

## Learning style preferences and academic performance of undergraduate physiotherapy students

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**Abstract:** University level education of physiotherapy is fairly new in Sri Lanka. Hence students' satisfaction of the curriculum and learning environment has not been thoroughly studied. Different learning preferences have been reported among various undergraduate populations. understanding of various learning preferences can be used to enhance their learning experiences. Cross sectional study was conducted among physiotherapy undergraduates from the Department of Physiotherapy, Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka .This study aimed to; i. Identify the different learning preference among physiotherapy undergraduates, ii. Assess the variations of learning preferences according to the gender and academic year, iii. Find out whether there is any relationship between learning preferences and academic performances. Learning preferences were assessed by Honey and Mumford's learning style questionnaire (LSQ). Academic performances were measured by semester cumulative grade point average (CGPA). Chi-square test was used to assess the association between categorical variables. Relationship between learning preferences and academic performances was measured using Pearson correlation coefficient. Eighty six undergraduates successfully responded to the questionnaire. Majority (51.2%) of the physiotherapy undergraduates preferred activist learning style. Chi-square value for the associations of learning preferences with gender ( $\chi=5.961$ ) and academic year ( $\chi=14.399$ ) were insignificant.

Undergraduates who reported multiple preferred learning styles had relatively high CGPA. However, there was no significant difference of mean CGPA among undergraduates with different preferred learning styles. Pragmatist learning preference strength was significantly and negatively correlated with the CGPA ( $r = 0.381$ ). Encouraging pragmatists to improve their preferences to other styles and including more learning activities related to pragmatists may improve their academic performance. Teaching and learning activities with wide variety may improve the overall academic performances of undergraduates.

**Keywords:** Learning Preferences, Academic Performances, Physiotherapy Undergraduates

### Introduction:

Learning styles of individuals are different according to the learners' cognitive processing [Marcy, 2001]. According to some educational researchers, disparity between learning content and mode of delivery of instruction may result in the learners' frustration with curriculum [Bertolami, 2001]. Educational researchers assume that improved learning outcomes may be obtained through addressing individual learning preferences [Silberman &Auerbach, 2006]. Educators have introduced various theories describing the learning preferences which aimed to understand the learning process better [Arthurs, 2007]. David A. Kolb introduced Kolb's experiential learning theory in 1984 which was widely discussed

among educational researches. Kolb's experiential learning theory works on two levels which are called perception and processing continuum and can be present in a four staged cycle of learning and four types of learning preferences [Kolb, 1984].

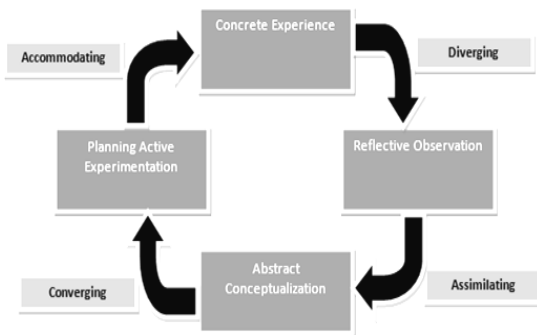


Figure 6: Kolb's experiential learning cycle [Kolb, 1984]

Many theorists were inspired by Kolb's learning theory. Honey and Mumford produced their own Learning Styles Questionnaire (LSQ) based on Kolb's learning theory as they found that Kolb's LSI had low face validity with managers. Hence rather than asking people directly how they learn, as Kolb's LSI does, Honey and Mumford gave them a questionnaire that probes general behavioral tendencies. Their reasoning for this was that the most people never consciously considered how they really learn [Knight, 2007].

Their questionnaire was directly derived from the Kolb's model of learning. However they made two modifications. First, they substitute the terms "reflector" for divergers (reflective observation), "theorist" for assimilators (abstract conceptualization), "pragmatist" for convergers (concrete experience), and "activist" for accommodators (active experimentation). In addition, the new labels have slightly different meanings. They hypothesized that individuals have different learning preferences based on the situation and level of experience, thus a learner would have multiple modes of learning preferences rather locked mode of preferences.

**Reflector** – these individuals prefers to learn from watching the activities. They prefer to view these activities in various perspectives, think about what happened and takes time to get to a conclusion. They prefer brainstorming. Lectures with an expert explanations and analysis will be helped for them.

**Theorist** – Inclined towards a step by step approach. They use models concepts and facts to understand the theories behind actions. Talking with experts is usually less useful to them.

**Pragmatist** – They attracted to real world applications of their new learning's to see how works. They are experimenters; want to try out new ideas. Prefer learn with field works, laboratory works and observations. They like to have feedbacks and to have clear links between hands on activity.

**Activist** – Attracted to face new challenges. They learn by doing and involved themselves in new challenges. Open minded and prefer to solve new problems and to work as small groups [Honey & Mumford, 2006].

Physiotherapy graduate level education in Sri Lanka was initiated and evolved within last two decades. Published research data regarding learning preferences of Sri Lankan physiotherapy undergraduates are limited. Authors could not find any published data of Sri Lankan physiotherapy undergraduates obtained through Honey and Mumford's LSQ. Some previous studies suggest that learning preferences should be examined with various tools [Mountford et al, 2006]. Class room instructions tailored according to the learners may be effective in improving learning experiences of medical undergraduates [Liew et al, 2015]. Further information regarding learning preferences of Sri Lankan physiotherapy undergraduates may be used to tailor more appropriate class room instructions and enhance the teaching learning experience.

## **Methodology:**

### **Study design, setting and participants**

A cross-sectional survey design was employed. This study was conducted among physiotherapy undergraduates of the Department of Physiotherapy, Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka. All undergraduates who have registered in academic year 2019/20 physiotherapy department from four academic batches were invited to the study. One hundred twelve undergraduates were eligible to include in the study.

### **Study instrument**

Data collection was done by a questionnaire which consisted of two sections. First section was used to enquire age, gender, academic year, and examination index number of participants while second part was the Honey and Mumford's learning Styles Questionnaire (LSQ) [Honey & Mumford, 2006]. Honey and Mumford's LSQ was used to examine learning styles preferences among physiotherapy students. This study instrument has shown good construct validity and internal consistency among South Asian populations [Haque & Afrin, 2018; Khan, 2009]. LSQ consists of 40 dichotomous statements that illustrate four learning styles identified by Honey and Mumford (Activist, Reflector, Theorist and pragmatist). Ten statements corresponds to each four styles are randomly organized. Respond to a statement can be made according to the degree of agreement/disagreement on statement. They were instructed to tick when they agree more than they disagree on a statement and to cross when they disagree more on a statement. LSQ enable the examiner to identify multiple learning preferences of the respondent. Strength of the preference for an each learning style can be further classified as very strong, strong, moderate, low or very low according to the general norms given

with the study instrument. Scoring was done according to the sum of positive responses for each scale. End semester cumulative grade point average (CGPA) was collected from examination department as the indicator of academic performance.

### **Data collection**

Institutional permission was obtained from the dean of the faculty prior to any data collection procedures. Data collections were done inside lecture halls at the beginning of a lecture during academic hours with the permission of the head of the department. Questionnaires were distributed among voluntary participants those who provided the informed written consent. Index numbers provided by participants were used with the permission of the dean of the faculty to obtain the examination results of relevant undergraduates from the examination department of the faculty.

### **Ethical considerations**

Ethical clearance for the study was obtained from the ethical review committee of faculty of Allied Health Sciences, university of Peradeniya. Undergraduates were informed that the voluntary participation is expected. Informed written consent from every participant was obtained at the beginning of the data collection. Participants were informed the necessity of their index number for the study. All the data were handled by the investigators of the study and only for the research purpose.

### **Data analysis**

SPSS v.21 was used to perform statistical analyzes the data. Descriptive statistics were used to characterize the sample (i.e., gender and academic year). Frequency tables of preferred learning styles were generated. Chi-square test was used to assess the association between categorical variables. Independent t-test and one way ANOVA test were used to assess the differences between

mean values of variables between groups. Relationship between learning preferences and academic performances was measured using Pearson correlation coefficient.  $p < 0.05$  was used as the level of significance for statistical tests.

**Results and Discussion:**

In this study, 76.7% response rate was reported. From the sample, 29 (33.7%) of the participants were male and 57 (66.3%) were female. This study showed comparatively low response rate (76.7%), compared to similar studies conducted in Sri Lanka (Kotelawela Defence University, 87% of undergraduates -87% and postgraduates 89.2%) [Abewardhana et al, 2018]. Comparatively less response rate may be resulted from the poor attendance of undergraduates during the time period of the data collection. Respondents were aged between 20-25 years. Twenty undergraduates from 1st academic year, 27 undergraduates from 2nd academic year, 21 undergraduates from 3rd academic year, and 18 years undergraduates from 4th academic year responded to the study.

Preferred learning style of the majority of respondents (51.2%) was "Activist" style. As contrary to these findings, previous study has shown that most physiotherapy undergraduates in Australia (26%) preferred reflector learning style [Mountford et al, 2006]. Furthermore, according to previous studies, most of other Asian students preferred passive and reflective type of learning [Charlesworth, 2008; Wong, 2004]. From the sample, 18.6% preferred "Theorist" learning style while 15.1% preferred "Reflector learning styles. Least preferred learning style was "Pragmatist" style (2.3%). Rest of the 12.6% respondents had multiple preferred learning styles. They were classified as "Mixed" style. According to a study conducted among undergraduates from various fields of study in the southern university of Chile, Medical undergraduates

had a balanced preference for all styles while engineering undergraduates preferred "Pragmatist" and "Activist" learning styles [Von Chrismar, 2015]. As demonstrated by the results of above mentioned studies, field of the study and region of the undergraduates may affect the learning preferences.

*Table 3: Respondents according to preferred learning style.*

Preferred learning style	Frequency	Percentage %
Activist	44	51.2%
Reflector	13	15.1%
Theorist	16	18.6%
Pragmatist	2	2.3%
Mixed	11	12.8%

Majority of both male and female respondents' preferred learning style was "Activist" style. Figure: 02, shows the gender wise distribution of the preferred learning styles. Chi square test value for the association of gender with learning preference was insignificant (Pearson chi square value = 5.961). Previous study conducted among pharmacy undergraduates of Brazil report similar results [Czepula, 2016]. A study conducted to examine learning preferences of secondary school students using Neil Fleming's Vark model reported that there was no significant association between gender and learning preferences [Singh et al, 2015]. Learning preferences may be independent from gender of the learner at least when examining with Honey and Mumford's LSQ.

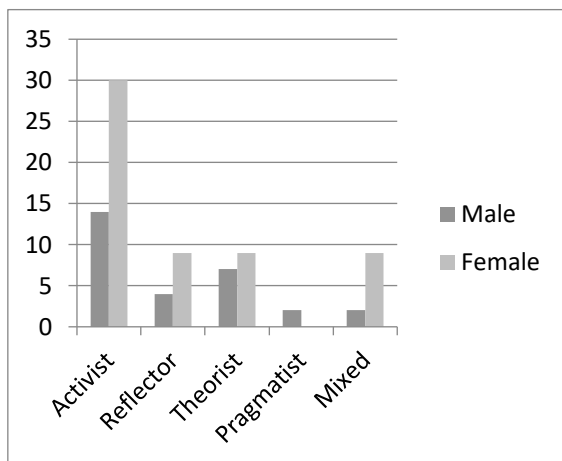


Figure 7: Learning preference according to gender

Chi square test value for the association between academic year and preferred learning style was insignificant (Pearson chi square value = 14.399). Pragmatists were reported only among 2<sup>nd</sup> year participants. Learning preferences of the undergraduates has not changed significantly from 1<sup>st</sup> to 4<sup>th</sup> academic years. A study conducted among Pakistan dental undergraduates and dentists has reported findings partially agreed with the findings of this study. According to the study most preferred learning style (reflector) remained constant from 2<sup>nd</sup> to 4<sup>th</sup> academic years and even among demonstrators [Butt et al, 2018].

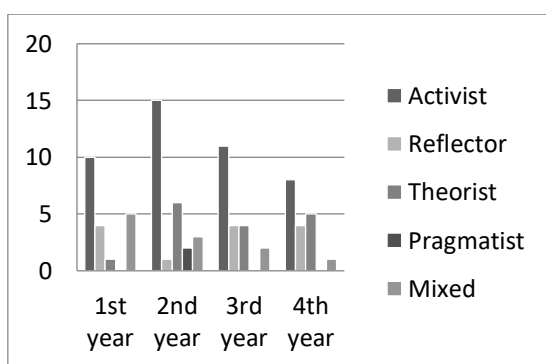


Figure 8: Learning preference according to academic year

Mean CGPA of undergraduates is 2.69. Mean CGPA of male respondents was less compared to female participants. Mean CGPA difference among academic years were insignificant. As shown in the table 2, highest mean CGPA is reported from “Mixed” group.

However, No significant difference of mean CGPA between any two groups were found.

Table 4: CGPA according to preferred learning style.

Preferred learning style	Min. CGPA	Max. CGPA	Mean CGPA
Activist	1.28	3.63	2.55
Reflector	1.47	3.62	2.55
Theorist	2.05	3.44	2.67
Pragmatist	2.24	3.21	2.72
Mixed	1.51	3.81	2.76

There is a significant negative weak correlation between pragmatist preference strength and CGPA. Previous study which has conducted among pharmacy undergraduates in United Kingdom reported significant weak positive correlation between Theorist, Reflector scores and first year examinations marks. Study also has found a significant weak correlation between Activist scores and first year examinations marks [Sharif et al, 2010].

Table 5: Correlation between preferred learning style and academic performance

Learning style preference	Pearson correlation coefficient
Activist	-0.141
Reflector	-0.126
Theorist	0.158
Pragmatist	-0.381*

### Conclusion:

There was a wide variety of learning preferences and strength of the preference among undergraduate physiotherapy students. Majority of the students preferred “Activist” style learning. Gender and academic year were not significant determinants of the learning preferences when examined with Honey and Mumford’s LSQ. Current study demonstrates that

multiple preferences may be beneficial towards academic performance. Although Pragmatists had relatively higher mean CGPA, strength of the preference to the “pragmatist” style in general has influenced negatively on academic performance.

### Recommendations:

Teaching and learning activities with wide range of activities based on undergraduates' preferences may enhance the learning experience and improve academic performances.

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