective dimensions, which are important to modern pharmacy practice. Because of the paucity of research on teaching perspectives of educators in the pharmacy field and the lack of data on teaching perspectives of faculty members involved in pharmacy practice resident education, the residency faculty members' experiential teaching perspectives were also characterized.

METHODS

This was a cross-sectional, survey-based study. A database of all 2011-2012 pharmacy practice residents in British Columbia (n=29) was obtained from the British Columbia Pharmacy Practice Residency Committee. A database of all teachers and preceptors of pharmacy practice residents, spanning all 5 residency programs in the province (n=306), was obtained from the British Columbia Pharmacy Practice Residency Committee. All the residency programs studied were affiliated with the University of British Columbia. Complete sampling of residents and faculty was used.

During the first 3 months of the residency program, residents and faculty preceptors were contacted by e-mail and asked to complete a 5- to 10-minute PILS questionnaire online.³¹ Faculty preceptors were also asked to complete a 15- to 20-minute TPI³³ online. Because teaching perspectives are context-dependent, they were asked to think of themselves in the experiential teaching context when completing it. Residents and faculty preceptors were asked to disclose their gender and program affiliation from among the 5 residency programs in the province. No other personal information was collected. Immediately after completion of these assessments, residents and faculty preceptors received e-mail notification of their dominant and secondary learning styles,

and were provided with an interpretation guide. They were asked to reflect upon it and discuss it with future students and teachers, respectively. Faculty preceptors also received notification of their dominant and backup teaching perspectives, and were provided with an interpretation guide (Table 2).

Residents and faculty members' primary and secondary learning styles were ascertained from the PILS.³¹ The secondary learning style further characterizes an individual's learning preferences and is intended to reduce stereotyping.³¹ Dominant and backup teaching perspectives were identified using the TPI authors' method for tabulating the survey responses.³⁵ Backup teaching perspectives are conceptually analogous to secondary learning styles. Simple descriptive statistics for the survey responses were used. For between-group comparisons (eg, residents vs faculty, male vs female) cross-tabulation and chi-square or Pearson R inferential statistics were computed. We also represented the data within a slightly adapted learning-style quadrants model proposed by Kolb.²² Data were analyzed using SPSS version 20 (SPSS Inc, Chicago, IL). The study was approved by the Behavioral Research Ethics Board at the University of British Columbia.

RESULTS

Twenty-nine residents (100%) and 185 faculty members (61%) completed the PILS questionnaire. Ninety-one (31%) faculty members completed the TPI (Table 1). For faculty members, the response rate was proportional to the number of faculty members in the various residency programs surveyed.

The most common dominant learning style among faculty members was assimilator (53%) followed by converger (30%) (Figure 1). Ninety-three percent (n=171) of respondents were assimilators, convergers, or both. The most common secondary learning styles among faculty members were converger (42%), assimilator (25%), and diverger (17%) (Figure 2).

The most common dominant learning style among residents was assimilator (48%), followed by converger (29%) and assimilator-converger (13%) (Figure 1). Ninety percent of respondents were assimilators, convergers, or both. The most common secondary learning styles among residents were converger (29%), diverger (23%), assimilator (13%), and assimilator-diverger (10%) (Figure 2).

The distribution of dominant learning styles between residents and faculty members was similar ($p=0.77$). The distribution of secondary learning styles between faculty members and residents was different, with more assimilators and convergers among faculty members, and more divergers and accommodators among residents

Table 1. Respondent Demographics for the Pharmacists' Inventory of Learning Styles and the Teaching Perspectives Inventory

	PILS (Residents N=29, Faculty N=185), No. (%)	TPI (Faculty N=91), No. (%)
Residents (N=29)		
Gender – Females, %	79	N/A
Health authority		
LMPS	22 (79)	N/A
VIHA	2 (1)	
IHA	2 (1)	
NHA	2 (1)	
Faculty (N=185)		
Gender – Females, %	66	67
Health authority		
LMPS	146 (78)	70 (77)
VIHA	17 (9)	10 (11)
IHA	16 (9)	7 (8)
NHA	1 (1)	1 (1)
Others	5 (3)	3 (3)

Abbreviations: PILS=Pharmacists' Inventory of Learning Styles; TPI=Teaching Perspectives Inventory; LMPS=Lower Mainland Pharmacy Services; VIHA=Victoria Island Health Authority; IHA=Interior Health Authority; NHA=Northern Health Authority; Other=ie, Drug and Poisoning Information Center, Pharmaceutical Services Division, etc.

($p=0.02$). The proportion of residents having a diverger component to their secondary learning style was 39% vs 25% of faculty members. Eighteen percent of residents had an accommodator component vs 7% of faculty

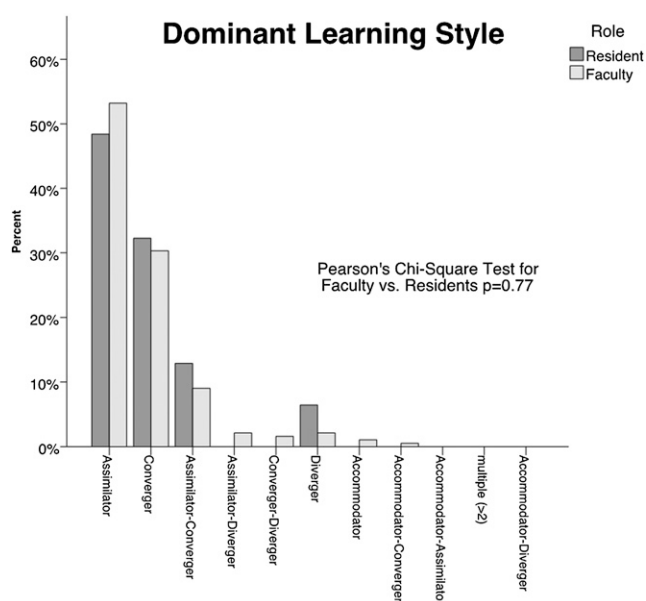


Figure 1. Dominant learning styles of faculty and residents.

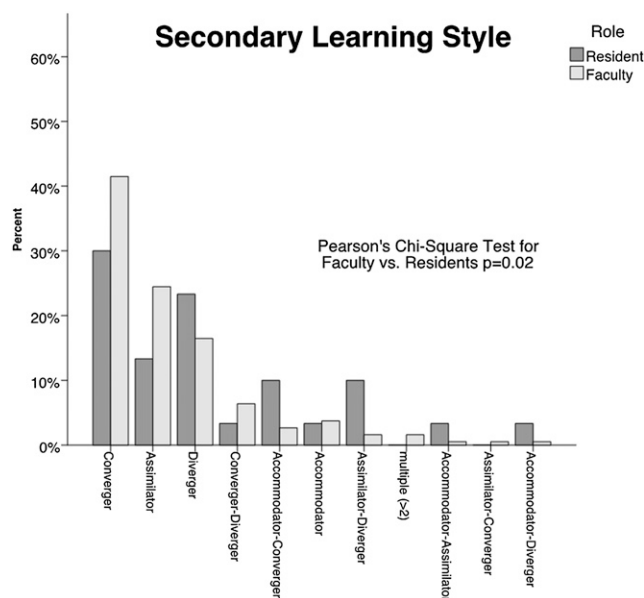


Figure 2. Secondary learning styles of faculty and residents.

members. For faculty members, there was no significant difference between males and females for the distribution of dominant learning styles ($p=0.95$). The most common dominant learning style among female residents was assimilator (57%). Male residents were evenly distributed across assimilator, converger, and diverger. Small numbers prevented inferential statistical comparisons for residents.

The most common dominant teaching perspective was apprenticeship (66%), followed by nurturing (12%), and apprenticeship-developmental (5%) (Table 3). A brief description of these teaching perspectives is provided in Table 2. The most common backup perspective among faculty members was developmental (36%), followed by nurturing (27%), and apprenticeship (16%).

DISCUSSION

In this study of learning and teaching styles among pharmacy faculty preceptors and residents, a complete sample of residents and an acceptable response rate for faculty preceptors were obtained for the PILS. The response rate for the TPI was suboptimal (31%). Some faculty preceptors surveyed may have been dormant (ie, had no residents assigned during the current residency year), some may have experienced survey fatigue by the time they were approached for the TPI, and some may have found the different online tool used for TPI to be cumbersome. The similarity between residents' and preceptors' learning styles has been shown among physicians,^{36,37} and between pharmacy undergraduate students and their faculty preceptors.^{2,4,15} The difference in secondary

Table 2. Brief Interpretation of Pharmacists' Inventory of Learning Styles and the Teaching Perspectives Inventory

PILS Brief Interpretation ³¹	
Accommodator (concrete-active learning; feel & do):	hands-on learner, acts on gut feeling vs logical analysis, impatient with abstract and theoretical, dislikes excessive feedback and talking.
Converger (abstract-active learning; think & do):	practical problem-solver and decision-maker, prefers technical vs social aspects, less concerned with details and others' feelings than with success.
Assimilator (abstract-passive learning; think & watch):	organized, detail-oriented, enjoys creating theories/models, requires structure and rehearsal time, hard on themselves.
Diverger (concrete-passive learning; feel & watch):	values harmony and relationships over success, analyzes problems from various angles, prefers observation vs action, enjoys brainstorming, acutely sensitive to environment and negative feedback.
TPI Brief Interpretation ³²	
Apprenticeship:	values socializing students into new behavioral norms and ways of working.
Developmental:	values teaching planned and conducted "from the learner's point of view."
Transmission:	values commitment to content or subject matter.
Nurturing:	believes long-term persistent effort to achieve comes from heart, not head.
Social Reform:	seeks to change society in substantive ways

Abbreviations: PILS=Pharmacists' Inventory of Learning Styles, TPI=Teaching Perspectives Inventory

learning styles, with more accommodators and divergers among residents, may signify the effects of change in the selection, training, and culture of pharmacy practice. Both are suggestive of an increased preference for active learning via concrete experiences involving the affective domain. If this is an early indicator of change, these styles may be more suited to emerging practice demands and environments for pharmacists.¹

The domination of assimilators and, to a lesser extent, convergers among residents and their faculty preceptors was consistent with the learning style comparisons of pharmacy undergraduate students and their faculty preceptors² and contrasted with those of students in other health professions. The resident and faculty preceptor learning styles in this study were typical of first-year medical students,³⁶ whereas medical residents and their

faculty preceptors are more frequently convergers.^{11,12,38} Another study showed that converger is the most common learning style among health professions trainees.⁹ Nursing students tend to be more divergers or accommodators.^{39,40} Medical students' learning styles shift from passive to more active preferences (eg, from assimilator or diverger to converger or accommodator) during the course of their training,¹⁸ and we plan to study this relationship among pharmacy residents once they have been in practice for a year. Medical residents tend to be more active learners than medical students,³⁶ and later-year medical students are more active learners than those in their early years.⁴¹ This study did not permit such direct comparisons, but even among pharmacy residents and their experienced faculty preceptors, assimilator (passive-abstract) rather than converger (active-abstract) was the most common learning style.

The dominance of the apprenticeship teaching perspective among faculty preceptors is reassuring because it is the most aligned with experiential learning. While this may not be reflective of all faculty preceptors in the target jurisdiction, it may be the most common perspective because of the overwhelming preference for it. This perspective also aligns with the "signature pedagogy" of health educators based on more than 1,200 TPIs from health educators (personal communication with Pratt D, developer of the TPI). It is not clear how faculty preceptors with dominant nurturing (11%) or transmission (1%) perspectives effectively precept in the experiential setting, and this deserves further study because these perspectives may have valuable elements.

The suboptimal response rate for the PILS may have resulted in under-detection of other teaching perspectives

Table 3. Dominant and Backup Teaching Perspectives of Faculty Preceptors for Pharmacy Program Residents in British Columbia

Perspective	No. (%)
Dominant Teaching Perspectives	
Apprenticeship	60 (66)
Nurturing	11 (12)
Apprenticeship-Developmental	7 (8)
Developmental-Nurturing	3 (3)
Apprenticeship-Nurturing	3 (3)
Backup Teaching Perspectives	
Developmental	33 (36)
Nurturing	25 (27)
Apprenticeship	15 (16)
Transmission	8 (9)
Transmission-Developmental	4 (4)

and may diminish the generalizability of our findings to residency program faculty. Because residents completed the PILS early in their programs, this study wasn't designed specifically to detect changes in their learning styles. Learning style may not have changed much from the strong similarity between residents and their preceptors; however, we are conducting a followup study of residents to determine whether their learning styles changed during and soon after residency. This study was completed in a Canadian pharmacy practice residency context and there may be relevant differences between these programs and US programs. However, the competency-based standards in Canada⁴² are similar to those in the United States,⁴³ so differences are unlikely to be structural or undermine generalization to the US context. We collected minimal demographic information about participants, which limited our ability to stratify results by experience, gender, and other potentially relevant factors.

The overwhelming preference for abstract conceptualization may not be obviously problematic for pharmacists were it to persist throughout their residency and into practice because therapeutic decision-making based on synthesizing patient data, integrating knowledge of evidence, and conceptualizing drug actions in the body do occur in an abstract conceptual context. It could hinder interactions with patients, including physical assessment and building therapeutic relationships. Of more concern is the overall preference for *watching* over *doing*. It is difficult to see how this preference is desirable in the socially complex, competitive, fast-paced health-systems environment. Pharmacists must be willing to take action and learn by doing. Residency program leaders should design their curricula to steer residents toward more active learning (eg, role playing, group projects, peer teaching, debates, etc) and to maximize interactions with patients and other caregivers. This may enhance comfort and confidence in relationship-building and mastery of affective aspects of practice. The fact that the faculty preceptors were no different from early-in-program residents in this regard is concerning and suggests this may not be occurring. To further encourage the implementation of this shift in focus, these approaches could be incorporated or more heavily emphasized in residency accreditation standards. Preceptor development efforts should include building awareness of these learning style issues and developing strategies to help residents shift their learning preferences in desirable directions.

Information about specific methods to change learning styles is sparse. There are no studies addressing this in health professions students in general; however, 1 study involving medical students' learning styles suggests that those do tend to change from assimilator dominant to

converger (ie, from passive-abstract to active-abstract preferences) during their education.¹⁸ In this study, nearly all the changes in learning styles evolved toward the converging style. Further incorporation of more active learning in residency programs is a reasonable strategy for increasing comfort with (and potentially preference for) active learning.

Another implication is that residents are overwhelmingly likely to be precepted by people with the same dominant learning style as them, which may offer the advantage of familiarity and the disadvantage of not exposing residents to alternative perspectives, potentially resulting in missed opportunities to be challenged with new ways of learning and reinforcement of traditional patterns.^{16,17} The challenge of altering residents' learning styles may be intensified by their faculty preceptors being uncomfortable with the required changes.

CONCLUSION

Pharmacy practice residents and faculty preceptors are primarily assimilators or convergers. Residents differ from faculty preceptors in their secondary learning style, with divergers and accommodators being more common among residents than among faculty preceptors. More participants had "passive" and "watching" learning styles than did medical residents, nursing students, and most other health professions trainees, who exhibit more "active" and "doing" learning styles such as converger and accommodator. The dominant teaching perspective among faculty preceptors was apprenticeship. Pharmacy residency programs should guide residents toward active learning and doing, and maximize interactions with patients and other caregivers. This may strengthen confidence in relationship-building and mastery of the affective aspects of practice.

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