

LEARNING STYLE PREFERENCES OF PHARMACY STUDENTS

Zoriah Aziz^{a*}, Tey Xin Yi^a, Syireen Alwi^a, Chong Nyuk Jet^a

^a*Department of Pharmacy, Faculty of Medicine, University of Malaya 50603 Kuala Lumpur,
Malaysia*



Abstract

Students have preferences about how they like to learn. Available evidence suggests that understanding students' learning style is helpful in providing them a successful learning experience. The aim of the study was to determine the learning styles preferences of pharmacy students. The Honey and Mumford's Learning Style Questionnaire (LSQ) was administered twice to all undergraduate pharmacy students (n=240) in the University of Malaya, Malaysia. The LSQ covered four different learning preferences: activist, reflector, theorist and pragmatist. The LSQ showed satisfactory test-retest correlation (0.57 to 0.66) and moderate internal reliability (0.53 to 0.61). Reflector learning style was the most common among the students (60.4%) followed by theorist and pragmatist (both 8.8%) and activist (6.2%). Another 15.8% of the students did not show any dominant learning styles. The preferred learning styles were statistically independent of the demographic variables examined such as level of academic year, sex, race and pre-university qualifications. A range of teaching methods and learning activities should be provided in pharmacy education in order to match the variety of learning styles.

Keywords: LSQ, reflector, activist, theorist, pragmatist, Malaysia

© 2013 Published by C-crcs. Peer-review under responsibility of Editor(s) or Guest Editor(s) of the EJSBS.

*Corresponding author.
E-mail address: zoriah@um.edu.my

doi: 10.15405/ejsbs.2013.1.14



1. Introduction

Learning style is a term used to describe the different and preferred ways that people learn. In Pharmacy education, the broad coverage of topics and the constraints of time in classes could reduce the effectiveness of teaching-learning interactions. Knowledge and awareness of student's learning style is important to teaching and learning process. This knowledge can be used to develop, design and deliver educational program to enhance student's learning. A match between the learning style and the teaching style will lead to improved student attitudes and better academic achievement (Romanelli, Bird, & Ryan, 2009).

A number of instruments are available to assess individual learning styles (Coffield, Moseley, Hall, & Ecclestone, 2004). Of these tools, the Learning Styles Questionnaire (LSQ) (Honey & Mumford, 1992) was developed to help individuals understand how they might learn best and it determines the learning style preferences based on Kolb's Experiential Learning Theory (Kolb, 1984). According to Kolb, "Learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping experience and transforming it." Based on this theory, learning is regarded as a cyclic process, which involves four interdependent modes: concrete experience, reflective observation, abstract conceptualisation, and active experimentation. The theory suggests that individual uses each of the learning modes while preferring certain modes to the others. This preference for certain modes is known as learning styles. LSQ is based on Kolb's Theory (1984) and contains 80 items designed to identify four types of learners. Activists for example are learners who involve themselves fully in new experiences and dislike structured procedures. Theorists on the other hand adapt and integrate observations into complex but logically sound theories. Pragmatists like practicality, group work and tend to avoid reflection and deep levels of understanding while reflectors focus on pondering experiences and observing them from different perspectives.

LSQ was selected for use in this study for a number of reasons. First, it has been widely used in previous studies involving healthcare students (Coffield et al., 2004; Linares, 1999; Quince, Benson, Siklos, & Wood, 2007). Second, it has satisfactory reliability and validity (Allinson & John, 1988; Honey & Mumford, 1982; Sadler-Smith, 2001). Third, compared to other tools such as Vermunt's learning style (1998), and Myers-Briggs's Type Indicator (Myers, McCaulley, Quenk, & Hammer, 1998), LSQ has fewer items and thus can be completed in a shorter time.

2. Problem Statement

Little is known about the learning style preferences of the pharmacy students in the University of Malaya. Identifying their learning styles would promote optimal learning.

3. Research Questions

The three research questions were (a) what was the test-retest and internal consistency reliability for LSQ (b) what were the learning styles preferences of pharmacy students (c) which variables significantly influenced the learning styles preferences.

4. Purpose of the Study

The aim of this study was to determine the learning style preferences of pharmacy students enrolled in the program at the university.

5. Research Methods

5.1. Design and setting

A non-experimental prospective, cross-sectional study design was used. The Ethic Committee of the University of Malaya Medical Centre, Malaysia approved the study. All students enrolled in the pharmacy programme at the University of Malaya in 2008 – 2009 were eligible. The questionnaires (in English) were distributed to the students before their lectures. In order to achieve a complete response, and to answer questions students may have had during the completion of the questionnaire, the questionnaires were completed under the supervision of the researchers. Students that completed and returned the questionnaire were considered as providing consent to participate in the study. Participants completed the questionnaire twice; the second time was after an 8-week interval.

5.2. Instrument

Participants completed a self-report questionnaire, which was divided into two sections. The first section collected demographic data, including gender, age, race, academic level (first, second, third and fourth year) and pre-university qualifications. The second section of the questionnaire consists of the Honey and Mumford's Learning Styles Questionnaire. The LSQ contains 80 items; each item has two options of answer (agree, disagree). For each "agreed" answer, one point was awarded and no point was given for the other response. The 80 items were grouped into four learning styles subscales namely activist, reflector, theorist and pragmatist. The maximum score for each subgroup would be 20 points. Score above 14 points

for the subscale was interpreted as strong preference for that particular learning style, except for the subscale “activist” where score above 11 indicated good preference for this style.

5.3. Data analysis

The Statistical Package for Social Sciences software (version 20.0) was used for data entry and analysis. Mean scores and standard deviation (SD) were calculated for the four subscales: activist, reflector, theorist and pragmatist. Statistical tests such as t-test and one-way ANOVA were performed to compare means of continuous data. Pearson correlation test was performed for test-retest reliability, and to estimate the internal consistency reliability of the scores, Cronbach alpha coefficient was calculated for each of the four scales of the LSQ.

6. Findings

All the 240 pharmacy students enrolled at University of Malaya completed the questionnaire, which gave a response rate of 100%. The number of students from each academic year was about the same. The students were between 18 to 23-year-old with a mean age of 20.5 (SD=1.2). The proportion of Chinese and Malay students was about the same while the Indian students constituted 3% of the total. Nearly 90% of the students enrolled into the pharmacy programme with local matriculation qualification.

6.1. Test-retest reliability of LSQ

Pearson’s correlation test was used to estimate the test-retest correlation coefficients for LSQ. Table 1 shows statistically significant correlation within all the subscales of LSQ. The r-value was highest for the ‘Reflector’ scale and lowest for the ‘Pragmatist’ scale.

Table 1. Test-retest reliability in Honey and Mumford’s LSQ

| Learning styles scales in LSQ | Pearson correlation (r) |
|-------------------------------|-------------------------|
| Activist | 0.629** |
| Reflector | 0.657** |
| Theorist | 0.620** |
| Pragmatist | 0.571** |

** Correlation is significant at the 0.01 level (2-tailed).

6.2. Internal consistency reliability of LSQ

Table 2 shows Cronbach Alpha coefficients estimated on the scores of the four LSQ subscales. The Cronbach Alpha coefficients indicated moderate internal consistency reliability.

Table 2. Internal consistency reliability in Honey and Mumford's LSQ

| Learning styles scales in LSQ | Cronbach Alpha (α) |
|-------------------------------|-----------------------------|
| Activist | 0.553 |
| Reflector | 0.609 |
| Theorist | 0.528 |
| Pragmatist | 0.572 |

6.3. Learning styles preferences of pharmacy students in University Malaya

The respondents were classified based on their dominant learning styles; and for some cases where students obtained equal scores for more than one learning styles, they were categorised as Mixed group, as suggested by Ronan (1996). Figure 1 illustrates a graphical representation of the preferred learning style for the students. It shows that the “reflector” type of learning style was most preferred by the students (60.4%), followed by the “mixed” learning style (15.8%) with “Activist” learning style to be the least preferred (6.2%).

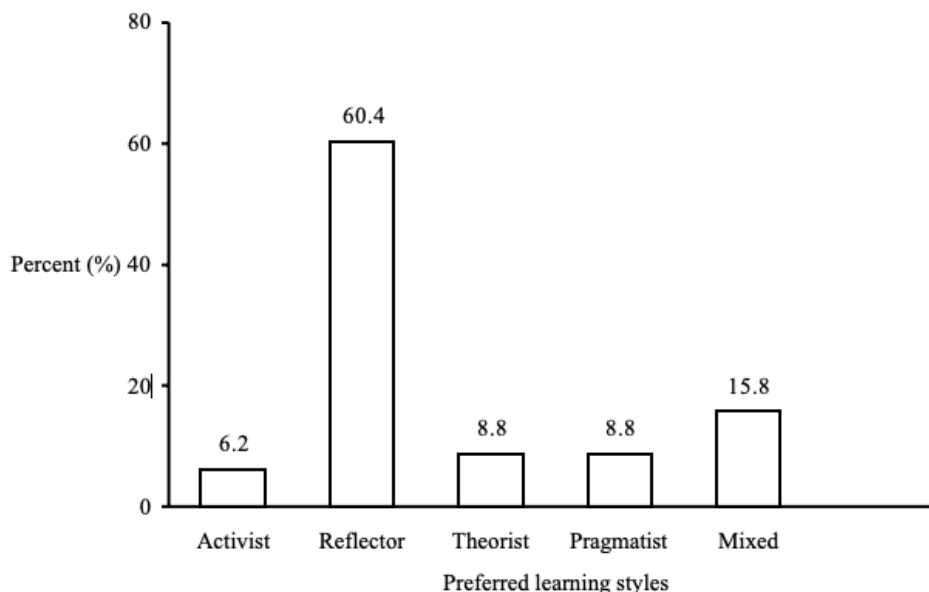


Figure 1. Distribution of LSQ learning styles preferences among the pharmacy students [n=240]

6.4. *The influence of demographic variables on learning styles score*

The statistical tests conducted to explore the influence of demographic variables on the scores of the learning styles indicated that only the variable race was statistically significant in influencing the scores of 'Reflector' scale. Post Hoc comparison using Tukey test indicated that the difference in mean scores between Malay (M=16.7, SD=2.3) and Chinese students (M=16.0, SD=2.8) were not statistically significant. However, these scores were significantly higher than Indian students (M=14.0, SD= 1.8).

7. Discussion

Previous studies that used direct supervision of questionnaire administration produced almost 100% response rate (Barron & Arcodia, 2002; Furnham, Jackson, & Miller, 1999; Lashley & Barron, 2006; Shaw & Marlow, 1999). We adopted similar method of questionnaire administration and achieved full response rate.

The test-retest reliability method is one of the simplest ways of testing the stability and reliability of an instrument over time. It has been suggested that test retest interval is important as the reproducibility of the measures decreases with increasing retest interval (Kurpius & Stafford, 2005). Test-retest correlations for all learning styles subscales in this study showed statistically significant reliability. However, the values obtained (0.57 to 0.66) were slightly lower if compared with the values (0.81 to 0.95) obtained by Honey and Mumford (1992) and Allinson and Hayes (1990) (0.66 to 0.78). This could be due to a longer retest interval used in our study; eight weeks compared to two weeks retest interval for the other two studies. The relatively small sample size of this study could also contribute to the slightly lower values obtained. It is known that the larger the sample size, the more reliable will be the findings. It is worth noting that the sample size in Honey and Mumford's study was 3500.

The Cronbach alpha values obtained in this study (0.53 to 0.61) show similar values to past studies where values range from 0.51 to 0.78 (Allinson & John, 1988; Cockerton, Naz, & Sheppard, 2002; Duff & Duffy, 2002; Swailes & Senior, 1999; Van Zwanenberg, Wilkinson, & Anderson, 2000). This low values maybe related to the weakness embedded in the design of LSQ itself. As suggested by Cockerton et al. (2002), there were conceptual overlaps of items within 'Theorist' and 'Reflector' scale. Such overlapping may affect the scores obtained for Reflector and Theorist in the LSQ study.

Understanding how students learn is important in order to improve the teaching and learning experience (Romanelli et al., 2009). The learning styles preference of pharmacy students in University Malaya was predominantly of a 'Reflector', followed by 'Theorist', 'Pragmatist,' and 'Activist'. As suggested by Honey and Mumford (1992) it seems that a large

number of our students preferred to observe, listen, think before acting and learn through reviewing. The low percentage of 'Activist' also indicates that, the students would rather plan properly and consider the benefits and risks before participating in any activities, instead of being active and making decision intuitively.

Our findings are also similar to those obtained by other studies which assessed the learning styles of medical students (McCall, Klein, Piterman, & Lam, 2005; Quince et al., 2007; Haley & Smith, 2005) and physiotherapy students (Francisco, Torres, & Venancio, 2004) in which the 'Reflector' is the dominant learning style. Just like any other professional courses such as medicine and nursing, pharmacy curriculum requires students to learn facts and theories. It is expected that pharmacy students be skillful in observing, planning, investigating, and analysing information within a well-facilitated learning environment.

Our respondents are all Asian students and they are known to be more passive and are mostly reflective learner rather than activist learner (Charlesworth, 2008; Wong, 2004). Based on the findings, the majority of the pharmacy students would benefit from teaching styles that match the need of the reflective students. However, we are not suggesting that the other three types of learning styles (activist, pragmatist, theorist) should be avoided. Ideally pharmacy educators should try to expose the students to all types of learning styles since each of the learning styles has its advantages and disadvantages (Hardigan, Cohen, & Janoff, 2003). While addressing to the learning styles of the majority of students, educators should take note on the minority needs and expose the less preferred styles to all learners. As suggested by Kolb (1976), learning is a lifelong experiencing cycle. It needs to be continuous and balanced. The matching of students' learning styles with teaching method is not aimed to be specific on certain dimensions of learning, but to discover the insufficiencies in other parts. As Romanelli (2009) suggested, the best practice in teaching should involve the curriculum that employs a variety of teaching styles.

Our findings revealed there was no statistically significant influence of sex, academic level as well as pre-entry qualification on learning styles scores in LSQ. This is in agreement with previous studies examining the association of demographic variables on learning styles (Francisco et al., 2004; Shaw & Marlow, 1999). However, our findings are in discordant with study by Haley and Smith (2005) which found significant relation between pre-entry qualification and learning styles; as well as study by Quince et al. (2007), which found sex and academic year of students have significant influence on learning style scores. These discordant results are probably due to the different disciplines examined. Very few study investigated the association between race and learning styles. Our finding revealed that Malay and Chinese students significantly preferred reflector learning styles compared to Indian students. Barron

and Arcodia (2002) revealed race influences the learning styles. However, this finding cannot be directly compared to our findings due to the different race involved.

Ronan (1996) and Van Zwanenberg et al. (2000) found the learning style preferences did not predict the students' academic performance. However, we did not examine the association of students' learning styles with their academic performances, mainly because as suggested by Kolb (1999) no particular learning style is superior over another. Instead, strong preference in all four styles is encouraged. Any linkage of learning style preference with examination results may encourage the belief that one learning style is superior over the other.

This study is one of the few LSQ studies conducted in Malaysia, as well as in Asian countries. The common obedient and passive attitude embraced by Asian students can be related to Reflector behavior. Our finding would enable the students to be aware of their dominant learning style preferences. They need to be more balanced in their learning styles, and become more active participants in the learning process. Otherwise, their achievement in any field would be limited by their reflective behavior.

7.1. Limitations of this study

The major limitation of this study is that Honey and Mumford's LSQ has not been widely used in pharmacy education, in Malaysia as well as other Asian countries. Therefore, it is very difficult to determine whether the LSQ can be used routinely to examine learning styles in our country as the reliability and validity of the LSQ has not been established in the pharmacy student group. Additionally, this study only involved students from one university, hence the generalisability of the results are limited.

This study seems to indicate the difficulty of measuring learning styles. The 80-items questionnaire takes time to be completed and may also be confusing for the non-native speakers of English in the way the questionnaire were worded, and hence provided poor reflection of their actual learning styles preferences. Even though the researchers attempted to minimise this limitation by giving full explanation and clarification on some of the concepts, some respondents might not have responded based on the learning concepts the items represented.

Another limitation was the longer retest interval in this study. However, this was unavoidable due to the interruptions of exam periods and semester breaks. Future study should take this limitation into consideration

It is recommended that this study be replicated with a larger sample size involving more than one university using the same instrument for comparison purposes. According to Honey and Mumford (1992) the 'strength' or degree of learning style preference should also be

compared against the general norms in order to know whether the individual's learning strength is above or below average. In the long run, there is a need to develop the general norms in local pharmacy education for better comparison and understanding.

8. Conclusion

The LSQ in this study showed satisfactory test-retest correlation and moderate internal consistency reliability. The learning styles preferences of undergraduate pharmacy students in University of Malaya (UM) were predominantly of a Reflector, followed by Pragmatist, Theorist and Activist. Some students displayed two or more learning styles at the same time. A range of teaching methods and learning activities should be provided in pharmacy education in order to match the variety of learning styles. The preferred learning styles seem to be independent of most of the socio-demographic characteristics, except for the influence of ethnicity.

Acknowledgements

The author(s) declare that there is no conflict of interest.

References

- Allinson, C. W., & Hayes, J. (1990). Validity of the learning styles questionnaire. *Psychological reports*, 67, 859-866. <https://doi.org/10.2466/PR0.67.7.859-866>
- Allinson, C. W., & John, H. (1988). The Learning Styles Questionnaire: An alternative to Kolb's Inventory? *Journal of Management Studies*, 25, 269-281. <https://doi.org/10.1111/j.1467-6486.1988.tb00036.x>
- Barron, P. E., & Arcodia, C. (2002). Linking learning style preferences and ethnicity: International students studying hospitality and tourism management in Australia. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 1, 15-27. <https://doi.org/10.3794/johlste.12.25>
- Charlesworth, Z. M. (2008). Learning styles across cultures: suggestions for educators. *Education & Training*, 50, 115-127. <https://doi.org/10.1108/00400910810862100>
- Cockerton, T., Naz, R., & Sheppard, S. (2002). Factorial validity and internal reliability of Honey and Mumford's Learning Styles Questionnaire. *Psychological reports*, 91, 503-519. <https://doi.org/10.2466/pr0.2002.91.2.503>
- Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). Learning styles and pedagogy in post-16 learning: a systematic and critical review. London: Learning and Skills Research Centre.
- Duff, A., & Duffy, T. (2002). Psychometric properties of Honey and Mumford's Learning Styles Questionnaire (LSQ). *Personality and Individual Differences*, 33, 147-163. [https://doi.org/10.1016/S0191-8869\(01\)00141-6](https://doi.org/10.1016/S0191-8869(01)00141-6)

- Francisco, N., Torres, R., & Venancio, J. An investigation of undergraduate physiotherapy student's learning styles. In M. Donaghy, A. G. Pascoal, M. G. Silva, N. Holten, & A. M. F. Lopes (Ed.). 108: Cruz Quebrada: Grafica
- Furnham, A., Jackson, C. J., & Miller, T. (1999). Personality, learning style and work performance. *Personality and Individual Differences*, 27, 1113-1122. [https://doi.org/10.1016/S0191-8869\(99\)00053-7](https://doi.org/10.1016/S0191-8869(99)00053-7)
- Haley, V., & Smith, C. F. (2005). Funded mini-project: An investigation into the learning styles of University of Southampton medical School entrants and outcomes of first year primary BM exams. Final report. Southampton: University of Southampton.
- Hardigan, P. C., Cohen, S. R., & Janoff, L. E. (2003). A comparison of learning styles among seven health professions: implication for optometric education The Internet Journal of Allied Health Sciences and Practice, 1. Retrieved 2 April 2012 from <http://ijahsp.nova.edu/articles/1vol1/toc1vol1.html>
- Honey, P., & Mumford, A. (1982). *The Manual of Learning Styles* (1st ed.). Maidenhead: Peter Honey.
- Honey, P., & Mumford, A. (1992). *The Manual of Learning Styles* (3rd ed.). Maidenhead: Peter Honey.
- Kolb, D. A. (1976). *Learning Style Inventory: Technical Manual*. Boston: McBer and Company.
- Kolb, D. A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. New Jersey: Prentice-Hall.
- Kolb, D. A. (1999). *Learning Style Inventory, Version 3*. Boston: Hay Group.
- Kurpius, S. E. R., & Stafford, M. E. (2005). *Testing and Measurement: A User-friendly Guide*. United States of America: Sage Publications.
- Lashley, C., & Barron, P. (2006). The learning style preferences of hospitality and tourism students: Observations from an international and cross-cultural study. *Hospitality Management*, 25, 552-569. <https://doi.org/10.1016/j.ijhm.2005.03.006>
- Linares, A. Z. (1999). Learning styles of students and faculty in selected health care professions. *The Journal of Nursing Education*, 38, 407-414. <https://doi.org/10.3928/0148-4834-19991201-07>
- McCall, L., Klein, B., Piterman, L., & Lam, T.-P. (2005). Learning style preferences for Hong Kong GPs recruited in a distance-learning course. *The Hong Kong Practitioner*, 27, 261-267.
- Myers, I. B., McCaulley, M. H., Quenk, N. L., & Hammer, A. L. (1998). *MBTI Handbook: A Guide to the development and use of the Myers-Briggs Type Indicator* (3rd ed.). Palo Alto: Consulting Psychologists Press.
- Quince, T., Benson, J., Siklos, P., & Wood, D. Learning styles re-visited. Proceedings of the ASME Golden Jubilee ASM 2007. Retrieved 2 March 2012 from http://www.asme.org.uk/conf_courses/2007/docs_pix/asm_abstracts_2007.pdf
- Romanelli, F., Bird, E., & Ryan, M. (2009). Learning styles: a review of theory, application, and best practices. *American Journal of Pharmaceutical Education*, 73, 9. <https://doi.org/10.5688/aj730109>
- Ronan, N. (1996). Learning styles and academic performance in an African university. *Research in Education*, 87-92. <https://doi.org/10.1177/003452379605600108>

- Sadler-Smith, E. (2001). Does the learning styles questionnaire measure style or process? A reply to Swailes and Senior (1999). *International Journal of Selection and Assessment*, 9, 207- 214. <https://doi.org/10.1111/1468-2389.00173>
- Shaw, G., & Marlow, N. (1999). The role of student learning styles, gender, attitudes and perceptions on information and communication technology assisted learning. *Computers and Education*, 33, 223-234. [https://doi.org/10.1016/S0360-1315\(99\)00020-2](https://doi.org/10.1016/S0360-1315(99)00020-2)
- Swailes, S., & Senior, B. (1999). The dimensionality of Honey and Mumford's Learning Styles Questionnaire. *International Journal of Selection and Assessment*, 7, 1-11. <https://doi.org/10.1111/1468-2389.00099>
- Van Zwanenberg, N., Wilkinson, L. J., & Anderson, A. (2000). Felder and Silverman's Index of Learning Styles and Honey and Mumford's Learning Styles Questionnaire: How do they compare and do they predict academic performance? *Educational Psychology*, 20, 365-380. <https://doi.org/10.1080/713663743>
- Vermunt, J. D. (1998). The regulation of constructive learning processes. *British Journal of Educational Psychology*, 68, 149-171. <https://doi.org/10.1111/j.2044-8279.1998.tb01281.x>
- Wong, J. K. K. (2004). Are the learning styles of Asian international students culturally or contextually based? *International Education Journal*, 4, 154-166.