# LEARNING STYLES AMONG HIGHER ACHIEVERS STUDENT AT SEBERANG PERAI POLYTECHNIC MALAYSIA

CHE GHANI CHE KOB*, SHANGEETAVAANI KANNAPIRAN,
ARMAN SHAH ABDULLAH

Department of Engineering Technology, Faculty of Technical and Vocational Education,
Universiti Pendidikan Sultan Idris, 35900 Tanjung Malim, Malaysia
*Corresponding author: cheghani@ftv.upsi.edu.my

## Abstract

Malaysian polytechnic system is a main stakeholder in mainstreaming and transforming technical and vocational in the Eleventh Malaysian Plan 2016-2020. Hereby, there is a need in the study to determine the learning styles of polytechnic students at Seberang Perai Polytechnic (PSP) among other 32 polytechnics in Malaysia. Felder Silverman Learning Style was used that consists of four dimensions are processing, perception, input, and understanding. It is important to know the learning styles among students, since each of them have different learning styles in their academic achievement. The present study was conducted via quantitative research methodology. A total of 403 high achiever students in Mechanical Engineering, Electrical Engineering, Commerce, and Information Technology and Communication departments participated in this survey. The result achieves the objectives of this survey that is to identify the different learning styles among high achievers and to compare it with gender and among the stated departments. As for the departments there was not much of significance difference in the students learning style used for their academic achievement via ANOVA analysis. Post Hoc Tukey HSD (Honest Significant Difference) test was used to obtain further results. Each student has their own style of learning to achieve success in their academic. Thus, students should know and understand their benefit of learning style to be good academic achievers.

Keywords: Felder Silverman learning style, Polytechnic students, Dimensions, High achievers, departments.

## 1. Introduction

Everyone definite have their own learning style to study. The various learning styles and models developed to enhance studying skills among students. However, the decline in academic achievement is due to the failure in adaption to the teaching and learning style [1, 2]. Many students are unaware of the necessarily to know the learning styles appropriate to the learning matter and utilized beneficially. Although the study of learning styles has been carried out in the country but study on learning style among polytechnic students are less done.

Based on the report (Laporan Kajian Semula Pengurusan: KSP) Session in June 2012 and December 2012, students obtained unsatisfactory moderately, low and failures with a total of 54.12 per cent and 50.22 per cent. The main factor contributed to the failure of students achieving high academic achievement is learning styles. The academic achievement of students will increase if the method and program resources matched to the properties of learning styles [3]. These graduates are facing difficulties to succeed academically in pursuing their studies to degree level [4]. It is among one of the causes in the decline in academic achievement is due to their failure to adapt the right learning style [5].

This research is conducted to investigate and examine the practice of learning styles [6] and academic achievement of students in PSP in the aspects of various study programs and gender. The aim of the research is to identify the different learning styles adopted by high achiever students at PSP according to four dimensions of learning styles (processing, perception, input and understanding) from the aspects of gender and department of their academic study.

## 2. Literature Review

Deterioration of academic achievement the students failed to adapt to teaching and learning style [1, 2]. Many students are unaware of the approach to understand the learning style and its benefit. This statement is supported by Griggs [7] that students who use appropriate learning style will get better academic achievement than students who do not use learning styles. As for Felder and Silverman [6], stated that learning styles are different from each other. If lecturers or instructors do not adjust teaching to students' learning styles will create discomfort and lack of attention from students. Lecturer identifying learning styles and adapt to teaching will contribute to more effective learning [8]. Thus, learning styles is a problem which should be identified by the lecturers in the planning of teaching and learning to be successful.

This study uses Felder-Silverman Learning Style Model (1988). Originally, Richard Felder and Linda Silverman focuses specifically on the learning styles of engineering students. Three years later, psychometric assessment instruments of Felder and Solomon's Index of Learning Styles (1991) is produced. At first there are five dimensions of Perception (Sensing/Intuitive), Input (Visual/Auditory), Organization (Inductive/Deductive), Process (Active/Reflective) and Understanding (Sequential/Global) [6]. Then two changes the Organization dimension (Inductive/Deductive) was dissolved and sub-scale Visual/Auditory amended to Visual/Verbal as in Fig. 1.
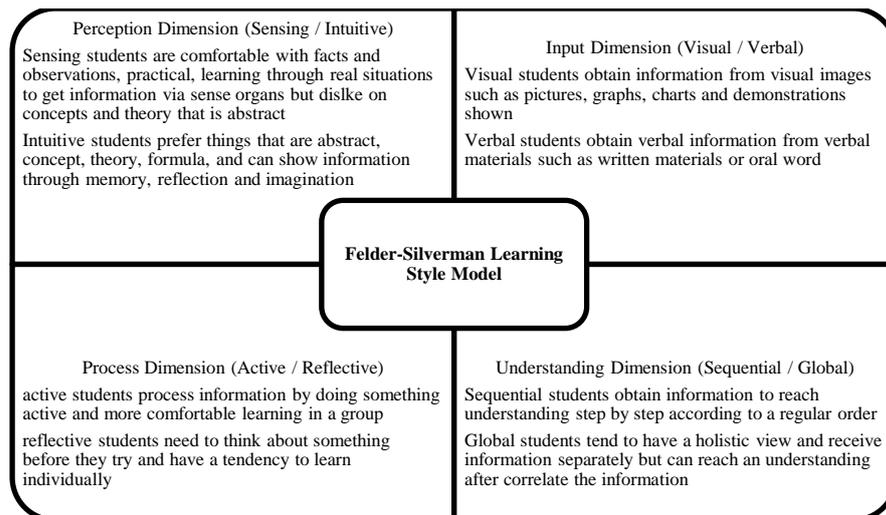
**Fig. 1. Felder-Silverman learning style model.**

## 3. Methodology

### 3.1. Research design

In this study questionnaire method was used to collect data and to measure the characteristics or variables of the sample size. Questionnaire is more practical than interview or observation because large number of samples required [9]. The independent variable is learning styles while academic achievement is the dependent variable. The relationship of the diversity of gender and program of study to the practice of learning styles is expected to affect student achievement.

### 3.2. Research population and sample

The study population of 403 high achiever students was selected studying at PSP with pointers above 3.5. There are four academic departments involved Mechanical Engineering Department (JKM), Electric Engineering Department (JKE), Commerce Department (JP), Information Technology and Communication Department (JTMK), Two more academic support departments, namely Department of General Studies and Department of Mathematics, Science and Computer. Random selection method is used in this study to determine the sample. Sampling study refers to Sample Size Determination Table to determine an appropriate number of samples. It has a confidence level of 95 percent [10].

### 3.3. Research instrumentation

The questionnaire for this study was divided into two parts. Part A on personal information of respondents (name, student registration number, gender, ethnicity, education programs, department of studies and academic achievement). Part B consists of Index of Learning Style (ILS) questionnaire built by Felder and

Silverman (1991) and later spread by Felder and Solomon from Carolina State University. Reliability item was tested via Cronbach Alpha. The result of the test showed that all achieved more than 0.5 except for Sequential / Global dimension.

## 4. Results

The results showed practice of learning styles obtained high achievers in PSP. Four dimensions of learning styles are more likely to have learning styles active, sensing, visual and sequential where visual learning style is the highest. All dimensions indicate the level of balanced learning style but for input dimension the level of visual learning style is more.

### 4.1. Learning style by gender

Both Figs. 2 and 3 results explains there is no much differences among male and female students learning style. Both genders have tendency to adopt the same style of learning for all dimensions of learning styles yet input dimension is more prone to visual learning style. Therefore, the analysis of the different learning styles of students by gender performed using t-test of independent samples. The results showed that there was no significant difference in learning style dimension for processing (t=1.009, $p>0.05$) and understanding (t=-1.782, $p>0.05$) while there were significant differences for dimension of perception (t=-2.599, $p<0.05$) and input (t=2.120, $p<0.05$). Following is Table 1 obtained from the test.
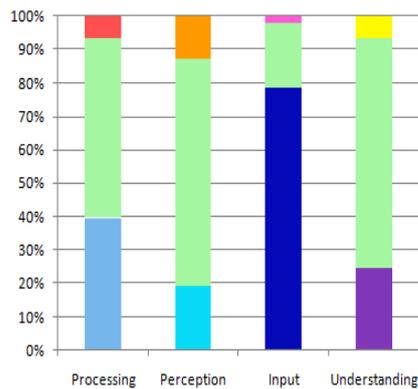


**Fig. 2. Male students learning style.**   **Fig. 3. Female students learning style.**
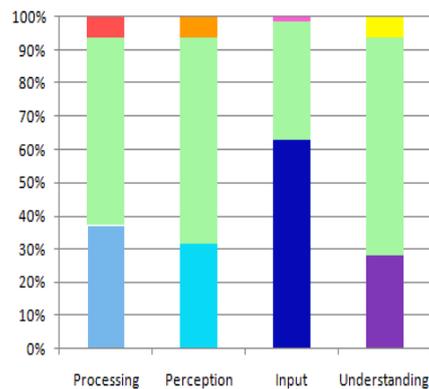
Learning styles:

■ Active intuitive        ■ Sensing verbal

■ Visual global        ■ Sequential balance

■ Reflective

**Table 1.** Learning styles of male and female students' results obtained via *t*-test.

| Dimension | Gender | Mean | Standard deviation | *t*-value | Level of significant |
|---|---|---|---|---|---|
| Processing (*active/reflective*) | Male | 2.91 | 3.77 | 1.009 | .314 |
| | Female | 2.42 | 4.06 | | |
| Perception (*sensing/intuitive*) | Male | 0.80 | 4.07 | -2.599 | .010 |
| | Female | 2.05 | 3.87 | | |
| Input (*visual/verbal*) | Male | 6.01 | 3.80 | 2.120 | .035 |
| | Female | 5.00 | 3.93 | | |
| Understanding (*sequential/global*) | Male | 0.72 | 4.00 | -1.782 | .760 |
| | Female | 1.55 | 3.74 | | |

### *Learning Style by Department*

Based on Fig. 4, overall student from different departments do have different styles of learning. Although the composition of learning styles in each department differs but the dominance of the stages of learning styles for each dimension is the same.
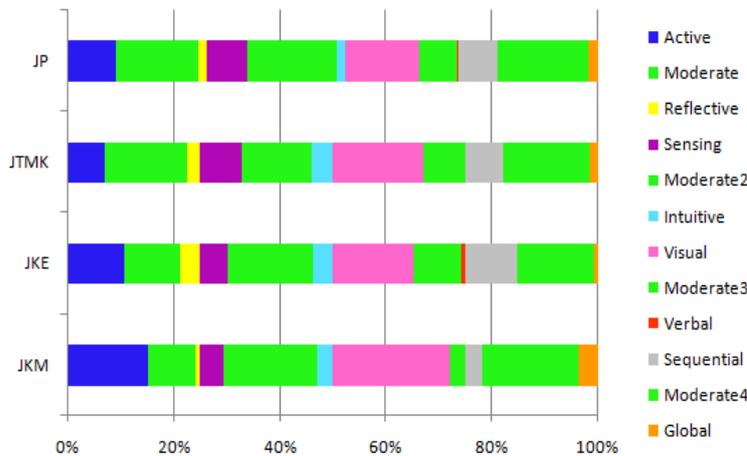


**Fig. 4.** Learning style of students by departments.

Hereby, test results one-way analysis of variance (ANOVA) showed that there were no significant differences for dimensions of processing (F (3,328) =1.251; *p>0.05*), perception (F (3,328) =1.678; *p>0.05*), and understanding (F (3,328) =1.961; *p>0.05*) but there is a significant difference for input dimension (F (3,328) =2.874; *p<0.05*). Thus, Post Hoc Turkey HSD test (Honest Significant Difference) is performed onto input dimension to seek clarification with further studies department which is significantly different. Table 1 shows that there is significant difference in the learning style of input dimension (p=0.028; *p<0.05*) among students from JKM and JP departments with different of 2.01 mean score while there was no significant difference between the students of other departments.

Tables 2 and 3 shows that learning styles dimension of processing (*p*=0.678; *p>0.05*), perception (*p*=0.936; *p>0.05*), input (*p*=0.665; *p>0.05*), and understanding (*p*=0.293; *p>0.05*) obtained has no significant relationship with academic achievement. The index recorded correlation inverse for all dimensions

except for input dimension showed linear correlation. The index of correlation dimension for all learning styles is between -0.04 to 0.024 and shows a very weak relationship that is under 0.20 that can be ignored. These finding states students may choose and practice preferences of any preferred learning styles to create greater academic success.

**Table 2. Post-Hoc Turkey HSD test for input dimension.**

| Academic department | | Mean difference (I-J) | Standard error | Sig. | 95% Confidence level | |
|---|---|---|---|---|---|---|
| (I) | (J) | | | | Lower limit | Upper limit |
| **JKM** | **JKE** | 2.27 | .99 | .106 | -0.30 | 4.85 |
| | **JTMK** | 1.37 | .96 | .486 | -1.11 | 3.86 |
| | **JP** | 2.01$^*$ | .72 | .028 | 0.15 | 3.88 |
| **JKE** | **JKM** | -2.27 | .99 | .106 | -4.85 | 0.30 |
| | **JTMK** | -0.90 | 1.00 | .807 | -3.50 | 1.69 |
| | **JP** | -0.25 | .77 | .988 | -2.26 | 1.74 |
| **JTMK** | **JKM** | -1.37 | .96 | .486 | -3.86 | 1.11 |
| | **JKE** | 0.90 | 1.00 | .807 | -1.69 | 3.50 |
| | **JP** | 0.64 | .73 | .814 | -1.24 | 2.53 |
| **JP** | **JKM** | -2.01$^*$ | .72 | .028 | -3.88 | -0.15 |
| | **JKE** | 0.25 | .77 | .988 | -1.74 | 2.26 |
| | **JTMK** | -0.64 | .73 | .814 | -2.53 | 1.24 |

Confidence level 0.05 significant mean difference.

*Relationship of Students Learning Style with Academic Achievement*

**Table 3. Correlation analysis between
learning styles with average collection points.**

| Learning Styles | Pearson Correlation | Sig. (2-sisi) | N |
|---|---|---|---|
| **Processing Dimension**(*active/reflective*) | -.023 | .678 | 332 |
| **Perception Dimension**(*sensing/intuitive*) | -.004 | .936 | 332 |
| **Input Dimension** (*visual/verbal*) | .024 | .662 | 332 |
| **Understanding Dimension** (*sequential/global*) | -.058 | .293 | 332 |

## 5. Discussion and Suggestions

In conclusion students were found to be dominant in visual learning style and followed by active, sensing, sequential learning styles. Students who practice active learning style prefer to study in a group explaining, discussing, sharing knowledge and asking question to lecturers if uncertain. Yet these students need to be open to accept criticism when mistakes are made. While reflective learners prefer to collect all the information then study thinking in depth. Studying alone and learning via lectures with quiet atmosphere is preferred by reflective learners. If forced to learn in a group, they tend to listen than contribute ideas. They feel unfriendly and lacking the ability to communicate with others and prefer last

minute studies due to difficult in recalling the information. Thus, they should avoid such studying style and socialize to mingle with friends.

Sensing learning style is more comfortable among students with facts, memorizing and repeating information. They learn by connections with real life situations and prefer lecturers who speak loud and clear repeating the previous instruction before continuing to next. Unlike the intuitive learners prefer creative learning style than factual material and like to learn through calculations rather than memorizing. They practice early learning by taking small notes, attitude of accuracy and adapt to given assignments. The visual learners have a high tendency to understand an instruction through drawings, diagrams, flow charts and graphs. Verbal learning style students understand and remember information orally and in writing. They practice writing the summary outline and increase the understanding by listening to the description of group members. While sequential learners understand learning structured according to the logical steps. But for global learners the freedom to learn is emphasized without having given guidelines or measures specifically learning during the learning sessions. They tend to collect information randomly and understand spontaneously by creating a link with the information collected.

Therefore, the lecturers should understand the methods and processes of teaching and learning in order to improve the mental and intellectual development of students by diversifying their teaching style [11]. The results of this study can help the polytechnic management to increase its effort towards the realization of the Quality Policy to develop potential students to excel in engineering, information technology and commerce. Administration needs to play a serious role to advice lecturers provide learning materials with more visual form and quality as well as complete equipment support student learning. Nevertheless, students can test themselves via measurement instruments of learning styles found in websites to understand the strengths and weaknesses of their learning styles.

## 6. Conclusion

Research on practice learning styles of each dimension is also in line with the theory raised by Felder and Silverman (1988). The strengths and weaknesses of each sub-dimensions of learning styles also researched and developed as a guide not only to students but also to the lecturers and the administration. Students have a tendency to one of the sub-dimension. The finding has proven practices of learning style in all dimensions except the input dimension is more likely to be practiced by the high achiever students in PSP. In conclusion, it was found that high achiever students in PSP tend to practice active, sensing, visual and sequential learning styles.

## Acknowledgement

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