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GJMBR-A Classification: *JEL Code: D83, M00*



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I. Introduction

Students' academic performance changed with their personality, environmental and social factors as well as their learning style. Students' learning style could be different from each other especially with their ability to learn. With the observation in a formal learning environment mainly in higher education institutes, it has observed that some prefer learning through reading, and some prefer group discussions. However, academic performance of the students might depend on their desirable learning style. In the literature, learning style defined in diverse way. "Educational environment which students prefer to study" defined as learning style by Stewart and Felicetti (1992). Honey and Mumford (1992) highlighted that learning style as attitude and behavior which reveal students most preferred learning method. Dunn (1990) defined learning style as a method, which every learner wishes to concentrate, process, and retain knowledge they receive from learning.

In the literature, various concepts and theories were developed to explain students' learning style. Business students who are especially training to became managerial positions have to learn well because most of their decision making could reflected by the way they understand and learn concepts and theories. Many research studies have revealed that learner's learning styles can enhance their performance, motivation, and efficiency (Oxford and Ehrman, 1992; Yousef, 2016; Hatami, 2013). In addition to this, there is a miscommunication between the teacher and the learner. Most of the traditional learning environment, teachers perceived that students' participation is lower as well as assume that learners can absorb all new information which they deliver at once.

With the Saudization program, many Saudi female students select business management degree programs, which enable them to become a future female manager. With the economic liberalization policies in Saudi Arabia, encourage foreign multinational companies to start their business in Saudi Arabia. Because of these favorable factors, recognize learning styles of future business managers is valuable. Though the traditional teaching evaluation survey has not supported to understand whether individual learners learned and receive new knowledge.

Rief (1993: 53) highlighted that "students retain 10% of what they read 20% of what students hear 30% of what students see 50% of what they see and hear 70% of what they say 90% of what they say and do". This finding is reflecting that learners' cognition has directly influenced their learning ability. Instructors' traditional teaching method may not be reflected right learning methods for the learner. Teaching methods might be kept students away from the classroom. It is, therefore important to explore the most suitable learning style for individual students. Numerous weak learners might be discouraged by traditional teaching methods which do not accommodate their learning styles. It needs that instructors implement teaching styles that make their teaching reachable to all learners, whether they are weak or best. According to the Griffiths (2012), the theory of learning concept introduced around in the 1970s explained that students' higher academic performance was a result of their learning condition. Many theories introduced numerous learning style models and theories. With this Learning Styles Questionnaire, instructors can take a better

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understanding of individual learners' attitudes and behaviors and learning processes (Sims, 1990; Campbell, 1991, Eaves, 2011).

In theory, shows different learning styles and various research studies discovered students learning preferences changed with major, gender as well as culture. It has identified that Business students in the Saudi university show different academic performance based on their courses they enrolled. Students who received higher grades for descriptive courses were not showed same grades for mathematical modules. Most of the students were failed in mathematical courses. It indicated that more than students learning ability or cognition, learning style for different subject area might be the cause for the different grades for the same students. Without correctly knowing students' desirable learning style, teachers cannot change their teaching modes. There were not many studies carried out this area to determine whether students' academic performance depended on learning style or not. Therefore investigation in this phenomenon is important to students as well as teachers. Results of this study reveal that instructors' awareness of learners learning preferences and accordingly, instructors might be able to practice different learning methods. It would help to enhance business students understanding ability and to achieve their learning objectives which will support them to practice successfully as a business manager in the competitive job market.

This study focuses on investigation of learning style preferences of business students who enrolled in two different set of course modules; descriptive courses and mathematical at one of the State Universities in Saudi Arabia. Descriptive courses are principles of management, strategic management, and organizational behavior, while mathematical courses are mathematics for business, business statistics, and operations research. These modules have three credit hours per week with 45 contact hours per semester with six assessments including two quizzes, two assignments, and mid - term examination and semester end examinations.

a) Objective of the Study

Therefore, the objectives of this study were:

- To identify the learning style preferences of business students who enrolled in two different set of course modules; descriptive courses and mathematical courses by using the VAK model;
- To find any differences between the learning styles of descriptive modules and mathematical modules of the same group of students.

b) Research Questions

1. Which are the dominant learning styles of Descriptive Courses?
2. Which are the dominant learning styles of Mathematical Courses?
3. Is there a difference in learning styles of Descriptive and Mathematical Courses?

c) Hypothesis

Ho: There is no association between students' Learning styles of descriptive courses and Learning styles of Mathematical courses.

Ha: There is an association between students' Learning styles of descriptive courses and Learning styles of Mathematical courses.

II. Literature Review

The concept of learning style explains that each individual students prefer to learn differently. It further defines that each student absorbs knowledge and process and retain information receiving from learning depended on their preference. Thus, learning style has become a predominant recognition in classroom management and education administration. Students' learning style depended on their cognition, environment and their emotional intelligence. Hence, every student is different from each other. Therefore, understanding the correct learning style of each student is an import for teachers to determine appropriate teaching method in classroom. Many scholars introduced different approaches to identify students' learning style preferences.

a) Dunn and Dunn's Model

Dunn and Dunn's model introduced by Rita and Kenneth Dunn in 1978 was the oldest learning style model relates to school students (Dunn, 2000). Based on the behavior of students and their responses to teaching methods this model developed. Five key dimensions were introduced by this comprehensive model to determine students' learning styles. Those five are (1) environmental (2) emotional (3) sociological (4) physical and (5) psychological. An environment defined as what students considered as idle place to learn like, warm, bright, nice desk, as well as place where they can verbally communicate, quieter place or some time informal environment. These elements were differing from students to student. Emotional dimension explained independence and self-directed learners. In one extent student prefer fully self-directed and another end of the dimension, students' expect close supervision and support continuously to complete their project. The third element explained a sociological aspect of the learner. Some students like team works and group projects, who were more like peer interaction, while others refuse to do group work. They prefer to learn from the adults rather than peers.

A fourth element in Dunn's model described individual learning preference regarding physiological

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preference. This dimension explained learning modality. Some students prefer a visual channel, while other prefers auditory channels. Mobility, time preference are some of the other elements describe under this element. The final learning style is psychological. This element explains how students act when they have learning problems. Some of them looking at bigger picture while other prefer to concern individual dimensions of the problem. Dunn (2009) in his studies which conducted in several institutions discovered that learning style has a direct impact of students' academic performance.

b) Kolb's Learning Style Inventory (LSI)

Kolb (1984) proposed a model with four elements related to Learning Style Inventory (LSI) instruments. These four instruments are concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing). Also, Kolb (1984) explained four different type of learning styles; 'accommodators', 'divergers', 'convergers', and 'assimilators'. In 2002, Loo applied the Kolb's Learning Style Inventory (LSI) to discover business major students' learning style. The study found that business students who were majoring accounting, finance, and management information system were preferred assimilator learning style. Jaju, Kwak, and Zinkhan (2000) discovered that students in marketing specialization were more prefer to be accommodators and Barnes, Gooden, and Preziosi, (2004) found that students who were in online education were more prefer to use combinations.

c) Honey and Mumford's Learning Style Questionnaire (LSQ)

Based on the Kolb's work in 1992 Honey and Mumford introduced Honey and Mumford's Learning Style Questionnaire (LSQ). In this model, they have presented four different type of learning styles; activist, theorist; pragmatist and reflector. Aziz, Tey, Alw, and Chong (2013) in their study in pharmacy students discovered that many students like to be a reflector, and then like to be theorists, pragmatist and activist continually.

d) The Grasha-Riechmann Student Learning Styles Scale (GRSLSS)

Grasha (1996) introduced the Grasha-Riechmann Student Learning Styles Scale (GRSLSS). This model showed six different type of learning styles; Avoidant, collaborative, competitive, dependent, independent and participant. Halili, Naimieb, Sira, Abuzaid, and Chin (2015) examined distance learners learning styles of Malaysian students by using this scale. The study revealed that the majority of female students preferred independent, competitive, dependent, participative and collaborative learning styles over male students who were avoidant learners.

e) Felder and Silverman Index of Learning Survey (ILS)

Felder and Spurlin (2005) introduced an Index of Learning Survey (ILS). Their learning style assessment consists of 44 elements categorizing into four dimensions. One dimension is sensory or intuitive and the second dimension is visual or verbal. Active or reflective is the third dimension while sequential or global is the last.

f) VARK/VAK Learning Styles Model (Visual, Auditory, Kinesthetic)

In the 1920s the VAK Learning Styles Model introduced by psychologists such as Fernald, Keller, Orton, Gillingham, Stillman, and Montessori, starting in the 1920's (Fleming, 2001). The purpose of the model was to determine preferable learning styles, which are commonly used by learners. Accordingly, the psychologist identified three major dominant learning styles visual, auditory or kinesthetic. However, it has recognized that learners combined all three or two and recognized fourth learning style as mix modality. The Visual-Auditory-Kinesthetic (VAK) learning style model explained that student learning method could classified into three categories as visual learners, auditory learners, kinesthetic learners or a multimodality learner.

Neil Fleming in 1987 expanded the VAR model to VARK model. This VARK model introduced four categories of learners; visual, aural, read/write and kinesthetic (Fleming, 2001). In this model, Fleming facilitated learner to select more than one learning style. Out of four elements of the model visual learners more prefer pictures, diagrams, video, animation, flowcharts, colors, symbols, lecturers gestures, and graphs use to improve their knowledge while Aural learners more prefer lecturers voices, discussions, verbal explanations, tape recordings, stories and jokes, recall to other people. The third type of learner Read/Write style more prefer lists, headings, dictionaries, glossaries, textbooks, and lecture notes and last type of learners- Kinesthetic more prefer real experiences, concrete examples, case studies, fieldtrips, laboratory experiments.

i *Visual Learner*

Visual learners prefer to see, read and write. They are more prefer to work in a silent environment, like to take note during teaching. They prefer textbooks, short notes, graphs, and charts as well as like to take notes. Visual leaners like to keep the information fresh and visible. Vivid imaginations level in high would like to think and visualizes in detail. Vivid learners prefer to have a handout, written instructions, highlight key information, and color coding and clear headings. Visual learners depend on their eye (Kastner and Stangl, 2011; Reid, 1987).

ii *Auditory Learner*

Auditory leaners like to depend on their ears. They are good communicators prefer listening and speaking with teachers and desire to read loudly and

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keep information in a memory. Their remembering capacity is very high. Auditory leaners prefer audio files, oral presentations, speeches, etc. Furthermore they like to work in a group and enjoy dialogue but do not prefer reading and easily distracted sounds (Reid, 1987; Vincent and Ross, 2001).

iii *Kinesthetic Learners*

Kinesthetic learners more prefer to learn through physical experience. They are more like to be movers and shakers. They desire to do, touch, feel and move while learning and would like to take regular breaks. They recognized as multi-tasker, therefore engage in physical activities in workshops. They prefer short verbal communication and discussion and use practice, role-playing, and modeling to learn (Reid, 1987; Vincent and Ross, 2001).

Student follow all these three modalities to receive new knowledge and information. However, with their preferences they may be biased to one of this modality, or might be two modality or all three at the same time. The dominant learning style shows students preferable learning style. Sometime student prefer to study one course with one style and another course with another style. If, they prefer more than one consider learning style they were considered as a multimodality learners. O'Brien (1991), in his study revealed that students who were in different major areas including business, education, and arts and sciences has different learning styles. Peyman et. al. (2014) recognized that Iranian medical students prefer aural and reading and writing learning style. Nikki, Stephen and Marie (2015) discovered that business students who are in introductory accounting course are prefer visual, while secondly kinesthetic learning style.

Nuzhat, Salem, Quadri and Al-Hamdan (2011) conduct learning style survey of medical students at King Saud Bin Abdul Aziz University Saudi Arabia and discovered that more than 70 percent of students preferred multiple learning modal. Prithish kumar and Michael, (2014) in their study of the first year medical students found that 87 percent of students prefer multimodal as their learning style while 14 percent were unimodal. They further revealed that out of unimodal learners nearly 8 percent like Kinesthetic learning style and the lowest likely model was visual and did not find any differences among gender.

This study focused on VAK model to determine learning preferences of students. For the analysis of this study the O'Brien's 'Learning Channel Preference Checklist' was used (O'Brien, 1989).

III. Research Methodology

This study is cross-sectional research depends on primary data gathered from the business student who studies in a state university in Saudi Arabia. The purposive sampling methods used to collect data from students who have completed three descriptive courses such as principles of management, strategic management, and organizational behavior, and three mathematical courses such as mathematics for business, business statistics and operations research in a selected semester. The sample of 150 students selected from each group, and 138 completed questionnaires from students who followed descriptive courses and 128 questionnaires from students who studied mathematical modules were responded. All of these were female students registered for Bachelor of Business administration degree program. More than 60 percent of students had a cumulative grade point average (CGPA) of between 2.0 and 3.7.

As a data collection tool, the modality (learning channel preference) questionnaire reproduced by O'Brien in 1985 used (O'Brien, 1989). The questionnaire consists of 30 questions under the visual, auditory and kinesthetic elements. Each question has three preferences; "never applies to me"; "sometimes applies to me"; and "often applies to me." Maximum 30 marks and minimum ten marks were given for each section. If students have marked "often applies to me" in every category, they considered as mix learners. The Cronbach's alpha for the three main is areas respectively 0.83, 0.80, and 0.77. Also, there were ten modalities explained each learning style such as preferred learning style; spelling; reading; handwriting; memory; imagery; distractability; problem-solving; response to periods of inactivity; and response to new situations.

The data has been analyzed through descriptive statistics as well as chi-square test and independent sample t-test. Percentages were calculated to determine students' preferable learning style, and chi-square test and independent sample t-test were conducted to find out whether there is any difference between learning style of descriptive courses and mathematical courses.

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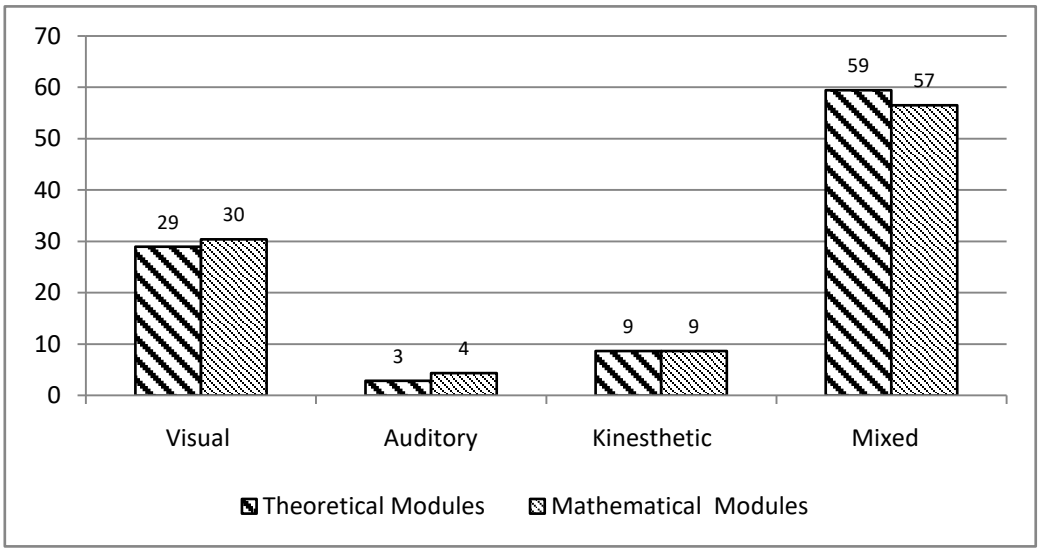
IV. Analysis of Data

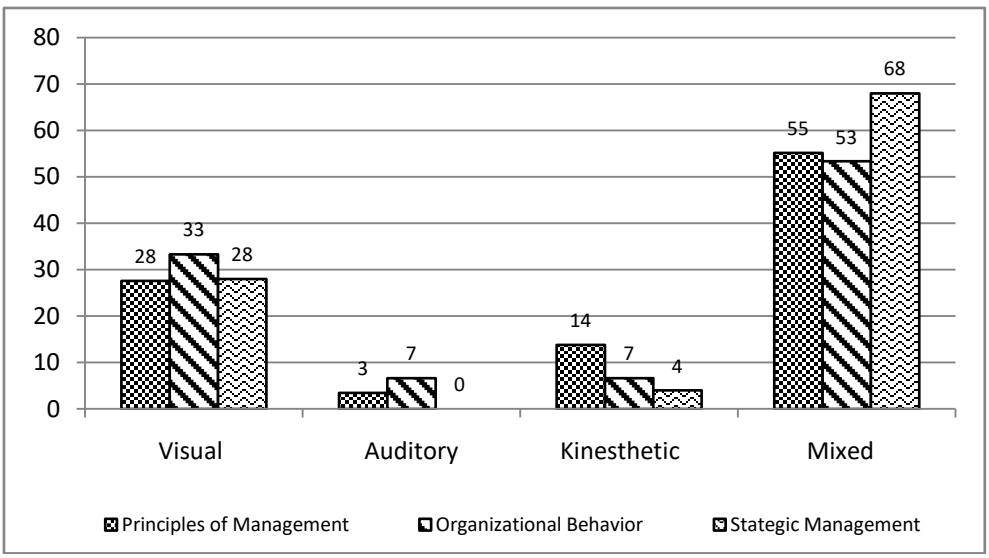
a) Descriptive Statistics



Source: Primary Data

Figure 1: Learning Style Preferences of Descriptive and Mathematical Courses (As a Percentage)

Figure 01 shows business students' preferences for descriptive and mathematical courses separately as a percentage. Accordingly, 59% of students in descriptive modules and 57% of students in mathematical courses prefer multimodal learning style. Highest preferred unimodal was visual and second highest unimodal is kinesthetic and for both types of courses given the same preferences. Auditory type liked by 3% of students in descriptive modules and 4% in mathematical courses.



Source: Primary Data

Figure 2: Learning Style Preferences of Descriptive Courses (As a Percentage)

Figure 02 shows students learning preferences for descriptive courses as a percentage. Majority of students preferred multimodal learning style showing that 55%, 53% and 68% respectively for principles of management, organizational behavior, and strategic management. Highest unimodal learning style is visual showing 28% of students in principles of management, 33% in organizational behavior and 28% students in strategic management. Secondly, students give preferences to kinesthetic learning style and finally auditory leaning unimodal.

Figure 03 shows that the majority of students' favorite learning styles in mathematical courses as a percentage. A preference for mathematics for business is 54.2%, business statistics is 71.4%, and operations research is 53.3%. The highest unimodal favoration

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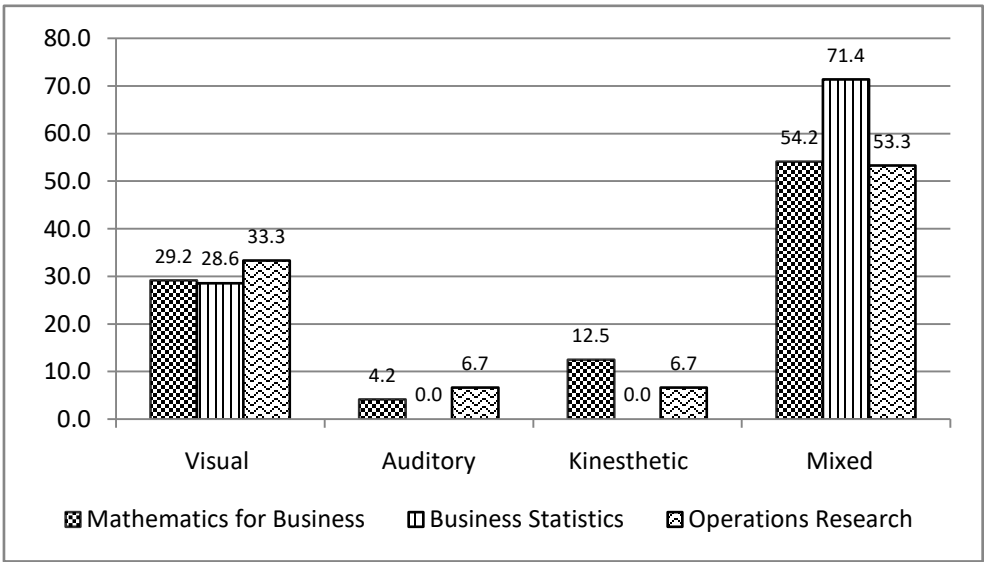
given for visual learning style by mathematics for business is 29.2%, business statistics is 28.6% and operations research is 33.3% respectively. Second highest unimodal learning style was kinesthetic. 12.5% mathematic for business students and 6.7% operations research students prefer this style, while 4.2% 12.5% mathematics for business students and 6.7% operations research students prefer auditory style. None of the business statistics students prefer auditory as well as kinesthetic learning style.



Source: Primary Data

Figure 3: Learning Style Preferences of Mathematical Modules (As a Percentage)

b) Results of the Hypothesis Testing

Table 01 shows the detailed analysis of the learning styles with ten modalities identified by O'Brien (1989). All of these ten modalities analyzed with Visual, Auditory, and Kinesthetic (VAK) sensory receivers. Students' learning preferences changed with modalities. However, most of the students who studied in descriptive courses as well as mathematical courses, prefer mixed learning style.

The null hypothesis of the study is "Ho: There is no association between students' learning styles of descriptive courses and learning styles of mathematical courses." Table 01 shows all p values are higher than 0.05 at the 5 percent confidence level. According to the p-values of the chi-square test, the null hypothesis accepted and alternative hypothesis rejected. The results demote that there are no differences between students learning style with descriptive courses and mathematical courses.

Table 02 shows the significance values of Levene's Test for equality of variances for each learning style. For observation of Visual Learning style, the p-values is .320, for Auditory Learning p-value is .505, Kinesthetic Learning p is equal to .076, Mixed Learning p-value is 0.125 and p-value for the total is .145. All these values are more than 0.05 at the 95 percent significance level. Therefore the equal variances are assumed. Hence, it was considered significance values of t-test to determine whether the null hypothesis is accepted or rejected. Table 02 shows significance t values for each learning style. Significance value for Visual Learning style is .167, for Auditory Learning style, the p-value is .374, for Kinesthetic Learning style, p is equal to .65, for Mixed Learning style, the p-value is 0.259 and p-value for the total is .167. Since these all p values are more than 0.05, the null hypothesis is accepted. It indicated that there is no difference between students' learning style between descriptive courses and mathematical courses.

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Table 1: Learning Styles of Descriptive and Methodical Courses

Modality	Elements	Courses		Pearson Chi-Square p
		Descriptive (n=138)	Mathematical (2=124)	
Preferred Learning Style	Visual	25.8	28.2	0.286
	Auditory	14.2	12.1	
	Kinesthetic	5.3	4.3	
	Mixed	54.7	55.4	
Spelling	Visual	14.3	16.4	0.076
	Auditory	26.2	33.2	
	Kinesthetic	3.3	3.2	
	Mixed	56.2	47.2	
Reading	Visual	26.4	28.9	0.231
	Auditory	7.3	5.2	
	Kinesthetic	11.2	9.4	
	Mixed	55.1	56.5	
Handwriting	Visual	12.2	12.7	0.355
	Auditory	13	13.8	
	Kinesthetic	9.9	6.6	
	Mixed	64.9	66.9	
Memory	Visual	10.3	12.3	0.446
	Auditory	11.7	11.2	
	Kinesthetic	25.1	26.2	
	Mixed	52.9	50.3	
Imagery	Visual	14	22.1	0.110
	Auditory	10.1	8.4	
	Kinesthetic	5.5	6.6	
	Mixed	70.4	62.9	
Distractability	Visual	17.6	22.4	0.269
	Auditory	18.4	24.5	
	Kinesthetic	7.9	8.5	
	Mixed	56.1	44.6	
Problem Solving	Visual	9.8	13.4	0.752
	Auditory	21	24.3	
	Kinesthetic	13.9	17.5	
	Mixed	55.3	44.8	
Response to Periods of Inactivity	Visual	13.2	13.4	0.154
	Auditory	11.4	14.6	
	Kinesthetic	19.8	23.4	
	Mixed	55.6	48.6	
Response to New Situations	Visual	9.8	13.4	0.345
	Auditory	21.5	24.3	
	Kinesthetic	8.4	9.1	
	Mixed	60.3	53.2	

Source: Primary Data

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Table 2: Results of the Independent Samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig.	Mean Differences	Std. Error Differences	95% Confidence Interval of the Differences	
									Lower	Upper
Visual Learning	Equal Variance Assumed	.452	.320	-1.347	259	.167	-.465	.354	-1.123	.123
	Equal Variance not Assumed			-1.324	256	.154	-.465	.351	-1.167	.113
Auditory Learning	Equal Variance Assumed	.653	.505	-.890	259	.374	-.234	.285	-.097	.310
	Equal Variance not Assumed			-.890	256.7	.374	-.234	.285	-.098	.309
Kinesthetic Learning	Equal Variance Assumed	3.45	.076	1.78	259	0.65	.567	.302	-.035	1.112
	Equal Variance not Assumed			1.775	257.3	0.61	.567	.299	-.027	1.114
Mixed Learning	Equal Variance Assumed	2.03	0.125	1.23	259	.259	.730	.264	-.035	1.009
	Equal Variance not Assumed			1.19	258.44	.254	.765	.254	-.543	1.19
Total Learning	Equal Variance Assumed	2.10	.145	1.12	259	.167	.712	.631	-.528	1.53
	Equal Variance not Assumed			1.136	258.66	.256	.71245	.623	-.520	1.94

Source: Primary Data

V. Discussion and Conclusion

The purpose of this study to compare business students' desirable learning style based on the descriptive and mathematical courses. It has revealed that both groups of students prefer multimodal more than unimodal. The highest unimodal preference is the visual style for both groups of students. Independent sample t-test results discovered that there is no difference between students who study descriptive courses and mathematical courses. To collect data VAK modality questionnaire which was reproduced by O'Brien (1985) was used.

According to the result of these analyses, the null hypothesis accepted and alternative hypothesis rejected. It shows that majority of the students have not restricted specific learning style. Students, who follow descriptive courses, as well as mathematical courses, are equally shown favoration for multimodal learning style. Second largest fondness given by them is the visual learning style. These students are less sensitive to auditory learning and kinesthetic learning styles. Moreover, it shows that there is no difference learning style among students who follow descriptive courses and mathematical courses.

Some of the previous studies found that students have different learning styles based on their major. O'Brien (1991) revealed that students who were in different major areas including business, education, and arts and sciences has different learning styles. Peyman et. al. (2014) found that Iranian medical students prefer aural and reading and writing learning style. Nikki, Stephen and Marie (2015) identified that business students who are in introductory accounting course are prefer visual, while secondly kinesthetic learning style. These finding are not matched with the findings of the current study. Anu, Anuradha and Meena (2012) study was conducted to find out learning style preference among undergraduate medical students revealed that majority of students prefer mixed learning style. The result of this study is matched with the present study. Research finding of Naik (2003) revealed similar results, showing that more students prefer mixed learning style. Zhu et al., (2018) conducted study to find learning style of nursing students. In their study it has revealed that 58.49% majority of student prefer multimodal learning style which is matched with the current study. Samarakoon, Fernando and Rodrigo (2013) in their study of medical undergraduate students' learning style survey also indicated that students prefer multimodal, which is match with the result of the current study. Wright and Stokes (2015) found out that students in introductory economic cause prefer different learning style, which was matched with the findings of current study. Darwish (2016) also revealed that students in Business students in UAE prefer mixed learning style.

Felderan and Henriques (1995) discovered that multiple learning modal significantly affected to increase

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students' academic performance. Dunn (2000) also revealed that mixed learning modal is preferable learning style for students. According to these research findings, mixed learning style is much better for students to improve their academic performance. It is a better guideline for teachers to determine students' desirable teaching method according to their preferences. These findings matched with the present study finding, and it is a guideline for teachers as well as students to determine their correct learning style.

VI. Implications for the Teaching-Learning Process

The result of the study discovered that majority of the students prefer to gather information from different ways to learn whether they study descriptive subjects or mathematical subjects. Therefore, to improve their academic performance, there should be a match between students' learning style and teaching style. The results of the present study indicated that teaching methods have to constantly match with the students learning preferences.

According to the present findings, business students in bachelor degree prefer multimodal learning style. Therefore, they are as visual learners, prefer graphs, charts, flow diagrams, as auditory learners prefer to listen, share and discussing with teachers and peer students. As kinesthetic learners, students prefer case studies, solve problems, examples, experiments. etc. Also, they like to communicate and share their experience with others. Teachers have recognized teaching methods to match their learning needs.

One of the limitations of this study was the data was limited to two different type of course modules only. It was not analyzed effect of learning style on their academic performance. Another limitation of the study was the sample. It was collected from one university as well as only from business major students. Therefore, the study will need further analyses to test the impact on academic achievement. Further, it is required to take a large sample from other universities also to generalize the results.

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