

Learning Styles of University Students: Implications for Teaching and Learning

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Abstract: Learning styles influence the way students learn and how they approach learning situations. Thus, understanding student learning styles is important in the quest to improve the effectiveness of student learning. This study aimed to examine learning styles among university students. A translated version of the Learning-Style Inventory was distributed to students undertaking natural-science, social science and professional courses. A total of 545 out of 600 questionnaires were returned. The inventory consists of 60 items using a seven-point Likert scale. Results indicated that students from different fields of study varied in learning style. The natural-science students were most dependent (Mean [M] = 5.17, SD = .64), whilst those taking professional courses were least dependent (M = 4.98, SD = .63). The social science students were the most participative (M = 5.20, SD = .87). The male students showed higher inclinations towards independence (M = 4.53, SD = .76) and avoidance (M = 3.57, SD = .84) in their learning styles, while the female students were found to be more participative (M = 4.60, SD = .73) and competitive (M = 5.15, S.D = .69). The implications of these findings are discussed in terms of university teaching and learning in ways that will accommodate different learning styles of students to improve student learning and promote lifelong learning.

Key words: Learning styles • Teaching and learning • University student • Teaching style

INTRODUCTION

Higher-education institutions are facing new challenges in the new century. The university is no more looked upon as the ivory tower, as it was by [1], but rather as a centre of mass education and an economics-driven entity [2]. In this new situation, students are the clients and lecturers are the service providers [3]. Hence, the latter must meet the ever-growing demands of the clientele-in part, by adjusting the learning environment. One scholar, [4], wrote that one of the mistakes made by lecturers at higher-education institutions is failing to recognise the different learning and thinking styles of students. As a result, lectures and learning activities are often conducted in a manner that does not match or suit the students' needs. A change in this situation can only be achieved when lecturers are aware of student learning styles and their impact on academic performance. Therefore, there is a need to conduct a survey on student learning styles and preferences in order to improve teaching and learning quality.

The role of the university changes with time [5]. With the advent of today's 'borderless world', universities have to meet high expectation from a large number of

stakeholders, notably from government (as the financier of universities in most countries), students' future employers, society as a whole and students themselves. The need to improve delivery methods and classroom instruction is never-ending. In order to foster high-quality teaching and learning, actions need to be taken to overcome the problem of unproductive delivery methods by faculty and low performance by undergraduates.

Most educators agreed that high-quality teaching contributes to high-quality learning. Effective learning depends on whether a learner is active, highly motivated and in possession of the right strategic knowledge. In order to help university undergraduates to learn effectively, instructors need to know and adapt to different styles of learning [6]. Grasha also suggests that if lecturers wish to help students learn, they should teach in a way that matches their students' learning style. Similarly, [7] stresses the influence of learning style on the environment in which students wish to learn and how they approach learning situations. Hence, this study is conducted to explore students' social learning preferences and suggest necessary measures to improve the teaching and learning environment and help students become lifelong learners.

Learning Style: A review of the relevant literature shows that learning style, like most psychological terms, has been used in different ways [8]. As a result, learning style varies in definitions, models and the instruments whereby it is measured. One study, [9], categorised individual learning styles into three categories: cognitive-centred styles, personality-centred styles and activity-centred styles. It was acknowledged by [10] that learning style is one of the six personal styles that have been studied vigorously. These authors defined 'learning style' as construct that encompasses both the individual's approach to learning, studying and problem-solving tasks, on the one hand and his or her approach to cognitive activities and information-processing operations on the other. Stylistic aspects of learning may also include variations in preferred modes of task or in the social conditions in which such tasks are undertaken.

Learning style has been defined as the different ways or means by which student learn [4, 6]. However, [11] stressed the process of learning, while [12] concentrated on learning procedures and responses by defining learning style as the way in which an individual begins to focus on, process and remember new information or knowledge. Earlier, the Dunn and Dunn learning-style model identified five main stimuli that trigger learning: environmental, emotional, sociological, physical and psychological factors [13].

Based on his work, [6] postulates that learning takes place in a social context and therefore that learning style can be observed by the way students behave and respond to the social learning environment. He categorised learning styles based on six modes of student behaviour in a learning environment at the tertiary level, as follows:

Independent learning style refers to the learning style of students who prefer to work alone and need little direction or attention from the lecturer. These students like to think for themselves and are confident in their learning abilities. Independent learners prefer to learn content that they themselves feel is important. In a classroom, they like self-paced instruction and independent-task assignments.

Avoidant learning style refers to the learning style of students with a high rate of absenteeism and those with poor work and study habits. These students are not keen to learn content or participate in classroom activities and prefer not to be called on in class.

Dependent learning style refers to the learning style of students who depended heavily on the lecturer and their friends to complete learning tasks. These students

always look to authority figures for specific guidelines and clear instructions for assignments. Dependent students prefer notes from lecturers to completing their own notes and learn only what is required.

Collaborative learning style refers to the learning style of students who find group work enjoyable. These students prefer tasks that involve group discussion and projects. Collaborative learners feel they learn by sharing ideas and knowledge. Lectures followed by small-group discussion or small seminars are considered the best way to learn material by these students.

Participative learning style refers to the learning style of students who are attentive and responsive to coursework requirements. These students are famous among teachers for being 'good citizens' in class and are eager to fulfill course requirements on time. Classroom discussion benefits them most of all the groups.

Competitive learning style refers to the learning style of students that emphasise high grades and attention from the lecturer. The aim of these students is to perform better than others in a class where rewards and recognition are only for the very best. Competitive learners take this competition seriously and are dominant figures in classroom discussions.

In his study, [6] found that there are no significant differences between the profiles of students majoring in a variety of academic disciplines. Students who are enrolled in a two-year program are more Dependent, Competitive and Participatory than those registered in four-year programs. Grasha also found that women have somewhat higher scores in the Collaborative style. Students over 25 years of age tended to be more Independent and Participatory in their learning styles. The current study aimed to identify variations in student learning styles and their implication for teaching and learning.

MATERIALS AND METHODS

This study used the survey method, distributing 600 questionnaires to third-year students at a public university in Malaysia. A total of 545 questionnaires were returned, of which 205 were completed by male and 340 by female students. Table 1 shows background data based on area of study, gender and age group. Although all samples were from third-year students, 360 samples were from students aged below 22, 120 between 23 and 26 years old and 65 above 27 years.

Table 1: Frequency Distribution of Sample Based on Area of Study, Gender and Age Group

Area of Study	Gender			Age			Total
	Male	Female	< 22	23-26	> 27		
Pure Science	71	118	135	52	2		
Social Science	73	94	70	37	60		
Professional	61	128	155	31	3		
Total	205	340	360	120	65		545

Data Collection: A translated version of the Grasha-Reichmann Student-learning Style Inventory [15] was used. Data were analysed using SPSS version 14.0. Pilot-test results showed that the inventory had an internal validity of (Cronbach’s alpha values) between 0.50 and 0.76.

RESULTS AND DISCUSSION

Table 2 shows that male students had higher means ($M = 4.53$, $SD = .76$) than did female students for the Independent style ($M = 4.49$, $SD = .67$). On the other hand, female students show higher means in the Dependent learning style ($M = 5.06$, $SD = .73$) as compared to their male counterparts (mean = 4.91, $SD = .75$). Female students also show higher means in Collaborative ($M = 5.06$, $SD = .73$) and Competitive ($M = 4.60$, $SD = .73$) learning styles than do their male students. Male students, however, show higher means in the Avoidant ($M = 3.57$, $SD = .84$) learning style than do female students (mean = 3.48, $SD = .82$).

Table 3 shows that students of different ages recorded different means for the various learning styles, except for the Avoidant type ($M = 3.57$, $SD = .83$). Older students were highly Collaborative ($M = 5.53$, $SD = .71$) and Participative ($M = 5.70$, $SD = .59$) as compared to their younger classmates. Younger students show higher scores on the Avoidant style ($M = 3.57$, $SD = .83$) than do those above 28 years old ($M = 3.12$, $SD = .69$).

Table 4 shows that social science students are more Independent ($M = 5.49$, $SD = .72$) than students in the natural-science ($M = 4.55$, $SD = .64$) and professional courses ($M = 4.38$, $SD = .65$). Natural-science students were found to be more Dependent ($M = 5.17$, $SD = .64$) than were social science ($M = 5.07$, $SD = .75$) and professional students ($M = 4.98$, $SD = .63$). Social science students were more Participative ($M = 5.20$, $SD = .87$) than those in natural-science ($M = 5.05$, $SD = .75$) and professional courses ($M = 4.93$, $SD = .68$).

The results of this study shows that student learning styles vary based on gender, age and field of study. Female students are found to be more Dependent,

Competitive, Collaborative and Participative, while male students were more Independent and Avoidant. This would mean that female students prefer and welcome lecturers that provide notes and learning materials. Dependent students benefit more from a well-structured lecture, strong guidance and concrete hands-on experiences. On the other hand, male students prefer to study on their own and are less dependent on lecture materials. This supports the findings of [6] that male students majoring in physical education adopt Avoidant and Independent roles to a higher degree than females. Finally, the results show that older students are more Collaborative and Participatory than are younger students.

Which Learning Style Is Dominant: Table 5 compares the means of the learning styles from this sample and the standardised mean as proposed by [6]. Grasha (1996). This shows that Collaborative ($M = 4.98 > 4.90$) and Competitive ($M = 4.57 > 4.06$) learning styles are more prevalent among the respondents than in Grasha’s standardised mean. However, Independent, Avoidant, Participative and Dependent learning styles are less prevalent. The results show that Competitive and Collaborative learning styles are most prevalent among the sample students. Competitive students learn best when lecturers are task-oriented; these students are highly motivated by rewards and recognition. Universities can encourage students to excel by providing more grants, scholarships and achievement awards. Collaborative students learn better from collaborative work and cooperative learning situations. Matching learning styles with instructional presentation strategies can enhance student learning [14]. In an experimental study, [14] found a significant gain in assessment scores for students who learned in matched conditions.

Table 6 shows the findings from a correlation test between learning style and academic performance. It was found that there was a low-level relationship between Participative, Collaborative and Competitive learning styles and cumulative grade point average (CGPA) ($r = .246$, $.103$ and $.123$ respectively, all $p < 0.001$).

Table 2: Mean and Standard Deviation Distribution of Learning Styles by Gender

Learning styles	Male		Female	
	Mean	SD	Mean	SD
Independent	4.53	.76	4.49	.67
Dependent	4.92	.75	5.27	.61
Collaborative	4.86	.84	5.06	.73
Competitive	4.52	.86	4.60	.73
Participative	4.90	.87	5.15	.69
Avoidant	3.57	.84	3.48	.82

Table 3: Mean and Standard Deviation Distribution of Learning Styles Based on Age

Learning styles	< 22 years old		22-27		> 28	
	Mean	SD	Mean	SD	Mean	SD
Independent	4.46	.67	4.51	.79	4.74	.64
Dependent	5.04	.66	5.01	.76	5.40	.64
Collaborative	4.93	.73	4.84	.85	5.53	.71
Competitive	4.60	.74	4.45	.85	4.62	.83
Participative	4.94	.71	5.04	.87	5.70	.59
Avoidant	3.57	.83	3.57	.83	3.12	.69

Table 4: Mean and Standard Deviation Distribution of Learning Styles Based on Field of Study

Learning styles	Science		Social Science		Professional	
	Mean	SD	Mean	SD	Mean	SD
Independent	4.55	.72	4.59	.72	4.38	.65
Dependent	5.17	.64	5.07	.75	4.98	.63
Collaborative	4.92	.77	5.13	.84	4.92	.71
Competitive	4.55	.84	4.64	.79	4.53	.70
Participative	5.05	.75	5.20	.87	4.93	.68
Avoidant	3.54	.76	3.56	.93	3.45	.79

Table 5: Comparison of Mean Learning Style and Standardized Mean by Grasha [6]

Learning style	Sample mean	Standardised mean	Inference
Independent	4.50	5.46	Not dominant
Avoidant	3.52	5.46	Not dominant
Collaborative	4.98	4.90	Dominant
Dependent	5.07	5.74	Not dominant
Competitive	4.57	4.06	Dominant
Participative	5.27	5.60	Not dominant

Table 6: Correlation Between Learning Style and Academic Performance

Learning Style	Independent	Avoidant	Collaborative	Dependent	Competitive	Participative
Academic Performance	.066	-.243	.103**	.123**	.070	.246**

** Significant at $p = 0.01$

The Avoidant style, however, shows a negative correlation with academic performance ($r = -.243$). It is reasonable that students who are active in class, work closely with friends and seek guidance from lecturers will excel in exams. This study also supports Grasha's finding that students with an Avoidant style tend to get lower grades than those with a Participative style.

CONCLUSION

This study shows that students have different learning preferences. Female students often have styles that jibe with classroom approaches to learning tasks at the university level, while male students more often choose to work independently. Academic staff should

also realise that dependent and independent learners may have different motives for learning, perhaps geared either toward performance or mastery. Students in the social sciences prefer to work in groups and do tasks that allow them to be actively engaged in classroom activities. Collaborative and competitive learning styles are dominant among students and it is therefore recommended that lecturers plan learning activities involving collaborative work and also that they set high expectations for student performance.

The results of the study also show that a student's attendance is related to his or her course grades; therefore, lecturers need to ensure that every student is punctual and cognitively engaged in learning. Students will find it easier to be attentive when lectures are conducted in an organised manner and blended with learning tasks that stimulate critical and creative thinking. As suggested by [15], learning style can affect students learning process, thus it is important for lecturers to accept diversity in learning styles among students and to be creative in conducting lectures and applying assessment methods in order to foster more enjoyable and meaningful learning experiences.

This study however, focuses only on learning style and academic performance. Future efforts could usefully study the relationship between the learning-style and other personal factors. Designing effective classroom-teaching and -learning strategies requires more than the mere identifying and matching with teaching styles of the preferred learning style of students. Situational factors such as the students' reason for attending school and the nature of their course requirements could also have an impact on learning style. Learning is more meaningful and effective when teachers and administrators understand why and how students think and learn.

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