Comparing Students' Learning Styles in Three Languages Majors at Mu'tah University in Jordan

Dr. Ali A. Aljaafreh
Dept. of English Language and Literature
Faculty of Arts - Mu'tah University/Jordan
(Currently on sabbatical at)
Department of English Language , Faculty of Arts- Hai'l University
P.O. Box 2440 -Kingdom of Saudi Arabia

Abstract

This study looked into the effect of Discipline, GPA and Gender on students' learning styles. 613 male and female students from three languages majors in a Jordanian university participated in the study. Schmeck, Ribich, and Ramanaiah's (1977) Inventory of Learning Processes measurement (ILP) was employed in the study. The results of the study revealed that the students' discipline and their GPAs exerted important effects on their use of three of the ILP processes (Deep Processing, Elaborative Processing, and Methodical Study): There were significant differences between the students according to their majors, and the students with higher GPAs were superior to those with lower GPAs in using these processes. The study showed also that gender may affect the use of two ILP processes (Deep Processing and Methodical Study). The findings of the study suggest that there is a strong relation between learning styles and academic achievement. It also suggests that variables, such as discipline and gender might be an artifact of some indirect elements in students' learning and teaching environment as well as their societal and cultural milieu.

Key words: learning styles, students' characteristics, cognitive strategies, higher education, college instruction

1. Introduction

Students' characteristics and their learning styles have interested researchers since the seventies of the past century. Recently, however, research on learning styles has witnessed renewed interest as researchers and educators have embarked on looking for ways to maintain high academic standards in the face of great challenges encountering higher education worldwide due to increasing expansion and privatization of higher education (see, for example, Matthews, 1994). It has been suggested that coming to know more about students' characteristics and their learning styles will help educators to forge a more responsive learning environment that would motivate students to achieve greater academic success (see, e.g., Banks, 1988; Claxton & Murell, 1987; Hoyt, 1989; Mathews, 1994). As Gregoric (1979) states, we ought to know more about students' learning styles and characteristics and how their minds operate in order to "improve mental health and self-understanding as well as increase learning" (p. 236).

For such purposes, researchers have conducted considerable amount of research on various questions and issues related to students' learning styles. In fact, various types of students' characteristics and learning styles have been identified, and numerous variables have also been isolated and researched in connection with students' styles and their learning. Researchers have sought to explore the effects of factors such as discipline or field of study (Biberman & Buchanan, 1986; Gadzella & Masten, 1998; Mathews, 1994; Clump & Skogsbergboise, 2003; Stewart & Felicetti, 1992), students' academic levels (Alnadaf, 2008; Clump & Skogsbergboise, 2003; Stewart & Felicetti, 1992), students' GPAs or course grades (Aljaafreh, 2010; Alnadaf, 2008; Gadzella, Baloglu, & Stephens 2002), age groups (Gadzella et al., 2001; Gadzella et al. 2002), gender (Aljaafreh, 2010; Alnadaf, 2008; Kosminsky & Kaufman, 1992; Miller, Alway, & McKinley, 1987; Miller, Finley, & McKinley, 1990; Verma, 1994), ethnicity (Gadzella, Masten, and Huang, 1999; Mathews, 1994), geographical locations of universities (Clump & Skogsbergboise, 2003; Reading-Brown & Hayden, 1989), gifted and non-gifted students (Thornton, Haskell, & Libby, 2006).

Notwithstanding such extensive valuable research, many questions remain unanswered and various issues still need further investigation. In fact, research has yielded inconclusive evidence with regard to many of the investigated issues and has raised many questions that need to be investigated. Indeed, researchers have stressed the importance of continued investigation in order to know more about students' learning styles and the conditions that might affect the way they use such styles and how they learn (see, e.g., Clump, 2005; Clump & Skogsbeghoise, 2003; Gadzella & Baloglu, 2003; Rachal & Rachal, 2007; Thornton et al. 2006). Moreover, research on learning styles has, so far, been limited to studying students in Western institutions. Very few studies have looked at students in other parts of the world or from other cultures, and this, I believe, is a serious limitation of research in this area. To really understand students' learning styles and how they operate, it is extremely necessary to widen the scope of research to include students from other cultures and other learning environments.

One issue that has been investigated previously is the interaction of discipline or field of study with students' learning styles. Reported research findings indicate that discipline plays an important role in students' use of learning styles (Biberman & Buchanan, 1986; Gadzella & Masten, 1998; Mathews, 1994; Clump & Skogsbergboise, 2003; Stewart & Felicetti, 1992). However, such research has not yet yielded a clear picture of the effect of this factor. It appears that the lack of clarity stems from the manner by which this variable has been investigated, in which previous research has focused on generalized headings of disciplines rather than separate majors. Indeed, Clump and Skogsbergboise (2003) remarked that a clearer picture might be obtained, if studies comparing students' learning styles according to their disciplines focus on discrete majors rather than grouping several majors under large generalized headings (p.2).

The purpose of this study is to compare the use of learning styles of three languages majors at ???????? University in Jordan, namely, English language and literature, Arabic language and literature, and Modern languages (The latter includes the study of both English and French). These majors, with some variations, focus on language skills, linguistics and literature. They all belong to the Faculty of Arts and are normally grouped under the heading: Arts Majors. Sometimes, they are also grouped under the heading: Languages Majors. In addition to the effect of the discipline variable, this study looked also into the effects of two other variables on students' learning styles, namely, students' GPAs and Gender type.

2. Statement of the problem.

For the past decade or so, more and more teachers, educators and education stakeholders have been voicing their concern over the increasing decline in students' academic standards in the Jordanian universities. This has, in fact, been observed and echoed by researchers (e.g., Aljaafreh, 2007, 2010; Alnadaf, 2008) and higher educational commissions (e.g., Council of Higher Education [CHE], 2000). That such concern is truly justified is evident from the students' results on the National Qualifying Exam that was held for university students in recent years (Ministry of Higher Education [MHE], 2006, 2007). The decline may be due to the enormous changes that took place in higher education in the country in the past two decades or so, which witnessed great expansion of government and private universities. Apparently, this has lead to fierce competition between universities in order to attract larger numbers of students to accumulate profit, for private universities, or overcome financial difficulties in the case of government universities. Unfortunately, this has not been accompanied by due attention to the quality of the education that students receive or to the preparedness of the learning/teaching environment to accommodate the high enrollment rate of students, which has ultimately contributed to the decline in students' standards. Indeed, the studies that were conducted on ??????? University students (Aljaafreh, 2010; Alnadaf, 2008; Alnaddaf, Aljaafreh, & Alsmadi, in press) made note of the decline in students' standards and the difficulties they face. Their findings showed ineffective use of a wide range of learning styles, especially those that characterize higher-order learning processes such as, critical thinking, analysis, comparison and contrast, conceptual organization and evaluation. They suggested that such inability, which can be linked to the poverty of the learning/teaching environment, has greatly contributed to the decline in students' standards.

The changing conditions in higher education, which is definitely not unique to Jordanian universities, pose a great challenge for educators and researchers to find alternative ways to maintain students' standards. With ample evidence from previous research indicating a strong relationship between students' learning styles and their academic achievement, the investigation of students' learning styles in this study represents a building bock in researchers' efforts to meet the challenges that university students face not only in Jordan but worldwide.

In addition, research on students' learning styles conducted thus far suffers a serious more basic limitation concerning its scope and contexts; the vast majority of research studies on learning styles have been conducted on Western universities in Western cultures. To be able to view the issue from various dimensions and to deeply understand its complexities, it is imperative that the scope of research should be expanded to include fundamentally different students and different cultures. This study, by investigating a non-western, Arabic culture, represents an attempt to widen the scope of research in this area.

3. Questions of the study

The following research questions were addressed in this study:

1. Are there differences in the students' scores on the ILP scales between the three languages majors and what are these differences?
2. Are there differences in the students' scores in these majors in relation to their GPAs and Gender type?

4. Significance of the study

This study is significant in many ways. First of all, even though considerable research has been done on students' learning styles, further research, as researchers have emphasized, is still needed to understand the various aspects of the topic; therefore, conducting this study will add another building block in researchers' effort to gain better understanding of the intricate relationship between students' learning styles, their conditions, and their academic achievement. More precisely, the study will provide further information on how students in the Jordanian universities use learning styles, and will, consequently, allow us to test some of the claims that have been made in previous studies. More knowledge will be gained about the effects of discipline as well as, GPA and Gender variables, which will help educators and teachers in the Jordanian universities in promoting a better and more responsive learning environment that would, hopefully, enhance students' academic achievement.

Secondly, studying the effect of the discipline variable in terms of separate majors rather than as a generalized heading will provide a clearer picture of the effect of this variable on the use of learning styles. Not only will this study provide a clearer picture of the effect of this variable, but will also inform us about the best ways to deal with the learning/teaching environment, if proved that different majors evoke differences in the way that students use learning styles.

Finally, the fact that this study looks at the learning styles of students coming from a non-western cultural background helps to expand the scope of research on learning styles, which has mostly, so far, focused on Western universities. This definitely will help researchers gain better understanding of how students' minds, universally, operate, which, ultimately, would equip educators with better tools to deal with the problems that university students encounter anywhere.

5. Literature Review

Review of previous research reveals that a great deal of research has been conducted on the investigation of the interaction between certain variables and students' learning styles. However, a few studies have looked at the effect of discipline on students' use of learning styles. Research on this issue has revealed differences in the use of learning styles in relation to students' disciplines or majors. Matthews (1994) reported significant differences in learning styles between humanities-based majors and mathematically-based majors. In a Southwestern state university in the US, Gadzella and Masten (1998) found that Psychology and Special education students had significantly higher scores than students in Sociology, Social work, and Criminal justice majors on the Deep Processing scale of Schmeck, Ribich, and Ramanaiah's (1977) Inventory of Learning Processes(ILP).

Clump and Skogsbergboise (2003) reported that Psychology students scored significantly higher than Biology students on "Deep Approach" learning styles, but reported similar scores for both majors on "Surface Approach" styles. Using Kolb's LSI, Biberman and Buchanan (1986) compared between the learning styles of students in humanities, applied majors, sciences, and business school majors. They found that the students in Economics/Finance majors scored significantly higher than Accounting students, and that the later had similar scores to the science majors. They reported also that the students in Management and Marketing majors had similar scores as the students in the humanities and applied majors.

Clump and Skogsbergboise (2003) remarked, however, that the picture obtained from the studies that looked into this variable is not clear because they mostly looked at discipline in terms of large groupings of majors rather than discrete ones. (p.2). Indeed, Stewart and Felicetti, (1992) looked at separate majors within the Business taxonomy and reported distinct differences in students' learning styles among the distinct majors.

The studies that looked into the effect of Gender type revealed some conflicting findings. Miller et al. (1990) reported that males scored better than females on the Deep Processing scale of the ILP while females scored better on the Methodical Study scale. Clump and Skogsbergboise (2003) also reported that males scored significantly higher than females on the Deep Processing scale, but scored significantly lower than females on the Methodical Study scale. However, no significant differences were found on Elaborative Processing or Fact Retention. Alnadaf (2008) reported that Physical Education female students did significantly better than males on Methodical Study. Other studies, on the other hand, reported lack of statistically significant differences on any of the learning styles (Aljaafreh, 2010; Kosminsky & Kaufman, 1992; Miller et al. 1987; Schmeck et al. 1977; Verma, 1994).

Research studies that investigated the effect of students' academic standings on the use of learning styles have mostly reported that "High achievers" scored significantly higher than "Low achievers" on almost all ILP scales (Gadzella & Bologlu, 2003; Gadzella et al. 2001; Gadzella, 1995; Gadzella, Ginther, & Williamson, 1987; Schmeck, 1983; Schmeck & Grove, 1979). Gadzella and Bologlu (2003) reported significant differences between students whose Educational Psychology grades were 90% and above and those whose grades were 79% or less. High Achievers had significantly higher scores than Low Achievers on Deep Processing and Fact Retention. Gadzella et al. (2001) found significant differences among students based on their course grades on three scales of the ILP: Deep Processing, Elaborative Processing, and Fact Retention. Women with grade A and B had significantly higher scores than grade C women on Deep Processing. Grade A women scored also significantly higher than grade C women on Elaborative Processing and Fact Retention.

In a study by Gadzella (1995), it was reported that grade A students in Psychology classes scored significantly higher than grade B, C, and D students on the Deep Processing, Elaborative Processing, and Methodical Study scales. Gadzella et al. (1987) reported also that students with higher GPAs scored significantly higher than those with lower GPAs on Deep Processing and Fact Retention. Likewise, Schmeck (1983) and Schmeck and Grove (1979) reported that students with high GPAs scored significantly higher than low GPAs on Deep Processing, Elaborative processing, and Fact Retention.

In Contrast, Alnadaf (2008), in a study conducted on Physical Education students at Mu'tah University in Jordan, reported that students with the lower GPAs (Fair and Good), scored higher means on three ILP scales, namely, Deep Processing, Elaborative Processing, and Fact Retention, whereas the students with Very Good GPAs scored the highest mean scores on the Methodical Study, but the differences among the students were not statistically significant. At the same institution, however, Aljaafreh (2010) conducted a study on the English major students and reported statistically significant differences among the students on the four ILP scales in favor of the higher GPAs.

6. Methodology

6.1 participants

The sample of the study consisted of 613 undergraduate students from three majors in the faculty of Arts at ??????? University representing more than 30 percent of the total student population of the faculty. There were 430 females and 183 males. The number of the participants was determined to be proportionate to the number of students, male female ratio, and the academic levels in each major.

6.2 Data Collection

The data for this study were taken from a huge data collected for a bigger project from various faculties and majors at ??????? University during the first semester of the academic year 2009. Since the participants were not speakers of English language, an Arabic translation of the original Measurement (Schmeck et al. 1977) was used. Students in the three majors answered the demographic information and the learning styles questionnaire of the measurement. The questionnaire was distributed to the second-, third-, and fourth – year students in their class periods by the researcher in the presence of the class teacher.

First-year students were exempted from participation because they usually register for general university requirements. Participants were given written instructions, informing them about the purpose of the questionnaire and how to answer its items. Additionally, oral guidelines on how to answer the questionnaire were given in each class and participants were urged to respond to its items in utmost objectivity. Students who did not wish to take the questionnaire were exempted from participating. After collecting the answer sheets from each class, the researcher excluded incomplete ones and those that were suspected of not being answered seriously, as indicated by the pattern of their responses.

6.3 Instrument

The Inventory of Learning Processes (ILP) questionnaire developed by Schmeck et al. (1977) was employed to investigate the students' learning styles in this study. The questionnaire consists of 62 items divided into four independent scales: (1) The Deep Processing scale (DP), which includes 18 items and assesses how students critically evaluate, compare and contrast, organize, and analyze information. (2) The Elaborative Processing scale (EP), which includes 14 items and assesses the way students personalize and translate information into their own terms. (3) The Fact Retention scale (FR), which consists of 7 items and assesses how students restore, retain, and process specific new pieces of information. (4) The Methodic Study scale (MS), which contains 23 items and assesses students' use of systematic recommended techniques in their study.

Researchers have previously investigated and reported the reliability and validity of the ILP scales. Schmeck et al. (1977) reported internal consistencies ranging from 0. 52 - 0.82 and test-retest reliability ranging from 0.78 - 0.88 for the four ILP scales. Significant and positive correlations between the four scale scores and achievement test scores ranging from 0.35 - 0.51 were also reported. Albaili (1993) reported a test-retest reliabilities ranging from 0.68 - 0.80 and internal consistencies ranging from 0.56 - 0.76 in a study on Arabic university students in the UAE. Bartling (1988) reported that the correlations between the four ILP scales and college high school GPA scores ranged from 0.34 to 0.58. House and Gadzella (1998) reported test-retest reliabilities ranging from 0.79 - 0.88 for the four scales.

In this study, the validity and reliability of the ILP questionnaire were calculated using a sample of 30 students not included in the study. The validity was calculated by correlating the students' scores on the ILP subscales with their GPAs (DP = 0.772, EP = 0.647, MS = 0.688, FR = 0.774), and the test-retest reliabilities for each of the subscales of the measurement were: DP = 0.71, EP = 0.74, MS = 0.74, FR = 0.64.

7. Data Analysis

Descriptive analysis was employed in order to evaluate and compare the students' responses on the ILP questionnaire. Means and standard deviations of the students' responses were calculated in order to see the differences between the students in the three majors in their use of the ILP learning strategies and the effects of student' GPAs and Gender. Analytical statistics, using One-Way Anova, were used in order to find out any statistically significant differences between the three majors in students' responses on the four ILP scales. When proved to be differences, post-hoc Scheffe test was employed to identify the groups that showed the significant differences.

8. 1 Results

Table (1) presents the mean scores and standard deviations of the students' responses on the four scales of the ILP (DP, EP, FR, and MS) for the three majors involved in this study, namely, Arabic, English, and Modern Languages (ML hereafter).

Table (1) Mean scores and Standard deviation of the three majors on the four ILP subscales

Major		N	Minimum	Maximum	Mean	Std. Deviation
English	Deep Process	224	2.00	18.00	10.4107	2.93900
	Elaborative Process	224	2.00	14.00	8.9196	2.31253
	Fact Retention	224	.00	7.00	4.8482	1.41554
	Methodic Study	224	1.00	21.00	9.9420	3.83180
	Valid N (list wise)	224				
Arabic	Deep Process	284	2.00	17.00	9.3310	3.19833
	Elaborative Process	284	2.00	14.00	8.9085	2.38933
	Fact Retention	284	1.00	7.00	5.0070	1.34241
	Methodic Study	284	.00	20.00	8.9577	4.02444
	Valid N (list wise)	284				
ML	Deep Process	105	3.00	17.00	10.2190	3.25512
	Elaborative Process	105	1.00	14.00	9.4381	2.38151
	Fact Retention	105	1.00	7.00	4.8952	1.38622
	Methodic Study	105	1.00	20.00	10.2190	4.13703
	Valid N (list wise)	105				

On DP, the English major students (mean =10.41) and ML students (mean =10.21) had higher mean scores than the Arabic major students. On EP, the ML students (mean =9.43) scored higher means than both English and Arabic major students, who had pretty much the same scores (English, means = 8.91 and Arabic, 8.90). On FR, the table shows that the three groups had very similar scores, with the Arabic major students scoring slightly higher (mean = 5.000) than English and ML students (means = 4.84 and 4.89). Finally, on MS, the three groups were distinct in their responses; the ML students had the highest score (mean =10.21), the English major students came second (mean = 9.94), and the Arabic major students had the lowest score (8.95).

Tables (2 and 3) present the means and standard deviations of the students' scores on the four ILP scales according to the GPA and Gender variables. These tables show that the students with higher GPA levels scored higher means on three of ILP scales, namely, DP, EP, and MS. They show also that females scored higher means than males on the Methodical Study scale, see the details below.

Table (2): Mean scores and Standard deviation of the three majors according to Gender on the four ILP subscales

Major	Gender		N	Range	Minimum	Maximum	Mean	Std. Deviation
English	male1	Deep Process	75	13.00	4.00	17.00	10.4667	2.87737
		Elaborative Process	75	9.00	5.00	14.00	8.8400	2.11839
		Fact Retention	75	5.00	2.00	7.00	4.7600	1.33396
		Methodic Study	75	13.00	4.00	17.00	9.4400	3.39013
	female2	Deep Process	149	16.00	2.00	18.00	10.3826	2.97875
		Elaborative Process	149	12.00	2.00	14.00	8.9597	2.41022
		Fact Retention	149	7.00	.00	7.00	4.8926	1.45723
		Methodic Study	149	20.00	1.00	21.00	10.1946	4.02304
Arabic	1	Deep Process	87	13.00	3.00	16.00	9.2414	3.36523
		Elaborative Process	87	11.00	3.00	14.00	8.7356	2.18057
		Fact Retention	87	6.00	1.00	7.00	4.9310	1.43700
		Methodic Study	87	17.00	1.00	18.00	8.3678	3.83713
	2	Deep Process	197	15.00	2.00	17.00	9.3706	3.12980
		Elaborative Process	197	12.00	2.00	14.00	8.9848	2.47740
		Fact Retention	197	6.00	1.00	7.00	5.0406	1.30085
		Methodic Study	197	20.00	.00	20.00	9.2183	4.08682
ML	1	Deep Process	21	13.00	3.00	16.00	9.0476	3.29357
		Elaborative Process	21	12.00	1.00	13.00	8.7619	3.17655
		Fact Retention	21	5.00	2.00	7.00	4.4286	1.20712
		Methodic Study	21	13.00	4.00	17.00	9.3333	3.67877
	2	Deep Process	84	14.00	3.00	17.00	10.5119	3.19825
		Elaborative Process	84	10.00	4.00	14.00	9.6071	2.12851
		Fact Retention	84	6.00	1.00	7.00	5.0119	1.40990
		Methodic Study	84	19.00	1.00	20.00	10.4405	4.23511

Table (2) shows that male and female students in both English and Arabic majors had pretty much similar scores on three scales of the ILP (DP, EP, and FR). However, in both majors, females scored higher means than males on the Methodical Study scale (means = 10.19 vs. 9.44, for English) and (means = 9.36 vs. 8.36, for Arabic). The table shows also that females in ML major scored noticeably better means than males on the four processes of the ILP (means, DP= 10.51 vs. 9.04, EP=9.60 vs.8.76, FR=5.01 vs. 4.42, MS= 10.44 vs. 9.33).

Table (3): Mean scores and Standard deviation of the three majors according to GPA on the four ILP subscales

Major	GPA		N	Range	Minimum	Maximum	Mean	Std. Deviation
English	Fair1	Deep Process	53	12.00	2.00	14.00	9.4906	2.70770
		Elaborative Process	53	9.00	3.00	12.00	8.1321	2.14868
		Fact Retention	53	7.00	.00	7.00	4.6226	1.61991
		Methodic Study	53	15.00	2.00	17.00	8.7547	3.36787
	Good 2	Deep Process	125	12.00	3.00	15.00	10.2400	2.76907
		Elaborative Process	125	12.00	2.00	14.00	8.9680	2.32426
		Fact Retention	125	6.00	1.00	7.00	4.9680	1.34366
		Methodic Study	125	20.00	1.00	21.00	10.1040	4.04376
	V.good3	Deep Process	41	15.00	3.00	18.00	11.9512	3.06554
		Elaborative Process	41	8.00	6.00	14.00	9.6585	2.06893
		Fact Retention	41	5.00	2.00	7.00	4.8293	1.22275
		Methodic Study	41	14.00	3.00	17.00	10.7805	3.56730
	Excell.4	Deep Process	5	11.00	6.00	17.00	11.8000	3.96232
		Elaborative Process	5	9.00	4.00	13.00	10.0000	3.53553
		Fact Retention	5	5.00	1.00	6.00	4.4000	2.30217
		Methodic Study	5	6.00	8.00	14.00	11.6000	2.60768
Arabic	1	Deep Process	84	14.00	2.00	16.00	8.0357	3.12952
		Elaborative Process	84	10.00	3.00	13.00	8.0357	2.35135
		Fact Retention	84	6.00	1.00	7.00	4.6667	1.32022
		Methodic Study	84	17.00	.00	17.00	7.3452	3.46234
	2	Deep Process	129	14.00	2.00	16.00	9.4419	3.05652
		Elaborative Process	129	11.00	3.00	14.00	8.9922	2.27244
		Fact Retention	129	6.00	1.00	7.00	5.0233	1.38330
		Methodic Study	129	18.00	1.00	19.00	9.4341	4.15490
	3	Deep Process	48	13.00	4.00	17.00	10.3958	2.83399
		Elaborative Process	48	11.00	2.00	13.00	9.4167	2.36853
		Fact Retention	48	5.00	2.00	7.00	5.2292	1.32472
		Methodic Study	48	14.00	1.00	15.00	9.2917	3.61415
	4	Deep Process	23	13.00	3.00	16.00	11.2174	3.23274
		Elaborative Process	23	9.00	5.00	14.00	10.5652	2.04108
		Fact Retention	23	3.00	4.00	7.00	5.6957	.82212
		Methodic Study	23	15.00	5.00	20.00	11.4783	4.07732
ML	1	Deep Process	16	8.00	6.00	14.00	8.9375	2.71953
		Elaborative Process	16	6.00	7.00	13.00	9.1250	1.82117
		Fact Retention	16	4.00	2.00	6.00	4.2500	1.12546
		Methodic Study	16	13.00	1.00	14.00	7.8125	2.99374
	2	Deep Process	56	14.00	3.00	17.00	9.7321	3.25571
		Elaborative Process	56	13.00	1.00	14.00	9.1250	2.70395
		Fact retention	56	6.00	1.00	7.00	4.8571	1.43246
		Methodic Study	56	18.00	2.00	20.00	10.2143	4.28407
	3	Deep Process	29	12.00	5.00	17.00	11.2414	3.01964
		Elaborative Process	29	8.00	5.00	13.00	10.0690	1.90734
		Fact Retention	29	5.00	2.00	7.00	5.3793	1.26530
		Methodic Study	29	15.00	5.00	20.00	11.4483	3.79460
	4	Deep Process	4	1.00	14.00	15.00	14.7500	.50000
		Elaborative process	4	5.00	8.00	13.00	10.5000	2.08167
		Fact Retention	4	3.00	3.00	6.00	4.5000	1.73205
		Methodic Study	4	12.00	4.00	16.00	11.0000	5.59762

For the interaction of GPA with the ILP processes, table (3) shows that on DP, the English major students who achieved higher GPAs scored higher means than those with lower GPAs. Precisely speaking, Very Good and Excellent students, who had similar scores in this case, were better than students with Good GPAs, and Good students were, in turn, better than Fair students. On EP as well as MS, there were differences between the students at each GPA level, the higher the GPA the better the mean obtained was. On FR, however, the picture is rather fuzzy and goes counter to the other processes; Excellent students, as shown in table 4, had the lowest mean scores and Good students had the highest, however, the differences between all GPA levels do not appear to be significant any way.

As for the Arabic major students, table 3 shows that the students with higher GPAs obtained higher means, the higher the better, on both DP and EP. For FR, again, the picture is not quite clear; there was no difference between Good and V. Good students, and there was only a slight difference between these levels and the Fair level, but there was a clear difference between Excellent and Fair students in favor of the former. On the MS, we see that Excellent students scored better than all lower levels, whereas Good and Very good levels, which had similar scores here, scored better than the Fair level. In other words, higher GPA levels outperformed lower ones.

As for the ML major, the students with higher GPAs scored higher means than those with lower GPAs on DP, the higher the better. This was also the case for the students' performance on the EP except that Fair and Good students obtained the same score, which was lower than V. Good students, which, in turn, was lower than Excellent. For FR, a similar picture to the English major can be observed; there were only slight differences between the GPA levels, with Excellent and V. Good scoring less than the lower Good level, which had the highest score. For MS, the results indicate that the higher GPA levels also obtained higher mean scores; Excellent and V. Good levels, which had similar scores, scored higher means than Good and Fair levels.

The next set of tables (4–9) present the analysis of variance between the three majors on each of the four ILP scales and the results of the Scheffe Post Hoc test in the cases of significant differences.

Table (4): Analysis of variance of the differences between the three majors on Deep Processing

Deep Process					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	160.760	2	80.380	8.278	.000
Within Groups	5923.064	610	9.710		
Total	6083.824	612			

As table (4) indicates, the analysis of variance of the three majors on DP shows significant differences between the majors, ($F= 8.278$, $P < 0.05$). A Scheffe Post Hoc test was performed to determine the location of the significant differences among the three majors.

Table (5): Scheffe Post Hoc of Deep Processing

		Subset for alpha = 0.05	
Major	N	1	2
Arabic	284	9.3310	
ML	105		10.2190
Eng	224		10.4107
Sig.		1.000	.850

Means for groups in homogeneous subsets are displayed.

Scheffe Post Hoc test, as shown in table (5), reveals significant differences between English and ML, on the one hand, and Arabic, on the other. No significant differences were found between English and ML students. In other words, the students in the English and ML majors scored significantly better than the Arabic major.

On EP and FR, as the tables (6 and 7) show, no significant differences were detected between the three majors. On MS, however, statistically significant differences were found between the majors, as shown in table (8), ($F= 5.724$, $P < 0.05$). A Scheffe Post Hoc test was performed to determine the location of the significant differences among the three majors. As table (9) shows, there were differences between English and ML, on the one hand, and Arabic, on the other, but there were no statistically significant differences between English and ML majors. Again, the English and ML majors performed significantly better than the Arabic major on the MS scale of the ILP.

Table (6): Analysis of variance of the differences between the three majors on Elaborative Processing

Elaborative

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	23.973	2	11.986	2.152	.117
Within Groups	3398.021	610	5.571		
Total	3421.993	612			

Table (7): Analysis of variance of the differences between the three majors on Fact Retention

Fact retention

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3.311	2	1.655	.873	.418
Within Groups	1156.673	610	1.896		
Total	1159.984	612			

Table (8): Analysis of variance of the differences between the three majors on Methodical Study

Method

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	180.864	2	90.432	5.724	.003
Within Groups	9637.700	610	15.800		
Total	9818.564	612			

Table (9): Scheffe Pot Hoc of Methodical Study

		Subset for alpha = 0.05	
Major	N	1	2
Arabic	284	8.9577	
English	224	9.9420	9.9420
ML	105		10.2190
Sig.		.073	.812

Means for groups in homogeneous subsets are displayed.

8.2 Discussion

The results of this study revealed important findings with respect to the way the students in the investigated majors responded to the ILP scales. Clear differences were found between the majors on three ILP processes, namely, DP, EP, and MS. The students in both English and ML majors scored significantly better than the students in the Arabic major on DP.

This indicates that English and ML major students appear to possess better abilities than Arabic students in using higher and deeper learning strategies associated with DP such as, analyzing, categorizing, comparison, critical thinking and evaluation.

How might these differences be interpreted? The differences in the students' responses on DP between English/ML and Arabic majors might be attributed to two factors. First, it appears that knowledge of an additional language beside the native language might have enhanced the students' abilities in using such processes. Not only does knowledge of another language provide students with an additional linguistic tool, which is an advantage in itself, but also it brings with it knowledge of an additional culture with its own views of the world and its ways of thinking. This may have equipped the students in the English and ML majors with extra resources and, hence, better abilities in using such studying and information processing strategies compared to the Arabic major students whose knowledge is restricted to one language and one culture. Secondly, the English and ML students were exposed to a learning/teaching context which is possibly more conducive and encouraging to the use of deeper learning strategies due to the fact that most of their instructors were graduates from Western universities, who usually use more interactive and less traditional teaching methods compared to the instructors in the Arabic department. In other words, Arabic students might be exposed to more traditional teaching approaches that do not normally encourage deeper learning strategies; rather they encourage lower and more surface learning styles such as memorization and information recall. Indeed, this contention is further supported by the results of these students on the other learning styles, especially FR as we will see below.

The lack of statistically significant differences between the three majors on EP indicates that all the groups used similar strategies when it comes to concretizing and relating the information they study to their own experiences. Likewise, there were no statistically significant differences between the three majors on FR. However, the results of the students' responses on this scale were interesting. For one thing, the trend in students' responses on FR was different from the other scales. Only on this scale that the Arabic major students had higher mean scores than both English and ML students. Additionally, the present study as well as previous ones conducted at the same institution (Aljaafreh, 2010; Alnadaf, 2008, Alnaddaf et al., in press), showed that even though the students in this institution exhibited modest performance on higher learning styles, especially, DP, they did well on FR. Furthermore, the results of this study regarding FR did in fact replicate and, hence, corroborate the results obtained in previous studies at the same institution (see, Aljaafreh, 2010; Alnadaf, 2008). Those studies consistently showed that there were no significant differences between students on the basis of different classifications and in relation to different variables regarding the strategy of FR. This study too showed that there was no significant effect of the Discipline, Gender and GPA variables on students' performance on FR.

The consistent lack of differences between students at this university on FR and their relatively good performance on this scale compared to their modest performance on DP can be explained in reference to the teaching/learning environment to which they were exposed as suggested by Aljaafreh, (2010). Indeed, this explanation is supported by the results of this study. It is contended, there, that the learning/teaching context fosters lower learning processes on the expense of high-order learning strategies as a consequence of reliance on traditional teaching approaches that encourage rote learning and recalling strategies and discourage deeper processes such as analysis, critical thinking and evaluation. This is supported by the results of the Arabic major students who had a tendency to do better on FR, but significantly lower on DP, which is possibly because the students, as mentioned above, appear to have been exposed to more traditional teachers and teaching approaches than students in both English and ML majors. It appears quite clearly that the Arabic vs. English/ ML situation is **a micro-case** of the general situation observed between ??????? University students and students in Western universities, where ???????? students appeared to do favorably good on FR while quite modestly on DP (see, e.g., Aljaafreh, 2010, Alnadda et al., in press). The learning /teaching contexts in both situations, I believe, are quite different; Western universities use more innovative, interactive approaches while ???????? University, in general, clings to more traditional types of teaching/learning approaches.

On MS, the results of the study, as can be seen in tables (1, 9, and 10), show that the English major students did better than the Arabic major students, but that the ML students significantly outperformed the Arabic major students. Why were the English and ML students superior in this learning style? Again, the question can be raised as to whether knowledge of additional languages exerts an effect on this or the other styles of learning or not. It is also quite possible that the significant difference between ML and Arabic may be linked to the gender variable.

This may be the case since the results of this study showed that females had better scores than males on MS for all the groups, and, in the ML sample, most of the participants were females (21 vs. 84). The results of this study concerning the gender type suggest that females have better abilities than males in using strategies associated with MS, such as recommended techniques and ways of managing the information they study. Previous research showed unclear picture and inconclusive evidence regarding the effect of this variable on the use of the ILP processes. A careful look, however, at the findings of previous studies reveal certain patterns of female/male performances; in some studies (Clump & Skogsbergoise, 2003 and Miller et al. 1990), it was reported that males scored significantly higher than females on DP while females scored higher than males on MS. Even though no significant differences were found, studies done on Arabic students (Aljaafreh, 2008; Alnadaf, 2008; Alnaddaf et al., in press) did also report that male students scored higher means on DP while females scored higher means on MS. The results of the present study, hence, support the findings of these studies, at least, with respect to the superior performance of females on the processes associated with MS.

Accumulated evidence, therefore, suggests that females might be better than males in the use of MS strategies. I believe this can be explained on the basis of societal or cultural aspects rather than gender per se, at least from the Arabic culture vantage point. We know that females in the Arabic culture are normally expected to comply with parental, societal, and cultural norms and practices more than males. This perhaps makes them more apt to attend to, comply and, in fact, use recommended techniques and methods of studying suggested by their teachers or teaching manuals. This might also partially explain the superior performance reported for males on DP in previous research. In contrast to females, males, at least, in the Arab culture show less compliance and more freedom in the way they think or deal with societal and cultural issues. In other words, they are more self-regulated and independent in their thinking and this may have fostered in them better abilities for using deeper thinking processes and perhaps, at the same time, fostered less abilities in following recommended methods for learning associated with the MS learning style.

The results of this study regarding the effect of the GPA variable suggest a strong relationship between the students' GPAs and the styles of learning they use. The superior performance of the higher GPAs on three of the ILP processes (DP, EP, and MS) implies that students who have higher GPAs appear to possess better abilities in analysis, categorization, and evaluation, and better ways of elaborating and managing the information they study, as well as better capacities in using recommended techniques of studying. However, the results suggest that all students from all the majors and in all GPA levels possess similar abilities in retaining and recalling information when they study. Such results, in fact, concur, with the previous studies that were conducted on Arabic students (Aljaafreh, 2010; Alnaddaf et al., in press) and they also concur, except for FR, with previous research done in the West on the effect of students' academic standing on their use of the ILP styles, which reported significant differences between high achievers and low achievers in the use of the four types of learning styles (see, e.g., Gadzella & Bologlu, 2003; Gadzella et al., 2001; Gadzella, 1995; Gadzella et al., 1987; Schmeck, 1983; Schmeck & Grove, 1979). The results of the present study, therefore, provide further evidence of a strong relationship between academic achievement and learning styles.

9. Conclusion

To obtain a clearer picture of the effect of discipline on students' learning styles, this study attempted to focus on discrete majors rather than generalized headings by studying, separately, three majors that are normally grouped under various headings, such as "humanities," "Arts" or "languages." Significant and perhaps insightful findings were revealed in this study. Despite the fact that the investigated majors share basic properties yet the students in these majors exhibited clear differences in their use of the ILP processes. The results, indeed, provide helpful insights and raise important questions with respect to the interaction between discipline and the use of learning styles. As noted in the discussion, exposure to additional linguistic tools, i.e. languages, and exposure to other cultures, indirectly through language and literature in this case, may play an important role in the effect of discipline on the use of learning styles. In other words, it is possible that discipline itself is merely an artifact of certain indirect elements or factors that determine students' orientation towards the information they study, and hence, the learning styles they use. It is important to note here that in such a case we might be well advised if our attention is drawn to possible indirect elements and factors in students' environments and cultures. This, I believe, will take research on learning styles a step forward in the attempt to understand students' characteristics and styles of learning and the way their minds work.

Again, it is also possible that the differences between females and males on the use of certain learning processes may have nothing to do with gender per se, but rather to certain cultural or societal aspects assigned to, or expected from, males and females, which eventually cause differences in orientation towards the studying process. The results of the study revealed also important findings concerning the relationship between the students' GPAs and their use of the ILP learning styles. In essence, the students who used the high-order learning processes tend to be high achievers, and this indicates a positive relationship between the students' learning styles and their academic achievement. Further support, then, is accumulated for the contention that learning styles are a good predictor of academic achievement.

These findings, therefore, strongly suggest that we must pay attention to university students' characteristics and learning styles and make sure that the learning/teaching environment is flexibly fit to their characteristics and encouraging of their learning styles. Many facets shape up the learning/teaching environment, but one important facet is the teaching process. Attention must be given to the educational approaches and teaching methods employed by university instructors. The goal would be to enhance the use of various types of learning styles, especially those related to higher-order learning processing. Such processes do not appear to be optimally used by the students in most of the Jordanian universities, which still follow traditional educational approaches. Such traditional approaches appear to have fostered lower-order fact retention types of learning styles on the expense of higher-order deep processing ones. Indeed, previous research has already suggested that certain styles of learning can be promoted by certain teaching methods and evaluation procedures. As pointed out by Gadzella et al. (2001), students modify their learning styles "due to one's perception of how the information learned is to be evaluated (p. 99). Students, therefore, appear to develop abilities in using the learning styles that are responsive to the teaching activities and evaluation procedures employed in their learning environment.

Finally, in order to obtain a deeper and clearer understanding of the effect of discipline on students' learning styles, future research need to focus on separate majors rather than general classifications of groups of majors. Additionally, to understand how students use learning styles and how various variables affect such use, it is imperative, I believe, that future research shift attention to study the role of certain elements in students' learning setting, their environment and the cultures in which they live rather than looking at encapsulated variables like "gender", "discipline", "GPA," etc. For instance, instead of studying languages majors as a general discipline or even as separate entities, future research might look into the effects of certain related issues, such as mono-lingualism, bilingualism, multilingualism, language as a mediation tool of experience and culture, cultural values, teaching approaches and so on. At last, the explanations forwarded in this study regarding the indirect effect of language, culture, and teachers' methods and orientation in relation to the discipline and gender variables should be subjected to further investigation and scrutiny.

References

Albaili, M. (1993). Psychometric properties of the inventory of learning process: Evidence from United Arab Emirates college students. Psychological Report, 72, 1331-1336.

Aljaafreh, A. (2008). A Preliminary Evaluation of the Program of Disseminating English Language Skills to the Students in the Jordanian Universities: Evaluating the Experience of Mutah University. Mu'tah Lilbuhuth wad-Dirasat: Humanities and Social Sciences Series, 23(5), 39-90.

Aljaafreh, A. (2010). An analytical study of the learning styles of English major students at Mutah University in Jordan. Annals of the Faculty of Arts: Ain Shams University, 38.

Alnaddaf, A. (2008). An analytical study of the learning processes of sport science students at Mutah University. Mu'tah Lilbuhuth wad-Dirasat: Humanities and Social Sciences Series. 23(5), 129-150.

Banks, J. (1988). Multi-ethnic education: Theory and Practice. Needham Heights, MD: Allyn & Bacon.

Bartling, C. (1988). Longitudinal changes in the study habits of successful college students. Educational and Psychological Measurement, 48, 527-535.

Biberman, G. Buchanan, J. (1986). Learning style and study skills differences across business and other academic majors. Journal of Education for Business, 61, 303-307.

Claxton, C. & Murrell, P. (1987). Learning styles: Implication for improving education practices. (ASHE-ERIC Higher Education Report No. 4) Washington, DC: Association for the Study of Higher Education.

Clump, M. (2005). Changes to students' learning processes following instruction on the topic. Journal of Instructional Psychology, 32(4), 293-297.

Clump, M., & Skogsbergboise, K. (2003). Differences in learning style of college students attending similar universities in different geographic locations. College Student Journal, 37(4), 501-509.

Council of Higher Education (CHE). (2000). Report on Disseminating the Computer skills and English language skills to the students in the Jordanian universities. CHE Decree, Session 13, Dec. 25, 2000. Amman, Jordan.

Gadzella, B. (1995). Differences in processing information among psychology course grade groups. Psychological Reports, 77, 1312-1314.

Gadzella, B., & Baloglu, M. (2003). High and low achieving education students on processing, retaining & retrieval of information. *Journal of Instructional Psychology, 30*(2), 99-103.

Gadzella, B., Baloglu, M., Masten, W., Helton, J., Huang, J. & Madsen, T. (2001). Differences among women attending university on thinking, learning, and academic performance. *College Student Journal, 35*(1), 77-84.

Gadzella, B., Baloglu, M. & Stephens, R. (2002). Prediction of educational psychology course grades by age and learning style scores. *College Student Journal, 36* (11), 62-69.

Gadzella, B., & Ginther, D., & Williamson, J. (1987). Study skills, learning processes, and academic achievement. *Psychological Reports, 61,* 167-172.

Gadzella, B., Masten, W. (1998). Critical thinking and learning processes for students in two major fields. *Journal of Instructional Psychology, 25*(4), 256-261.

Gadzella, B., Masten, W. & Huang, J. (1999). Differences between African and Caucasian students on critical thinking and learning style. *College Student Journal, 33*(4), 538-542.

Gregoric, A. (1979). Learning/teaching styles: Potent forces behind them. *Educational Leadership, Editorial*, 234-236.

House, W. & Gadzella, B. (1998). Reliability of the inventory of learning processes. Paper presented at Southwestern Psychological Association Convention. New Orleans, LA.

Hoyt, K. (1989). The career status of women and minority persons: A 20-year retrospective. *The Career Development Quarterly, 37*, 202-212.

Koziminsky, E. & Kaufman, G. (1992). Academic achievement and individual differences in the learning processes of Israeli high-school students. *Learning and Individual Differences, 4*, 335-345.

Matthews, D. (1994). An investigation of students' learning styles in various disciplines in colleges and universities. *Journal of Humanities Education and Development, 33*, 65-74.

Miller, D., Alway, M. & McKinley, D. (1987). Effects of learning styles and strategies on academic success. *Journal of College Student Personnel, 28*, 399-404.

Miller, D., Finley, J. & McKinley, D. (1990). Learning approaches and motives: Male and female differences and implications for learning assistance programs. *Journal of College Student Personnel, 31*, 147-154.

Ministry of Higher Education (MHE). (2007). Report of the results of the university qualifying exam for the 2nd semester 2006/2007. No. 10/1/8115, July 4, 2007.

Ministry of Higher Education (MHE). (2006). Report of the results of the university qualifying exam for the 2nd semester 2005/2006. No. 10/1/6408, May 24, 2006.

Rachal, K., Daigle, S. & Rachal, W. (2007). Learning problems reported by college students: Are they using Learning strategies? *Journal of Instructional Psychology, 34(4)*, 191-199.

Reading-Brown, M. & Hayden, R. (1989). Learning styles-liberal arts and technical training: What's the difference? *Psychological Reports, 64*, 507-518.

Schmeck, R. (1983). Learning styles of college students. In R. Dillon & R. Schmeck (Eds.), *Individual differences in Cognition* (pp. 233-297). New York: Academic Press.

Schmeck, R. & Grove, E. (1979). Academic achievement and individual differences in learning processes. *Applied Psychological Measurement, 3*, 43-49.

Schmeck, R., Ribich, F., & Ramanaiah, N. (1977). Development of a self-report inventory for assessing individual differences in learning processes. *Applied Psychological Measurement, 1,* 413-431.

Stewart, K., & Felicetti, L. (1992). Learning styles of marketing majors. *Educational Research Quarterly, 15*, 15-23.

Thoronton, B., Haskell, H., & Libby, L. (2006). A comparison of learning styles of gifted and non-gifted high school students. *Individual Differences Research, 4*(2), 106-110.

Verma, B. (1994). Hemisphericity and learning styles among students of distance education. *Indian Journal of Psychometry and Education, 25*, 53-60.