

ENTREPRENEURIAL EDUCATION LEARNING STYLE AMONG UNIVERSITY STUDENTS

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Abstract- The purpose of teaching entrepreneurship is to give the students an exposure towards a better understanding of the concept of entrepreneurship; and to nurture interest and awareness in business and to help them discover possibilities of various opportunities in the business world. Thus the pedagogy as well as students' learning style needs to be adjusted based on a broadening market interest in entrepreneurial education. Moreover many studies have shown that academic performance of university students is related to their learning styles. The objectives of this study were to examine the differences of learning style between male and female students, to determine the differences in learning style between technical and non-technical students and to ascertain the most prominence learning style among university students. By means of cluster random sampling data was collected from 997 students from five public universities in East Coast and Southern region of Peninsula Malaysia. For this study the Grasha-Riechmann Student Learning Style Scales (GRSLSS) was utilized to identify student learning preferences in six learning style categories: avoidant, participative, competitive, collaborative, dependent and independent. By using self-administered questionnaire of 60-item scales data were collected and responses were recorded using a 5-point Likert scale; ranges from 1 (strongly disagree) through 5 (strongly agree). The findings indicated that female students had higher tendency in collaborating with female colleagues and participating cooperatively in their activities. Female students obtained significantly higher mean in collaborative, participative, and dependent styles than males, whereas in avoidant, and independent styles, the mean for males were higher than the opposite gender. The findings also indicated that the technical group's mean in avoidant and competitive were higher than non-technical group whereas mean for collaborative, participative, dependent, and participative styles were higher among non-technical than those of the technical group. In general there was no significant difference in terms of learning style preferred either by male or female and by technical and non-technical students.

Keywords: Learning style, Grasha – Riechmann Scales, cluster sample, East Coast Peninsular Malaysia

1. Introduction

Small and medium enterprises are major contributors to national income in most countries in the world since it's creates new job and escalates national wealth. In Malaysia concerns about entrepreneurship and entrepreneurship education emerged especially when graduates were highly dependence on the government and private organizations for employment

(Mohar Yusof, Manjit Singh Sandhu & Kamal Kishore Jain, 2008). Therefore the government took initiative to reduce the tension, by paying serious attention to entrepreneurship education in order to educate, guide and train students to be involved in entrepreneurship. In order to nurture interest and awareness in business, the pedagogy as well as students' learning style needs to be adjusted based on market interest in entrepreneurial education.

Learning styles is the manner in which a learner perceives, interacts with, and responds to the learning environment. Components of learning style are the cognitive, affective and physiological elements, all of which maybe strongly influenced by a person's cultural background. Keefe (1979) defines learning style as a set of cognitive, emotional, characteristic and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with and respond to the learning environment.

There are many instruments available to study students' learning styles. Among them are Index of Learning Styles (Felder & Spurlin, 2005), Kolb's Learning Styles Inventory (LIS, 1984), Pharmacist's Inventory of Learning Styles (PILS, 2003) and The Grasha-Riechmann Student Learning Style Scales (GRSLSS). The accommodation of students learning styles in the learning environment have resulted in improved test scores while a mismatch in learning characteristics and learning environment resulted in poor students' achievement (Andrews, 1990; Dunn et al., 1995; Klavas, 1994). Learning styles do differ with cultural differences of various ethnic groups.

Goldfinch and Hughes (2007) worked on learning styles that reflects on preferences on four stages of adult learning cycles: having an experience (the activist stage), reviewing the experience (the reflector stage), concluding the experience (the theorist stage), and planning the next steps (the pragmatist stage). However, this study focuses on male and female; technical and non-technical students and their style of learning entrepreneurship courses.

1.1 Problem Statement

Albeit entrepreneurship is recognized as a field of study, there remains, questions what constitutes a model entrepreneurship curriculum and what courses should be taught in entrepreneurship programs. The issue of the way of teaching entrepreneurship is yet to be solved. However, methods that are used to teach entrepreneurship outside the classroom aims at a close contact between students and real entrepreneurs (Faudziah Zainal Abidin & Habshah Bakar, 2005). For instance, the cooperation with entrepreneurs using incubator for new ventures, having direct collaboration with entrepreneurs, internships and industrial attachment for academicians are mechanisms of how to bring students real experience life as entrepreneurs.

Generally, models for an entrepreneurship program are numerous. Over time, the gap between education and vocational setting has increasingly widened. Concepts learned in the classroom have some state incongruence with the need of vocational world. The classroom slowly becomes isolated to the world of work outside of the learning-context. Education

and knowledge cannot be delivered solely from textbooks and lectures; it must include practical, hands-on experience that challenges the students, especially in entrepreneurial studies (Ani Asmah Tajul Ariffin, 2009). Knowledge of awareness, motivational and certain competencies can only be absorbed when students undergone or experienced and got involved in the process of inventing new business through “negotiation” and “working with entrepreneurs”. Both methods are among the best mechanism in promoting entrepreneurship attributes to students plus other hands-on methods such as simulation method, case study, role model, working papers, thesis and writing business plans, rocket pitching, entrepreneurial visit and vocational attachment.

Gearing towards effectiveness of learning, from perspective of learners themselves, the educators need to know how do the learners learn? and what style of learning have they practiced? Based on assumption that learning styles cannot easily be changed but strategies are dynamic and adaptable to situations, the present study objectively investigate is there any difference of learning styles among male and female students in learning entrepreneurship courses? Is there any difference in learning style between technical and non-technical groups? If so, which is the most prominence learning styles preferred by the students? Specifically the study aims to identify the differences in learning styles preferred by male and female students, to determine the differences in learning styles between technical and non-technical students and, to examine the most prominence learning style preferred by students.

1.2 Research Questions

1. Is there any difference in learning styles preferred by male and female students?
2. Is there any difference in learning style between technical and non-technical students?
3. What is the most prominence learning style preferred by students?

1.3 Research Objectives

1. To identify the differences in learning styles preferred by male and female students.
2. To determine the differences in learning styles between technical and non-technical students.
3. To examine the most prominence learning style preferred by students.

1.4 Significance of the Study

The significance of this study is in line with the intention of the Ministry of Education (MoE) of revitalizing entrepreneurial acumen of all graduates and also in tandem with the

Ministry of Entrepreneur and Co-operative Development (MECD) to encourage young Malaysians to venture into business and to explore opportunities in this sector. It is significant to identify learners' learning styles for leading teaching and learning activities, because it can help teachers to teach and treat their students with respect to the students' certain characteristics and it can make learning more effective. This study is also significant in designing learning experiences that match with student's learning styles.

2. Evidences of past researches

In teaching and learning process, the attempt has always been made to identify effective factors in student's learning. According to Ackerman, Sternberg, and Glaser (1989), the review of literature suggests that two specific categories of predictor variables have been studied to explain learning and individual differences. Sarter and Jones (2000) state that the first category includes *cognitive measures* and ability tests (Zhang LF, Sternberg RJ;1998). The second category of measures which is used to predict differences among students is *non-cognitive measures*. These measures include thinking styles (Sternberg RJ, Grigorenko EL.1997, Zhang LF,2002) and learning styles ((Zhang LF, Sternberg RJ;1998). Learning styles are considered by some scholars (Dunn RS, Dunn KJ,1979) as an influencing factor on the learners' educational performance.

There are numerous theories of learning styles, most of which are cognitive styles (impulsive – reflective, Kolb's learning styles, etc.). Keefe (1979) classify these styles into five categories: physiological, attentional, receptive, expectancy and incentive, concept formation and retention. Sternberg and Grigorenko (1997) classify them into four categories: cognitive-oriented, personality-oriented, activity-oriented, and mental self-government styles (Mirak Zadeh AA, 2010).

2.1 Learning Style Models

Past researches have shown that in some of cognitive styles (reflective vs. impulsive) individuals act differently to solve issues due to their styles, but lately different studies have shown that acting reflectively or impulsively is influenced by the prior knowledge not the style itself (Grasha AF, 1996). Accordingly, Grasha and Riechmann establish a model of learning styles which considers students' interaction and participation instead of cognition and personality and thus, pull out this model from the orbit of neither cognition nor personality. They believe that this model helps teachers and professors to recognize teaching which is appropriate for specific learning styles.

Grasha and Riechmann (1996) consider learning styles as social interactions whereby students define them as having different roles in interaction with classmates, teachers and course content (Grasha AF, 1996). They suggest that learning styles can be identified through social and emotional dimensions such as attitudes and responses toward learning, teachers, classmates and classroom.

The Grasha-Riechmann Model classifies learning styles into six categories, each of which has its own characteristics. Individuals with *avoidant style* less likely to be present in the classroom and seldom participate in the activities other students and the teacher do in the classroom. In general, they do not enjoy the classroom climate and whatever is happening in the classroom. Individuals with *participative style* follow the class and enjoy going to and participating in the class so that they are eager to volunteer for activities and prefer to have discussion and lecture in the classroom. Individuals with *collaborative style* feel that learning is possible through sharing the ideas and opinions with stronger students and as a result, they interact with the teacher and would like to work with others and also prefer to discuss in small groups in the classroom. Individuals with *dependent style* have little curiosity for new learning and learn only what is taught. They also consider teacher and classmates as resources for support and help and they are dependent on authorities to determine the area of activities. Individuals with *independent style* like to think by themselves and they are sure that they have the ability to learn. Individuals with *competitive style* learn the content with the aim of achieving better performance than the other students in the classroom. These students believe that they have to compete with other students in the classroom to get reward.

Previous studies done using Grasha-Riechmann learning styles (Amir R, Jelas ZM, 2010) have shown that males and females have different learning styles, due to the gender characteristics. Another, the difference between learning styles can be due to the content of the study. For example Mahamod, et al. (2010) show that art students have a tendency toward collaborative and participative learning, while science students prefer independent learning (Mahamod Z, Embi MA, Yunus MM, Lubis MA, Chong OS, 2010) and Clark and Latshaw (2012) also state that students of different majors have different learning styles (Clark SD, Latshaw CA, 2012). Actually, it seems logical to expect different learning styles in different fields.

3. Methodological artifacts of the study

Grasha and Riechmann (1996) developed a scale of 60 items with six subscales: Independent (10 items), Dependent (10 items), Avoidant (10 items), Participative (10 items), Competitive (10 items), and Collaborative (10 items) to determine learning styles of the students. The answers were checked on a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The internal consistency along with the reliability were assessed for all subscales of independent, dependent, avoidant, participative, competitive, and collaborative styles that were varied from 0.696 to 0.933. Result of pilot test for the current study as shown below:

Table 1 : Pilot Test

No	Variable	No of Item	Cronbach's Alpha (Pilot Test)	Cronbach's Alpha (P) (Actual Study)	Sample of items
1	Independent	10	0.665	0.730	i) I learn a lot of the content in my class on my own ii) When I don't understand something, I try to figure out myself.
2	Avoidant	10	0.663	0.888	i. Do not want to learn the content, do not enjoy learning ii. Avoid taking part in course activities
3	Competitive	10	0.781	0.771	i) Working with other students on class activities is something I enjoy doing ii) I enjoy discussing my ideas about course content in my class
4	Collaborative	10	0.773	0.771	i) Working with other students on class activities is something I enjoy doing ii) I enjoy discussing my ideas about course content in my class
5	Dependent	10	0.697	0.696	i) I want clear and detailed instructions on how to complete the assignment ii) I rely on my teachers to tell me what is important for me to learn
6	Participative	10	0.779	0.933	i) It is my responsibility to get as much as I can out of a course ii) I do all assignments well whether or not I think they are interesting

3.1 Subject of the study

The population under study are students in the five public universities located within East Corridor of Economic Region (ECER) namely Universiti Malaysia Kelantan (UMK), Universiti Teknologi MARA (UiTM) Kelantan, Universiti Malaysia Terengganu, Universiti Sultan Zainal Abidin (UniSZA), Universiti Malaysia Pahang (UMP) and Universiti Teknologi Mara (UiTM) Dungun, Trengganu. There were 1200 packets of questionnaire (addressing age, gender, education level, and attitudes and the six dimensions of avoidant, participative, competitive, collaborative, dependent and independent) by The Grasha-Riechmann Student Learning Style Scales (GRSLSS) instrument used for data collection. Samples were chosen using cluster random sampling from all universities involved in the study.

3.2 Sampling Procedure

The population of this study consisted of undergraduate students both from technical and non-technical (N=15893) of six selected Public Universities in academic year 2013/2014. The selected universities were classified into technical (mechanical, electrical and civil engineering) and non-technical (commerce, tourism, hospitality, wellness, logistics) and

then, between 30 to 40 students were selected from each group. Due to variance in each group and 0.05 error rate, Z-value (=1.96 for 95% confidence level), σ^2_{wx} =total variance (3.39), \bar{x} =total mean (3.6), the sample size was calculated using the following formula :

$$n \geq \frac{N Z^2 \sigma^2_{wxx} - 2 N E^2 + Z^2 \sigma^2_{wxx} - 2}{\sum = \text{error}(0.05)}$$

$Z = Z\text{value}(=1.96 \text{ for } 95\% \text{ confidence level})$
 $N = \text{population size (15893)}$
 $\sigma^2_w = \text{total variance (3.39)}$
 $\bar{x} = \text{total mean (3.6)}$
 $\sigma^2_{wxx} = \text{relative variance}$

The minimum sample size that sufficient for analysis was 760. However since a bigger sample is required for factor analysis of Grasha-Riechmann Learning Styles Scale, a number of 1200 samples were randomly selected. After screening process, only 997 sets of questionnaires; 296 males and 701 females with 497 technical and 500 non-technical faculties were free from missing values and qualified for analyses.

3.3 Data Collection

Data collection was conducted in the second half of 2013 using self-administered questionnaires. The self-administered questionnaire was selected for three reasons. First, the participants of the study were relatively exposed to work experience and assumed that they could understand the content of questionnaire very easily. Second, the participants would have more confidence and freedom to express their views as compared to the interview method. Thirdly, it was relatively easy to gather data from a large number of participants within a shorter period. Fourth, it involved relatively smaller amount of budget as compared to other data collection methods.

Data collection was conducted by meeting all selected samples at their campuses on the dates that both parties (researcher and the samples) were mutually agreed. The researcher distributed the questionnaires to each of the samples (start from this date, they are called respondents). With the presence of researcher and other research team members, any enquiries about the questionnaires was responded immediately and more importantly all the questionnaires ready to be collected within the same day. The same procedure went through all selected universities that completed in three months. Data collected was then analysed using descriptive statistics (mean, and standard deviation), and Independent Sample T-Test to test for mean differences, followed by an advance Eta Squared to check for the most dominant learning style of the students.

3.4 Data Analysis

Descriptive statistics was utilized to describe the respondents of male and female groups, and technical and non-technical groups. Independent Sample T-Test was used to examine the differences between learning styles among male and female, and technical and non-

technical groups. To find out whether there is a significant difference between the two groups, refer to Sig. (2-tailed), which appears under the section labelled t-test for equality of means. Two values are given. One for equal variance, the other for unequal variance. The Levene's test result will be chosen if the value in the Sig.(2-tailed) column is equal or less than 0.05 that indicated a significant difference in the mean scores on the dependent variable for each of the two groups. If the value is above 0.05 there is no significant difference between the two groups.

4. Research Findings

Data was analysed based on objectives developed of the study that is to examine the differences in learning styles among male and female students, to determine the differences in learning styles between technical and non-technical students and; to examine the most prominence learning style preferred by students.

4.1 Descriptive Statistics

From the analyses there were 997 undergraduate respondents involved in the study whereby 296 (29.7%) were males and 701 (70.3%) were females. Their age were ranging from 18 to 33 years old with more than 90 % (915) were 23 years old and below. Only 14 % of the total respondents aged more than 27 years old. Distribution of the respondents was varied from 17 to 21 per cents among all institutions. Details distribution were as follow: There were 218 respondents (21.9%) from Universiti Malaysia Kelantan, 176 (17.7%) were from Universiti Malaysia Pahang, 221 respondents (22.2%) were from Universiti Sultan Zainal Abidin, 175 (17.6%) from UiTM Kota Bharu and the remaining 207 (20.8%) were from UiTM, Dungun, Trengganu. About half of the respondents 49.8% (487) were from technical program with another half (50.2 % or 500 respondents) were non-technical. In terms of candidature, there were 24 (2.4%) respondents from semester 1; 158 (15.8%) from semester 2; 165 (16.5) respondents from semester 3; majority 396 (39.7%) respondents were from semester 4; 83 (8.3%) respondents from semester 5; 90 (9.0%) from semester 6; 40 (4.0%) semester 7; 39 (3.9%) respondents of semester 8 and lastly 2 (2.0%) respondents were from semester 9.

4.2 Inferential Study–Comparison of mean–a test of between subject effects for Gender

In order to provide evidence for the first research question an Independent Sample t-test was conducted to compare the learning styles scores for Independent Learning Style of males and females. There was no significant difference in scores for males ($M=35.53$, $SD = 4.97$) and females ($M = 34.92$, $SD = 4.57$; $t(995)=1.88$, $p=.06$). The magnitude of the differences in the means was very small ($\eta^2 = .009$). Expressed as a percentage (multiply an η^2 value by 100), only .9 per cent of the variance in Independent is explained by gender. An Independent Sample t-test was also conducted to compare the learning styles

scores for Avoidant of males and females. There was a significant difference in scores for males ($M=31.22$, $SD = 5.52$) and females ($M = 28.90$, $SD = 5.36$; $t(995) = 6.09$, $p=.01$). The magnitude of the differences in the means was moderate ($\eta^2 = .100$). To compare the learning styles scores for Competitive of males and females the same analysis was conducted. There was no significant difference in scores for males ($M=36.04$, $SD = 6.63$) and females ($M = 35.88$, $SD = 5.74$; $t(995) = 0.39$, $p=.70$). The magnitude of the differences in the means was very small ($\eta^2 = .000$). The same analysis was also done on Collaborative styles among male and female students. There was no significant difference in scores for males ($M=38.96$, $SD = 5.24$) and females ($M = 39.44$, $SD = 5.02$; $t(995) = -1.37$, $p = .17$). The magnitude of the differences in the means was very small ($\eta^2 = .007$). An Independent Sample t-test was also conducted to compare the learning styles scores for Dependent of males and females. There was no significant difference in scores for males ($M=38.36$, $SD = 5.22$) and females ($M = 39.03$, $SD = 4.41$; $t(955) = -2.09$, $p=.04$). The magnitude of the differences in the means was small ($\eta^2 = .011$). For Participant learning styles of males and females the analysis indicated that there was a significant difference in scores for males ($M=37.81$, $SD = 5.61$) and females ($M = 39.98$, $SD = 5.19$; $t(995) = -5.67$, $p=.01$). The magnitude of the differences in the means was moderate ($\eta^2 = .086$).

4.3 Inferential Study – a test of between subject effects for major of Technical and Non-Technical Program

In order to provide evidence for the second research question an analysis was conducted to compare the learning styles scores for program of study that consisted of technical and non-technical. An Independent Sample t-test was conducted to compare the learning styles scores for technical and non-technical major. There was no significant difference in scores for Independent of technical ($M=34.97$, $SD = 4.74$) and non-technical ($M = 35.23$, $SD = 4.66$; $t(995) = -0.87$, $p=.39$). The magnitude of the differences in the means was very small ($\eta^2 = .002$). An Independent Sample t-test was also done to compare the learning styles scores for technical and non-technical major. There was no significant difference in scores for Avoidant of technical ($M=29.68$, $SD = 5.42$) and non-technical ($M = 29.52$, $SD = 5.62$; $t(995) = -0.46$, $p=.65$). The magnitude of the differences in the means was very small ($\eta^2 = .001$). There was no significant difference in scores for Competitive of technical ($M=36.15$, $SD = 5.92$) and non-technical groups ($M = 35.72$, $SD = 6.11$; $t(995) = 1.11$, $p=.27$). The magnitude of the differences in the means was very small ($\eta^2 = .002$). The same Independent Sample t-test was conducted to compare the learning styles scores for technical and non-technical major for Collaborative. There was no significant difference in scores for Collaborative of technical ($M=39.01$, $SD = 5.47$) and non-technical ($M = 39.58$, $SD = 4.67$; $t(995) = -1.78$, $p=.08$). The magnitude of the differences in the means was very small ($\eta^2 = .006$). There was no significant difference in scores for Dependent of technical ($M=38.62$, $SD = 5.03$) and non-technical ($M = 39.04$, $SD = 4.28$; $t(995) = -1.46$, $p = .14$). The magnitude of the differences in the means was very small ($\eta^2 = .004$). An Independent Sample t-test was also done to compare the learning styles scores for Participative learning styles. There was no

significant difference in scores for Participative of technical ($M=39.05$, $SD = 5.66$) and non-technical ($M = 39.61$, $SD = 5.14$; $t(995)=-1.62$, $p=.11$). The magnitude of the differences in the means was very small (eta squared = .005). Lastly for the third research objective, result from data analysis indicated that the most popular learning styles were based on both gender and area of study. As Table 2 shows, there was a significant difference between males and females in avoidant (Eta square = 0.100) and Participative (Eta square = 0.086), while there wasn't a significant difference in collaborative, dependent, independent and competitive styles with Eta square varied from 0.000 to 0.009. According to the means reported in findings males had a higher mean in avoidant and independent and competitive styles while females' mean was higher in participative, collaborative, and dependent styles. In terms of area of study in collaborative, participative, dependent, and competitive styles, there was a difference between non-technical and technical groups, whereby non-technical group had higher mean in independent, collaborative, dependent and participative. The technical groups scored higher mean in both avoidant and competitive.

5. Discussion

The purpose of this study was to investigate the differences in Grasha-Riechmann learning styles among students of non-technical and technical students as well as to examine the learning styles of males and females. The results indicated that males had significantly a higher mean in independent, and avoidant styles, while females' mean was higher in cooperative, participative, and dependent styles. In respect to the field of education (major), the technical group's means in cooperative, participative, dependent and competitive styles were higher than those for the non-technical group.

According to the results, females have more desire to participate in activities which need more communication with others and generally they are more satisfied with communication and collaboration than males. On the other hand, males have a desire to make decisions and to do things more individually and they have less tendency toward collaboration and dependence than females and therefore, have independent styles. Also, avoidant style and competitiveness are more common among males (Mahamod Z, Embi MA, Yunus MM, Lubis MA, Chong OS.). The findings was consistent with the findings of Amir and Jelas (2010) which showed that males obtained higher scores in Independent and Avoidant scales. In their study, females' scores in Collaborative, Dependent, Participative and Competitive scales were significantly higher than those for males (Mahamod Z, Embi MA, Yunus MM, Lubis MA, Chong OS. Gujjar and Tabassum (2011) also found similar results but the males' and females' scores were not significantly different in Avoidant scale (Mahamod Z, Embi MA, Yunus MM, Lubis MA, Chong OS, 2011). Hamidah, Sarina, & Kamaruzaman (2009) also showed that females have higher scores in Collaborative, Participative, Competitive and Dependent styles (Hamidah JS, Sarina MN, Kamaruzaman J, 2009).

Mahamod et al. (2010) also found that females use the Collaborative, Dependent, and Participative styles more than males do. In this research, males' scores in Dependent, Avoidant and Competitive were higher than that of females. Kraft (1976) and O'Faithaigh (2000) showed that males adopt Independent and Competitive styles more than females do because females naturally experience fear of failure and thus they are dependent on the teachers. Although female students had higher scores in Collaborative, Participative and Dependent learning styles than males, this difference was not significant (Mahamod Z, Embi MA, Yunus MM, Lubis MA, Chong OS, 2011).

According to the results of the learning styles' differences in the fields of non-technical and technical, Fuhrman and Grasha (1983) state that learning styles of participation are influenced by the more underlying characteristics of the personality which may be involved in choosing the field of study. Thus, preferring specific learning styles and tending to choose the specific fields of study may have a common reason. Hence, it is likely that people who have extroversion personality, for example, will choose majors which require interaction with other people. On the other hand, since learning styles are not fixed, they can vary depending on environmental conditions; therefore, in the majors providing more teamwork and collaboration, individuals will have orientation to cooperative and participative styles little by little, and even this may cause them to lose their independence.

6. Conclusion

The results in relation to learning styles of participation and academic achievement have demonstrated that communication styles will affect learning styles of participation. In Cho et al. (2007), students who had strong friendship networks and communication styles tended to use more cooperative learning and are more successful in using it. As a result, these students gained the best academic outcomes (Cho H, Gay G, Davidson B, Ingrassia A, 2007). The findings of the present study also showed that technical students had higher scores in Collaborative, Participative, Dependent and Competitive styles than non-technical students. Each of the four styles involves interaction with others (even in the form of comparison in the competitive style). Although it seems there is more interaction in the non-technical, actually doing group work and collaborative projects is more common among technical students and it may be the reason for the higher scores in these scales for technical students.

References

- Zhang LF, Sternberg RJ. Thinking styles, abilities, and academic achievement among Hong Kong university student. *Hong Kong educational research association*. 1998;13:41–62.
- Sternberg RJ, Grigorenko EL. Are cognitive styles still in style? *American psychologist*. 1997;52(7):700–12.

- Zhang LF. Thinking styles: Their relationships with modes of thinking and academic performance. *Educational Psychology*. 2002; 22:331–48.
- Grasha AF, Riechmann SW. A rationale to developing and assessing the construct validity of a student learning styles scale instrument. *Journal of Psychology*. 1974; 87: 213–23.
- Dunn RS, Dunn KJ. Learning styles/teaching styles: Should they can they be matched? *Educational Leadership*. 1979;3:238–44.
- Seyf AA. Modern Educational Psychology. Tehran: Nashre Doran; 2011. Persian.
- Witkin HA, Moore CA, Goodenough DR, Cox PW. Field-dependent and field independent cognitive styles and their independent cognitive styles and their educational implications. *Review of Educational Research*. 1977;47(1):1–64.
- Mirak Zadeh AA. Examination of learning styles among students of the Islamic Azad University of Takestan. *Iranian Journal of Economics Research and Agricultural Development*. 2010;40(4):79–89. Persian.
- Imamipour S, Shams Esfandabad H. Learning and cognitive styles. Tehran: Samt; 2011. Persian.
- Grasha AF. Teaching with style: A practical guide to enhancing learning by understanding teaching and learning style. Pittsburgh: Alliance publishers; 1996.
- Amir R, Jelas ZM. Teaching and learning styles in higher education institutions: Do they match. *Procedia Social and Behavioral Sciences*. 2010;7(3):680–4.
- Gujjar AA, Tabassum R. Assessing learning styles of student teachers at federal college of education. *Procedia Social and Behavioral Sciences*. 2011;30(1):267–71.
- Mahamod Z, Embi MA, Yunus MM, Lubis MA, Chong OS. Comparative learning styles of Malay language among native and non-native students. *Procedia Social and Behavioral Sciences*. 2010;9(1):1042–7.
- Clark SD, Latshaw CA. Effects of learning styles/ teaching styles and effort on performance in Accounting and Marketing courses. *World Journal of Management*. 2012;4(1):67–81.
- Hamidah JS, Sarina MN, Kamaruzaman J. The Social interaction learning styles of science and social science students. *Asian Social Science*. 2009;5(7):58–64.
- Cho H, Gay G, Davidson B, Ingraffea A. Social networks, communication styles, and learning performance in a CSCL community. *Computer & Education*. 2007;49(2):309–29.