

*The Relationship between Students' Learning Style and Academic Performance in
Mara Professional College, Malaysia*

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Abstract

A study was conducted to determine MARA Professional Colleges students' perception on learning style. The study builds on the Dunn and Dunn model and instruments of learning style. This model believes that students' preferences and learning outcomes are related to factors other than intelligence, such as environment, opportunities to move around the classroom, working at different time of the day and taking part in different types of activity. The learning style dimensions studied are environment, emotional, sociological, physiological and psychological. Data were collected via questionnaires from 508 students. The study utilizes correlation and regression statistics to analyse the data. The finding of the survey show there is a relationship between the five dimension measured environment ($r=0.006$), emotional ($r=0.624$), sociological ($r=0.138$), physiological ($r=0.260$) and psychological ($r=0.431$). Emotional contributed the most which is 28.3%, followed by psychological (9.4%), sociological (1.9%), physiological (1%) and environment does not contribute towards educational performance. The results suggest that focuses should be given on student's level of motivation, persistence, responsibility and need for structure. It also revealed that environmental elements of sound, light, temperature and furniture or seating design do not contribute to academic performance. The results of the study have valuable implication to the college lecturers and administrators to adapt teaching style and activities to student learning preferences.

Introduction

What is learning style? It is the way a person processes, internalizes and studies new and challenging material. Students' performance may be related to learning preferences or styles as learners. In many cases, neither students nor lecturers are aware that difficulty in learning may not rest solely in the material itself. Meanwhile, Domino (1970) found out that college students taught in their preferred learning styles scored higher on tests, fact knowledge, attitude and efficiency than those taught in instructional styles different from their preferred style. Mismatch of teaching styles and learning styles could give negative impact to students. Students tend to be bored and inattentive in class, do poorly on tests, get discouraged about the course and may conclude that they are not good in the subject and give up (Felder & Silverman 1988 & Oxford et.al 1991). As a result, students' success in classes may ultimately depend on understanding the learning style characteristics of students who enrol in the respective courses.

Literature Review

Most of the time lecturers who are confronted by low grades, unresponsive classes, poor attendance, may become overly critical of their students or begin to question their own competence as teachers (Felder 1995). A study by Stice (1987) concluded that students retain 10% of what they see and hear, 26% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say and 90% of what they say as they do something. So, lecturers have to vary the teaching methods to increase the students' understanding.

One of the most widely known theories assessed is the learning style model Dunn & Dunn (2000). Dunn & Dunn's learning style model uses four main sensory receivers which are visual, auditory, kinaesthetic and tactile to determine the dominant learning style. According to the theory, one or two of these receiving styles is normally dominant. This style may differ according to task. An important principle in Dunn & Dunn's model is the idea that students' achievements are heavily influenced by relatively fixed characteristics (Dunn & Griggs 2003).

Dunn and Dunn (1992) define learning style as 'the way in which individuals begin to concentrate on, process, internalize and retain new and difficult academic information'. According to Dunn (2003), the inability of schools and teachers to take account of preferences produces endemic low achievement and poor motivation. There are empirical researches as shown by Riding & Grimley, (1999); Richardson (1994); Cano & Garton (1994) suggest that learning styles can enhance academic performance in several respects. Analyses of the learning styles of non-achieving students have revealed that, as a group, such students learn in a style and with instructional strategies that differ significantly from those of students who perform well in school (Dunn & Griggs, 1988, 1990).

White (1980) confirmed there was a pattern of intellectual change which occurred in college students. Perry (1970) further stated that basic progression of intellectual change influenced the teachers to seek alternative ways to teach and advice. White (1980) and Lyons (1984) encouraged teachers who hoped to nurture the importance of basic progression in the development of intellectual change, to practice their art with responsive versatility in an effort to retain more students.

Therefore, the literatures from previous studies show correlations between learning style and academic performance. There are repeatedly evidenced the statistically increased academic achievement (Cafferty,1980; Carbo, 1980; Douglass, 1979; Krinsky, 1982; Pizzo, 1982; Shea, 1983; Tannenbaum, 1982; Trautman, 1979; Urbschat, 1977; Weinberg, 1983; Wheeler, 1983; White, 1980) and improved attitudes toward learning (Copenhaver, 1979; Pizzo, 1982) that emerge when students are taught through their unique personal characteristics.

Problem Statement

The concept of learning style has a broad meaning. In this research, it is proposed and defined as an individual's preferential focus on different types of information, the different ways of perceiving the information, and the understanding of information (Li et al 2008). Students' performance may be related to learning preferences, or styles as learners. Students may also self-select into or away from classes based on their learning preferences. As a result, students' success in classes may ultimately depend on understanding the learning style characteristics of the students who enrol in course. Reid (1987) in his research stated that students with their variety of language and cultural backgrounds and differences in age and previous education, often come together in programmes in which they are taught homogeneously by teachers who have little knowledge of learning styles. Another purpose is to better understand the different learning styles among these students in order to develop appropriate teaching strategies for improving teaching methodology at these colleges. Although learning style has been heavily researched (Coffield et al 2004; Reynold & Vince 2007; Welsh et al 2007; Hornyak et al 2007; Herbert & Stenfors 2007; Sievers 2007; Hyde 2007; Kayes 2007; Gracia et al 2007; Demirbas & Demirkan 2007; Armstrong & Mahmud 2008; Li et al 2008), not much is known about MARA Professional Colleges students' learning style, especially in the field of professional education.

Purpose of the Study

This paper therefore has the following objectives:

- i. To examine the relationship between learning style dimension (environment, emotional, sociological, physiological and psychological) with academic performance.
- ii. To examine the contribution of learning style dimension (environment, emotional, sociological, physiological and psychological) towards academic performance.

Methodology

This study was carried out through a survey method, using questionnaires as the main instrument. The sample consists of 508 respondents among male and female students, aged 18-25 years old, who were enrolled in Diploma and Higher National Diploma programme in MARA Professional Colleges. The Dunn and Dunn model of learning style is used in this study. The questionnaire consists of two sections to measure the studied element. Section A consists of 9 items on demography information (college, age, gender, residential, semester, programme and CGPA). Section B contains 45 items firstly, to measure learning style dimension (environment, emotional, sociological, physiological and psychological). Likert scale was used whereby scale '1' is Strongly Disagree and

scale '5' is for Strongly Agree. A pilot study was carried out to revise the questionnaire and for item analysis. The validity and reliability of the questionnaire was measured. Factor analysis was performed to determine the underlying factorial structure of the scale. The result of the analysis revealed 5 dimensions (environment, emotional, sociological, physiological and psychological) with eigenvalues greater than 1.0. The internal consistencies of scale were assessed through computing Cronbach's alpha. The dimensions of learning style show the reliability value between 0.813 to 0.930. Implication from these values indicates that all of the items used for each component in the questionnaire have a high and consistent reliability values.

The research conceptual framework for this current study is suggested in Figure 1. This research conceptual framework explains that academic performance of students is influenced by elements of learning style (environment, emotional, sociological, physiological and psychological). The dependent variable in this research is academic performance. The independent variables in use are environment, emotional, sociological, physiological and psychological.

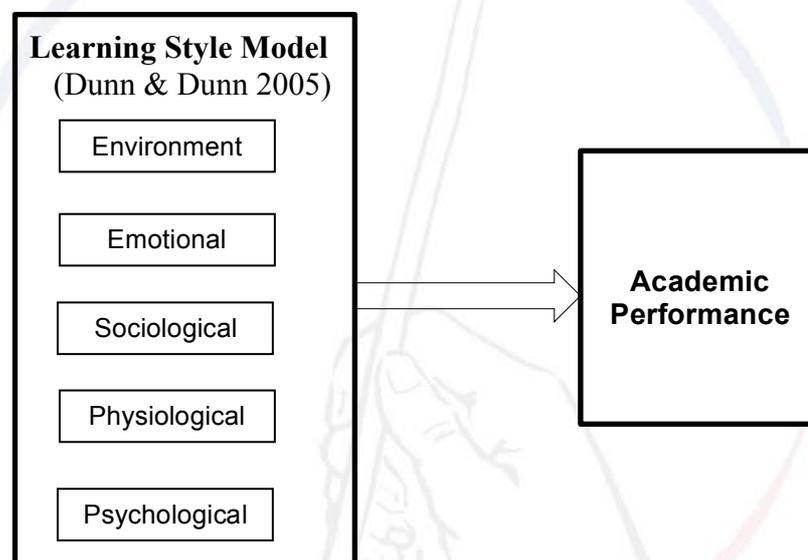


Fig 1: Research Conceptual Framework

Findings

In this study, the relationships between the learning style dimension (environment, emotional, sociological, physiological and psychological) and academic performance were examined. Table 2 shows the results of Pearson Correlation Analysis.

Table 2 Analysis of Pearson Correlation– Zero Order

	Environmen t	Emotiona l	Sociologica l	Physiologica l	Psychologica l
Academic Performance	0.006 (508) p = 0.09	0.624 (508) p = 0.00	0.138 (508) p = 0.00	0.260 (508) p = 0.00	0.431 (508) p = 0.00
Environment	1.000 (508) p=.	0.350 (508) p=0.00	0.242 (508) p=0.00	0.330 (508) p=0.00	0.258 (508) p=0.00
Emotional	0.350 (508) p=0.00	1.000 (508) p=.	0.333 (508) p=0.00	0.470 (508) p=0.00	0.301 (508) p=0.00
Sociological	0.242 (508) p=0.00	0.333 (508) p=0.00	1.000 (508) p=.	0.329 (508) p=0.00	0.251 (508) p=0.00
Physiologica l	0.330 (508) p=0.00	1.000 (508) p=.	0.329 (508) p=0.00	1.000 (508) p=.	0.334 (508) p=.
Psychologica l	0.258 (508) p=0.00	0.301 (508) p=0.00	0.251 (508) p=0.00	0.334 (508) p=.	1.000 (508) p=.

*p< 0.05

1. Relationship between learning style dimension (environment) with academic performance.

Ho1₁: There is no significant relationship between learning style dimension (environment) with academic performance.

The results shows that the correlation coefficients between learning style dimension (environment) and academic performance is $r = 0.006$, $n = 508$, ($p < 0.05$). No significant correlation ($p < 0.05$) was found between learning style dimension (environment) with academic performance.

2. Relationship between learning style dimension (Emotional) with academic performance.

Ho1₂: There is no significant relationship between learning style dimension (emotional) with academic performance.

The results shows that the correlation coefficients between learning style dimension (emotional) and academic performance is $r = 0.624$, $n = 508$, ($p < 0.05$). Significant positive correlation ($p < 0.05$) was found between learning style dimension (emotional) with academic performance.

3. Relationship between learning style dimension (sociological) with academic performance.

Ho1₃: There is no significant relationship between learning style dimension (sociological) with academic performance.

The results shows that the correlation coefficients between learning style dimension (sociological) and academic performance is $r = 0.138$, $n = 508$, ($p < 0.05$). Significant correlation ($p < 0.05$) was found between learning style dimension (sociological) with academic performance.

4. Relationship between learning style dimension (physiological) with academic performance.

Ho1₄: There is no significant relationship between learning style dimension (physiological) with academic performance.

The results shows that the correlation coefficients between learning style dimension (physiological) and academic performance is $r = 0.260$, $n = 508$, ($p < 0.05$). Significant positive correlation ($p < 0.05$) was found between learning style dimension (physiological) with academic performance.

5. Relationship between learning style dimension (psychological) with academic performance.

Ho1₅: There is no significant relationship between learning style dimension (psychological) with academic performance.

The results shows that the correlation coefficients between learning style dimension (psychological) and academic performance is $r = 0.431$, $n = 508$, ($p < 0.05$). Significant positive correlation ($p < 0.05$) was found between learning style dimension (psychological) with academic performance. The correlation coefficient value gained from this analysis shows relationship between the learning style dimensions and academic performance.

2. Contribution of learning style dimension (environment, emotional, sociological, physiological and psychological) towards academic performance.

The result from the correlation as shown in Table 2 fulfils the required conditions for regression analysis. The correlation analysis shows that the studied dependent variable does not have a high correlation. Tabachnik and Fidell (1996) in Pallant (2001) stated that regression analysis can only be done if the correlation value between the studied enabler is < 0.7 . Thus, the regression analysis can be carried out. Linear regression analysis was used to determine the contribution of the independent variable which is the learning style dimension towards academic performance as stated in hypothesis Ho2₁ below.

Ho2₁: There is no significant contribution from independent variable learning style dimension (emotional) towards academic performance.

Ho2₂: There is no significant contribution from independent variable learning style dimension (sociological) towards academic performance.

Ho2₃: There is no significant contribution from independent variable learning style dimension (physiological) towards academic performance.

Ho2₄: There is no significant contribution from independent variable learning style dimension (psychological) towards academic performance.

Table 3 and 4 show the results of linear regression analysis for the learning style dimension (emotional). The linear regression analysis shows that the independent enabler which is the learning style dimension (emotional) is the indicator with correlation ($\beta = 0.705$, $t = 8.461$ and $p = 0.000$) ($p < 0.05$) and the value of R^2 ($R^2 = 0.283$) contributes 28.3 % towards academic performance among Mara Professional College students. Thus, Ho2₂ will be rejected.

Table 3 Analysis of Linear Regression between Learning style dimension (emotional) towards academic performance

Independent Variable	B	Beta (β)	t	Sig. -t	R ²	Contribution (%)
Learning Style Dimension (Emotional)	0.705	0.622	8.461	0.000	0.283	28.3
Constant	2.705		5.901	0.000		
R		0.534 ^a				
R squared		0.283				
Adjusted R squared		0.279				
Standard Error		0.853				

Table 4 Analysis of Variance

Source	Sum of Squared	df	Mean Square	F	Sig (p)
Regression	52.140	1	52.140	71.589	0.000 ^a
Residual	131.826	506	0.728		
Total	183.966	507			

The contribution of attitudinal factor towards entrepreneurial intention among Mara Professional College students forms the linear regression as below:

$$Y = 2.705 + 0.705 X_1 + 0.853$$

Y = Academic Performance

X₁ = Learning Style dimension (emotional)

Constant 2.705

Standard Error 0.386

Table 5 and 6 show the results of linear regression analysis for the influence of learning style dimension (sociological) towards the academic performance. The linear regression analysis shows that the independent enabler which is the learning style dimension (sociological) is the indicator with correlation ($\beta = 0.138$, $t = 27.988$ and $p = 0.000$) ($p < 0.05$) and the value of R^2 ($R^2 = 0.019$) contributes 1.9 % towards academic performance among MARA Professional College students. Thus, Ho2₂ will be rejected.

Table 5 Analysis of Linear Regression Between learning Style dimension (sociological) towards academic performance

Independent Variable	B	Beta (β)	t	Sig. -t	R ²	Contribution (%)
Learning Style Dimension (Sociological)	0.105	0.138	27.988	0.000	0.019	1.9
Constant	3.363		3.137	0.000		
R		0.138 ^a				
R squared		0.019				
Adjusted R squared		0.017				
Standard Error	0.456					

Table 6 Analysis of Variance

Source	Sum of Squared	df	Mean Square	F	Sig (p)
Regression	2.044	1	2.044	9.839	0.000 ^a
Residual	105.105	506	0.208		
Total	107.149	507			

The contribution of attitudinal factor towards entrepreneurial intention among Mara Professional College students forms the linear regression as below :

$$Y = 3.363 + 0.105 X_1 + 0.033$$

Y = Academic Performance

X₁ = Learning Style Dimension (Sociological)

Constant 0.120

Standard Error 0.033

The regression linear analysis in Table 7 and 8 show that the independent enabler which is the learning style dimension (Physiological) is the indicator which has the correlation of (β = 2.907, t=20.137 and p=0.000) (p<0.05) and the value of R² (R²=0.010) indicates the contribution of 1.0% towards the academic performance among MARA Professional College students. Thus, Ho₂₃ is rejected.

Table 7 Analysis of Linear Regression Between Learning Style Dimension (Physiological) Towards Academic Performance

Independent Variable	B	Beta (β)	t	Sig. -t	R ²	Contribution (%)
Learning Style Dimension (Physiological)	0.025	0.026	3.679	0.591	0.010	1.0
Constant	2.907		7.035	20.137		
R		0.026 ^a				
R squared		0.010				
Adjusted R squared		0.010				
Standard Error	0.460					

Table 8 Analysis of Variance

Source	Sum of Squared	df	Mean Square	F	Sig (p)
Regression	0.074	1	0.074	0.349	0.000 ^a
Residual	107.075	506	0.212		
Total	107.149	507			

The contribution of Learning Style Dimension (Physiological) towards academic performance among of MARA Professional College students forms the linear regression as below

$$Y = 2.907 + 0.025 X_1 + 0.460$$

Y = Academic performance

X₁ = Learning style dimension (Physiological)

Constant 2.907

Standard Error 0.416

The regression linear analysis in Table 9 and 10 show that the independent enabler which is the learning style dimension (Psychological) is the indicator which has the correlation of ($\beta = 0.346$, $t=3.679$ and $p=0.000$) ($p<0.05$) and the value of R² (R²=0.094) indicates the contribution of 9.4% towards the academic performance among MARA Professional College students. Thus, Ho23 is rejected.

Table 9 Analysis of Linear Regression Between Learning Style Dimension (Psychological) Towards Academic Performance

Independent Variable	B	Beta (β)	t	Sig. -t	R ²	Contribution (%)
Learning Style Dimension (Psychological)	0.346	0.307	3.679	0.000	0.094	9.4
Constant	2.926		7.035	0.000		
R		0.307 ^a				
R squared		0.094				
Adjusted R squared		0.087				
Standard Error	0.671					

Table 10 Analysis of Variance

Source	Sum of Squared	df	Mean Square	F	Sig (p)
Regression	6.098	1	6.098	13.533	0.000 ^a
Residual	58.573	506	0.451		
Total	64.670	507			

The contribution of Learning Style Dimension (Psychological) towards academic performance among of MARA Professional College students forms the linear regression as below

$$Y = 2.926 + 0.346 X1 + 0.671$$

Y = Academic performance
X1 = Learning style dimension (Psychological)
Constant 2.926
Standard Error 0.416

From the linear regression analysis can be concluded that Learning Style Dimension (Emotional) contributed the most 28.3%, followed by Psychological 9.4%, Sociological only contribute 1.9 %, physiological (1%) and environment does not contribute towards educational performance.

Discussion and Implication

In this study the environment factors do not contribute to the academic achievement. However, studies showed that the instructional environment do affect to the processing skills and brain behaviour. By redesigning the instructional environment into a totally responsive atmosphere could improve the attention of the students in class (Pizzo 1982; Krimsky 1982 & Shea 1983).

Motivation varies with students' interests and successes, and the degree to which their teachers' styles match their own. Motivation changes class to class, teacher to teacher, and day to day. Some students are self-motivated to learn, and others lack motivation. A self-motivated student, usually like school and enjoy learning on their own. However, if students are lack motivation they will think about their reasons for attending college. An expanding body of research affirms that teaching and counselling students with interventions that are congruent with their learning-style preferences results in their increased academic achievement and more positive attitudes toward learning (Dunn, 1982; Dunn & Burke, 2006 & Dunn et al., 2009)

Persistence is an analytic quality. Analytic processors "stay on task" while learning. Whereas, global processors often require "breaks" for intake, interaction, and focus changes. Some students finish what they start, while others have many things going on at once and may not finish what they have started. If the students are persistent, they generally finish what have been started. However, if they are lack persistence, they may get bored or distracted easily. These are the students who need considerable support and have to have their assignments in small chunks with periodic due dates. Semester-long projects without periodic checks would be disastrous with these students.

Students differ by preferring more or less structure. Students who prefer structure want the teacher to give details about how to complete the assignment. They need clear directions before completing an assignment. Students who prefer less structure want the teacher to give assignments in which the students can choose the topic and organize the material on their own. The older students become, the less structure they need, although, under pressure (of exams or multiple study assignments), many college students require structure (Nelson 1993 Sawyer, 1995).

Responsibility has a unique meaning in the area of learning style. Some students like to please others by doing what is asked of them. They complete assignments to please the lecturers. Other students are less likely to conform. They prefer to complete

assignments because they want to rather than because someone else wants the assignment done. These students may need to look for something interesting and personally meaningful in assignments. Responsibility tends to correlate with conformity whereas students with low responsibility scores are usually non-conforming (Dunn, White & Zenhausern, 1982). Some people experience three different stages of nonconformity--the "terrible twos", "adolescence", and "mid-life crisis". Although some students are either consistently conforming or consistently nonconforming, others respond uniquely to particular situations. Teachers should know how to work with nonconforming students (Dunn & Griggs, 1995; Dunn, White, & Zenhausern, 1982).

It is hoped that the findings of this study can be used to improve the teaching practice and the performance of students. In view of the results of this study, it may prove beneficial to consider learning style preferences when designing and teaching courses to maximize learning success. As mentioned earlier, it is quite difficult determine individual learning styles of the students, dividing them into classes based on their learning styles, and teaching them accordingly. However, the teachers can address each learning style at least some of the time in their teaching. This way, the students' positive attitude toward the courses would also be promoted.

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