

## Faculty of Nursing Students Learning Styles and its Impact on their Academic Achievement at Assiut University

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### Abstract

**Background:** Learning style of students is one most important factors which influence their learning. There is a relationship between learning styles and students' academic achievements. **The aim of the study:** To determine the learning styles preferred by the faculty of nursing students at Assiut University and its impact on their academic achievement. **Subject and method:** A descriptive correlational research design used to conduct this study. A total number of studied sample were (n= 641): first (n= 148), second (n= 217), third (n= 153) and fourth (n= 123) year. Data collection tool consisted of three parts: **I**-Socio-demographic data sheet, **II**-Learning styles questionnaire sheet, and **III**-Student academic achievement grade. **Results:** There was a positive strong correlation between preferred learning style in the first, second and fourth year and their academic achievement. While, there was a positive moderate correlation in the third year. **Conclusion:** The highest percentage of the study sample were preferred Uni – mode learning styles. Overall, the combination of learning style has a greater impact on their academic achievement than use one preferred learning style. **Recommendations:** Encourages nursing students to use all learning styles. Conduct a workshop for nursing educators about "the importance of learning styles to improve learning and teaching process".

**Keywords:** *Learning Styles, Academic Achievement & Nursing Students.*

### Introduction

Learning style (LS) has been defined as an individual's natural, habitual and preferred ways of absorbing, processing, and retaining new information and skills. (El-Gilany & Abusaad, 2012). Learning style of students is one of the most important factors which influence their learning. Learning styles describe how to understand, manage and respond to the learning environment. Learning style is an important factor in the process of teaching and learning. Some negative effects can be observed on nursing student learning as a result of an imbalance between the learning and teaching methods. Using appropriate methods of teaching and determination of student learning styles can facilitate their learning. (Mohammadi & Thaghinejad, 2014)

The learning style analysis (LSA) gives a diagnosis about someone's learning/information intake preferences and provides guidelines/ recommendation for improving academic achievement and school performance. (Prashnig, 2005). The diagnosis of learning style gives an advantage to educators in terms of facilitating them to analyze the performance of their students, motivate them in the better way and guide their students in the school that how they can get maximum benefit in the instructional programs. (Eittah & Ahmed, 2013)

According to Dunn and Dunn (1978, 1993), in the VAK learning styles model, Students are classified as

visual, auditory, or kinesthetic learners. Visual learners learn through seeing drawings, pictures, and other images. Auditory learners learn by listening to lectures and participating in discussions. Kinesthetic learners learn through physical touching and other hands-on experiences. (Lowy, 2013). The VARK instrument defines the learning preference based on the sensory modality in which a student prefers to take in new information. The three major sensory modalities are visual (V), aural (A), and kinesthetic (K), which are collectively known as VAK. Fleming, (2011) expanded this classification system to VARK to include read-write (R, a mixed sensory modality that is not assessed under VAK). (Al-Saud, 2013)

The relationship between teaching -learning styles and academic achievement should entail the following main characteristics, which can be implemented and contextualized by teachers to improve their educational settings: First, teaching styles should increase self-awareness and metacognition of learners about their strengths and challenges. Second, teaching styles should balance learning tasks and activities so that they would accommodate all learners by taking into account all dimensions of learning styles. Third, while learners should be able to choose to learn in a manner they prefer. On this note, the benefits of matching/mismatching teaching and learning styles

need to be unfolded. Research on learning styles and academic achievement has shown that teaching learners how to learn, monitor and manage their own learning styles are crucial to their academic achievement. (Letele, et al., 2013)

Learning styles seem to play a major role in academic achievements. Many studies strongly suggested that there are relationships between certain learning styles and students high academic achievements. (Abdu Saadi, et al., 2013). Some studies have also found that congruence (matching) between teaching and learning styles has a positive impact on achievement and satisfaction. When incongruence (mismatching) exist between learning styles of most students in a class and the teaching style of the professor, the students may become bored and inattentive, do poorly on tests, get discouraged about the courses, the curriculum, and themselves, and in some cases change to other curricula or drop out of school. (Gilakjani, 2012)

### Significance of Study

Several nursing researchers examined learning styles preferences such as Mohamed & Helal, (2012) study of identifying the learning style preferences of nursing students at Faculty of Nursing & Technical Institute of Nursing in Alexandria based on VARK learning styles. Also, Eittah & Ahmed, (2013) study of the assessment of the nursing students' perception of their learning style at Faculty of Nursing in Menoufia University based on Witkin's field independence-dependence model and Abou - Shousha & Abd El Rahman, (2014) study to examine the learning styles of nursing administration students and their teaching mode efficiency at Faculty of Nursing - Damanhour University based on VARK learning styles.

The identification of learning styles of learners and measurement is extremely important for each of the curriculum planners, teachers and learners themselves, where it contributes to re-build and design curricula and courses, and choose the content and experiences, teaching methods and means and diversification which commensurate with the different learning styles of learners. Hence, the importance of such study in that it provides faculty members at universities with knowledge about learning styles and their role in achieving effective learning. So, the present study is conducted to identify the learning style preferred by the faculty of nursing students at Assiut University.

### Aims of study

#### The current study aimed to

- Determine the learning styles preferred by the faculty of nursing students.

- Determine impact of the learning styles preferred by the faculty of nursing students on their academic achievement.
- Compare preferred learning style among four nursing year's students enrolled in the Faculty of Nursing at Assiut University.

#### Research questions

##### The current study seeks to answer the following questions:

- What is the learning style preferred by the faculty of nursing students?
- Is there a positive impact on the learning styles preferred by the faculty of nursing students on their academic achievement?
- Is there a difference in preferred learning style for four nursing years' students enrolled in the Faculty of Nursing at Assiut University?

#### Subject & method

This current study aimed to determine the learning styles preferred by the faculty of nursing students and its impact on their academic achievement, and compare preferred learning style among four academic years nursing students.

The methodology followed in carrying out the study is presented in four designs, namely:

- I. Technical design
- II. Administrative design
- III. Operational design
- IV. Statistical design

#### Technical design

This design included research design, study setting, subject, and tool of data collection.

#### Research design

A descriptive correlational research design was used to conduct this study.

#### Study setting

The study was carried out at Faculty of Nursing - Assiut University.

#### Study subject

A representative sample of female nursing students enrolled at Faculty of Nursing - Assiut University during the academic year (2013-2014), because the majority of them were females, while there was a negligible number of males was found only in the first and second year, For this reason, males were excluded. A total number of studied sample according to the formula were (n= 657) classified as follows: first year (n= 148), second year (n= 217), third year (n= 169) and fourth year (n= 123) were accepted to participate in this study. This was estimated using the following formula (Brown and Hollander, 1977).

$$N = \frac{(Z_{\alpha/2})^2 P(1-p)}{D^2} \quad \text{I.}$$

Where: N = Sample size

P = 0.25

$D^2 = 0.25 \times 20\% = 0.05$

$Z_{\alpha/2}$  = z score or critical value separating an area  $\alpha/2$  of in the right tail of the Standard Normal Distribution.

### Study tool

The tool used to collect data for the present study was consisted of three parts as follows:

#### Part I: The socio - demographic data sheet

It is used to gather data about studied nursing students (age – a place of residency - academic level - marital status – father and mother education - father and mother work).

#### Part II: The learning styles questionnaire sheet

It's a self-administered questionnaire adopted from the learning styles assessment tool of **Think-tank, Arizona. edu, (2013)** and learning styles inventory tool of **Academic Success Services, (2005)**. This tool was translated into Arabic and modified by the researcher to be more suitable for the study. It used to determine nursing students preferred learning style based on VAK (Visual, Auditory, and Kinesthetic) learning styles model (**Dunn & Dunn, 1978 & 1993**).

It consisted of (27) items classified into three main categories as follows: Visual learning style (9) items, Auditory learning style (9) items and Kinesthetic learning style (9) items. Each item of these three categories has three options of answers: agree (scored = 5), neutral (scored = 3) and disagree (scored = 1).

#### Scoring system

Maximum and minimum scores of each category were summed up by number of items and multiplied by answers scores, that classified into three types:

- **Uni- learning styles:** The maximum score = 45 and minimum score = 9 for each one subgroup.
- **Bi- learning styles:** The maximum score = 90 and minimum score = 18 for each two subgroup.
- **Multi or combination - learning styles:** The maximum score = 135 and minimum score = 27 for all subgroup.

#### Part III: The student academic achievement grade

It is used to determine the studied nursing student's final academic achievement grade during academic year (2014), through Grade Point Average (GPA) that included:

- Excellent grade → ( 85% or more )
- Very good grade → ( 75 - less than 85% )
- Good grade → ( 65 - less than 75% )

- Satisfactory grade → ( 60 – less than 64% )
- Fail grade means → ( less than (60% )

#### Administrative design

An official permission to conduct the study was obtained from the Dean, vice dean of education and students affairs and academic departmental heads. This was directed through formal verbal and written letters to faculty members that were responsible for the selected sections of data collection. Also, education and students affairs staff that were responsible for final academic achievement grade to all studied nursing student's chosen in the study.

#### Ethical considerations

The study proposal was approved by the researcher and ethics committee. An oral agreement was obtained from the students who participate in the study after explaining the aim of the study. Participants in the study were informed about their rights to refuse or consent participation in the study. The researcher also reassured the participants in the study, that their privacy would be protected and any obtained information would be strictly confidential before starting data collection. Data was collected by the researcher from the defined study sample.

#### Operational design

This design involves preparatory phase, the pilot study, and the actual fieldwork.

#### Preparatory phase

In this phase the researcher translated and modified self-administered learning styles questionnaire after extensive reviewing the available literature concerning the study topic. This tool was incorporated by learning styles assessment tool of (**Think-tank, Arizona. edu, 2013**) and learning styles inventory tool of (**Academic Success Services, 2005**). Arabic translation of the first version of the study tools was done to ensure a better understanding of students. The validity of the study tool was done by three experts from nursing administration department to test content validity. The necessary modification and reconstruction of the study tool were done to become ready for use. This phase took three weeks from 1st week to 3rd week of March (2014).

#### Pilot study

A pilot study was carried out on 20 students of the total sample before beginning of actual data collection. The aim of the pilot study to test the feasibility, clarity, and reliability of data collection tool and to estimate the required time to fill the questionnaire. It helped in making necessary changes in the tool based on detected data collection problems or difficulties.

**Reliability**

Learning styles scale	Cronbach's Alpha	No.of Items
1.Visual learning styles	0.840	9
2.Auditory learning styles	0.790	9
3.Kinesthetic learning styl	0.830	9

*Cronbach's Alpha*  $\geq 0.7$

**Fieldwork**

The researcher started to collect data from the 1st week of April and lasted in 1st week of **May (2014)**. The researcher harmonized and organized field work with teaching staff that were responsible for the selected sections. If they agreed, then the researcher asked them about the preferred time for data collection, either in the first or last part-time of the selected sections. Also, data collection was done according to the researcher work circumstances and the study schedules of the students. The researcher introduced himself to the students, the purpose and nature of the study were explained and complete confidentiality of data was assured. Students were asked for their approval and cooperation. Students were encouraged to participate in the study by explained them the importance of study and its impact on the educational process in their college. The researcher explained the main parts of the questionnaire. Instructions regarding how to fill up the form were also explained. After that, the printed questionnaire forms were distributed to each student who was willing to participate in the study, then asked to complete the questionnaires. The average time taken for completing each questionnaire was approximately 20 minutes depending on the students' response. The questionnaires were completed under the supervision of the researcher and direction teaching staff who responsible for students during data collection period. The investigator checked self-administered questionnaire sheet to ensure the student name written and the sheet completely filled.

**Limitations of study**

One of the limitations, Researcher faced during the study is a drop of the studied sample size. A total number of studied sample according to the formula were (n= 657) classified as follows: first year (n= 148), second year (n= 217), third year (n= 169) and fourth year (n= 123). A total actual number of studied sample were (n= 641) due to uncompleted questionnaires (n= 16) among the third year.

**Statistical design**

Data entry and findings statistical analysis were carried out using SPSS-20. Data were presented using descriptive statistics in the form frequencies and percentages. Quantitative variables were presented in the form of means and standard

deviation. Qualitative variables were compared using chi-square test and student t-test. Statistical significance difference was considered at p-value ( $P \leq 0.05$ ).

## Results

Table (1): Visual learning style preferred by four academic year's nursing students in the Faculty of Nursing at Assiut University (N=641).

Visual learning style	Responses	First year (N=148)		Second year (N=217)		Third year (N=153)		Fourth year (N=123)		P. value
		No.	%	No.	%	No.	%	No.	%	
My notes have lots of pictures, arrows, or other symbols in them.	Agree	61	41.2	76	35.0	83	<b>54.2</b>	55	44.7	<b>0.001</b> **
	Neutral	61	41.2	77	35.5	47	30.7	32	26.0	
	Disagree	26	17.6	64	29.5	23	15.0	36	29.3	
Understand and follow the directions or instruction through the use of maps.	Agree	50	33.8	60	27.6	47	30.7	36	29.3	0.418
	Neutral	53	35.8	84	38.7	69	45.1	53	43.1	
	Disagree	45	30.4	73	33.6	37	24.2	34	27.6	
Before beginning an unfamiliar or new task, prefer to see someone do it first.	Agree	131	88.5	172	79.3	126	82.4	94	76.4	0.097
	Neutral	11	7.4	36	16.6	24	15.7	24	19.5	
	Disagree	6	4.1	9	4.1	3	2.0	5	4.1	
Can call the correct answer from my notes during taking the exam.	Agree	88	59.5	149	68.7	95	62.1	82	66.7	0.349
	Neutral	49	33.1	62	28.6	48	31.4	34	27.6	
	Disagree	11	7.4	6	2.8	10	6.5	7	5.7	
Prefer that professors write information on the board during lecture.	Agree	94	63.5	116	53.5	92	60.1	87	<b>70.7</b>	<b>0.046</b> *
	Neutral	38	25.7	77	35.5	50	32.7	29	23.6	
	Disagree	16	10.8	24	11.1	11	7.2	7	5.7	
Prefer draw pictures such as tables, maps and graphs to help me understand the material better.	Agree	83	56.1	107	49.3	96	<b>62.7</b>	66	53.7	<b>0.001</b> **
	Neutral	44	29.7	88	40.6	54	35.3	35	28.5	
	Disagree	21	14.2	22	10.1	3	2.0	22	17.9	
If I sat near the window in the classroom, perhaps displace my mind about the lecture.	Agree	69	46.6	106	48.8	81	52.9	65	52.8	0.725
	Neutral	55	37.2	69	31.8	51	33.3	38	30.9	
	Disagree	24	16.2	42	19.4	21	13.7	20	16.3	
Can easily remember scenes and roles through educational films.	Agree	102	68.9	154	71.0	119	77.8	91	74.0	0.438
	Neutral	38	25.7	55	25.3	29	19.0	24	19.5	
	Disagree	8	5.4	8	3.7	5	3.3	8	6.5	
Need to look at something several times before to understand it.	Agree	84	56.8	131	60.4	93	60.8	77	62.6	0.976
	Neutral	57	38.5	75	34.6	53	34.6	40	32.5	
	Disagree	7	4.7	11	5.1	7	4.6	6	4.9	

N.B:  $P > 0.05$  non-significant\* $P < 0.05$  significant\*\* $P < 0.01$  moderate significant\*\*\* $P < 0.001$  highly significant.

Table (2): Auditory learning style preferred by four academic year's nursing students (N=641).

Auditory learning style	Responses	First year (N=148)		Second year (N=217)		Third year (N=153)		Fourth year (N=123)		P. value
		No.	%	No.	%	No.	%	No.	%	
Understand and remember things that I hear	Agree	65	43.9	115	53.0	77	50.3	54	43.9	0.130
	Neutral	74	50.0	98	45.2	73	47.7	62	50.4	
	Disagree	9	6.1	4	1.8	3	2.0	7	5.7	
Often need verbal explanations of graphs and diagrams to understand them.	Agree	110	74.3	158	72.8	123	80.4	88	71.5	0.036*
	Neutral	35	23.6	48	22.1	26	17.0	23	18.7	
	Disagree	3	2.0	11	5.1	4	2.6	12	9.8	
When performing an unfamiliar task, I prefer to have someone talk me through it.	Agree	124	83.8	181	83.4	131	85.6	96	78.0	0.173
	Neutral	22	14.9	24	11.1	19	12.4	21	17.1	
	Disagree	2	1.4	12	5.5	3	2.0	6	4.9	
Remember material better when I summarize it out loud.	Agree	78	52.7	136	62.7	103	67.3	88	71.5	0.044*
	Neutral	50	33.8	57	26.3	32	20.9	26	21.1	
	Disagree	20	13.5	24	11.1	18	11.8	9	7.3	
It is difficult for me to study in a noisy area.	Agree	116	78.4	180	82.9	118	77.1	96	78.0	0.136
	Neutral	27	18.2	21	9.7	28	18.3	20	16.3	
	Disagree	5	3.4	16	7.4	7	4.6	7	5.7	
Prefer to listen to a speech than to read the same material.	Agree	92	62.2	142	65.4	88	57.5	67	54.5	0.531
	Neutral	44	29.7	58	26.7	50	32.7	45	36.6	
	Disagree	12	8.1	17	7.8	15	9.8	11	8.9	
Remember more about a subject by listening to a lecture than by reading a text.	Agree	89	60.1	153	70.5	86	56.2	70	56.9	0.024*
	Neutral	51	34.5	50	23.0	51	33.3	38	30.9	
	Disagree	8	5.4	14	6.5	16	10.5	15	12.2	
Enjoy learning through collective learning rather than self-learning.	Agree	87	58.8	136	62.7	91	59.5	82	66.7	0.431
	Neutral	45	30.4	60	27.6	53	34.6	30	24.4	
	Disagree	16	10.8	21	9.7	9	5.9	11	8.9	
Enjoy studying foreign languages.	Agree	86	58.1	134	61.8	98	64.1	81	65.9	0.114
	Neutral	53	35.8	67	30.9	49	32.0	28	22.8	
	Disagree	9	6.1	16	7.4	6	3.9	14	11.4	

Table (3): Kinesthetic learning style preferred by four academic year's nursing students (N=641).

Kinesthetic learning style	Responses	First year (N=148)		Second year (N=217)		Third year (N=153)		Fourth year (N=123)		P. value
		No.	%	No.	%	No.	%	No.	%	
Enjoy classroom activities, where I can participate (practical activities in the labs).	Agree	51	<b>34.5</b>	67	30.9	29	19.0	25	20.3	<b>0.001**</b>
	Neutral	53	35.8	69	31.8	45	29.4	37	30.1	
	Disagree	44	29.7	81	37.3	79	51.6	61	49.6	
Enjoy working with my hands.	Agree	94	<b>63.5</b>	110	50.7	94	61.4	58	47.2	<b>0.001**</b>
	Neutral	36	24.3	61	28.1	38	24.8	25	20.3	
	Disagree	18	12.2	46	21.2	21	13.7	40	32.5	
Think better when I have the freedom to move.	Agree	116	78.4	162	74.7	118	77.1	101	82.1	0.705
	Neutral	26	17.6	42	19.4	29	19.0	19	15.4	
	Disagree	6	4.1	13	6.0	6	3.9	3	2.4	
When learning something, I often ignore the directions and just start doing it.	Agree	19	12.8	35	16.1	27	17.6	16	13.0	0.612
	Neutral	55	37.2	68	31.3	45	29.4	47	38.2	
	Disagree	74	50.0	114	52.5	81	52.9	60	48.8	
Often tap my foot or pencil when thinking.	Agree	94	<b>63.5</b>	116	53.5	78	51.0	72	58.5	<b>0.012*</b>
	Neutral	34	23.0	50	23.0	51	33.3	37	30.1	
	Disagree	20	13.5	51	23.5	24	15.7	14	11.4	
When I'm trying to explain something to someone else I use my hands a lot.	Agree	61	41.2	88	40.6	56	36.6	50	40.7	0.792
	Neutral	58	39.2	97	44.7	66	43.1	52	42.3	
	Disagree	29	19.6	32	14.7	31	20.3	21	17.1	
Get restless when I am required to sit still for an extended period of time.	Agree	138	<b>93.2</b>	188	86.6	119	77.8	109	88.6	<b>0.005**</b>
	Neutral	5	3.4	17	7.8	24	15.7	8	6.5	
	Disagree	5	3.4	12	5.5	10	6.5	6	4.9	
When to learning a new vocabulary, I am writing words several times.	Agree	112	75.7	149	68.7	112	73.2	81	65.9	0.301
	Neutral	33	22.3	54	24.9	32	20.9	36	29.3	
	Disagree	3	2.0	14	6.5	9	5.9	6	4.9	
Have high athletic abilities.	Agree	20	13.5	29	13.4	30	<b>19.6</b>	20	16.3	<b>0.006**</b>
	Neutral	61	41.2	84	38.7	80	52.3	60	48.8	
	Disagree	67	45.3	104	47.9	43	28.1	43	35.0	

**Table (4): Visual, auditory, kinesthetic and combination learning style preferred by four academic year's nursing students (N=641).**

Academic year		Preferred learning styles						
		Uni –mode learning styles			Bi –mode learning styles			Multi or combination –mode learning styles
		V Maximum Score = 45	A Maximum Score = 45	K Maximum Score = 45	VA Maximum Score = 90	AK Maximum Score = 90	VK Maximum Score = 90	VAK Maximum Score =135
First year (N=148)	Mean±SD	32.3±5.6	34.6±5.5	30.5±4.8	66.9+10.11	65.1+10.3	62.8+10.4	97.4+10.6
	% of prefer	126(85.1%)	125(84.5%)	136(91.9%)	73(49.3%)	80(54.1%)	68(45.9%)	37(25.0%)
Second year (N=217)	Mean±SD	31.6±5.5	35.8±5.0	28.9±5.4	67.4+10.5	64.7+10.4	60.5+10.9	96.3+11.2
	% of prefer	177(81.6%)	191(88.0%)	185(85.3%)	111(51.2%)	90(41.5%)	130(59.9%)	55(25.3%)
Third year (N=153)	Mean±SD	33.5±5.6	35.4±5.9	29.0±5.7	68.9+11.5	64.4+11.6	62.5+11.3	98.0+12.9
	% of prefer	136(88.9%)	127(83.0%)	126(82.4%)	87(56.9%)	90(58.8%)	68(44.4%)	41(26.8%)
Fourth year (N=123)	Mean±SD	32.7±6.1	34.9±6.1	28.9±5.5	67.6+12.2	63.8+11.6	61.6+11.6	96.5+13.8
	% of prefer	107(87.0%)	101(82.1%)	101(82.1%)	76(61.8%)	73(59.3%)	54(43.9%)	34(27.6%)
Total (N=641)	Mean±SD	35.3±5.6	32.5±5.7	29.3±5.4	67.8+11.3	61.8+11.1	64.6+11.0	97.1+16.7
	% of prefer	546(85.2%)	544(84.9%)	548(85.5%)	347(54.1%)	333(51.9%)	320(49.9%)	167(26.0%)
P. value		0.237 <sup>Ns</sup>	0.417 <sup>Ns</sup>	0.064 <sup>Ns</sup>	0.137 <sup>Ns</sup>	0.002*	0.004*	0.951 <sup>Ns</sup>
<ul style="list-style-type: none"> <li>• Uni ↔ Indicates to students prefer one learning styles (Maximum score = 45 &amp; Minimum score = 9)</li> <li>• Bi ↔ Indicates to students prefer two learning styles (Maximum score = 90 &amp; Minimum score = 18)</li> <li>• Multi ↔ Indicates to students prefer three learning styles (Maximum score = 135 &amp; Minimum score = 27)</li> </ul>								

**Table (5): Academic achievement by grade point average (GPA) for four academic year's nursing students (N=641).**

Academic year	Excellent		Very good		Good		Satisfactory		Fail	
	No.	%	No.	%	No.	%	No.	%	No.	%
First year (n=148)	23	15.5	53	35.8	25	16.9	2	1.4	45	30.4
Second year (n=217)	85	39.2	94	43.3	13	6.0	0	0.0	25	11.5
Third year (n=153)	47	30.7	68	44.4	15	9.8	0	0.0	23	15.0
Fourth year (n=123)	7	5.7	52	42.3	31	25.2	1	0.8	32	26.0



Table (6) Part I: Correlation matrix between preferred learning styles by four academic year's nursing students and their academic achievement by grade point average (GPA) (N=641).

Learning styles Part (I)	First year(n=148)						Second year(n=217)					
	Excellent	Very good	Good	satisfactory	Fall	Correlation matrix	Excellent	Very good	Good	satisfactory	Fall	Correlation matrix
<b>Visual learning style</b>												
Low	3(2)	5(3.4)	5(3.4)	1(0.7)	8(5.4)	<b>r =0.65**</b>	18(8.3)	20(9.2)	1(0.5)	0(0)	1(0.5)	<b>r =0.24<sup>NR</sup></b>
Averaged	16(10.8)	38(25.7)	17(11.5)	1(0.7)	31(20.9)		56(25.8)	67(30.9)	11(5.1)	0(0)	18(8.3)	
High	4(2.7)	10(6.8)	3(2)	0(0)	6(4.1)		11(5.1)	7(3.2)	1(0.5)	0(0)	6(2.8)	
<b>Auditory learning style</b>												
Low	5(3.4)	8(5.4)	3(2)	0(0)	7(4.7)	<b>r =0.11<sup>NR</sup></b>	10(4.6)	12(5.5)	1(0.5)	0(0)	3(1.4)	<b>r =0.66**</b>
Averaged	17(11.5)	35(23.6)	19(12.8)	1(0.7)	33(22.3)		62(28.6)	66(30.4)	12(5.5)	0(0)	18(8.3)	
High	1(0.7)	10(6.8)	3(2)	1(0.7)	5(3.4)		13(6)	16(7.4)	0(0)	0(0)	4(1.8)	
<b>Kinesthetic learning style</b>												
Low	0(0)	7(4.7)	3(2)	1(0.7)	2(1.4)	<b>r =0.74**</b>	16(7.4)	14(6.5)	0(0)	0(0)	2(0.9)	<b>r =0.61**</b>
Averaged	21(14.2)	35(23.6)	19(12.8)	2(1.4)	37(25)		63(29)	74(34.1)	11(5.1)	0(0)	17(7.8)	
High	2(1.4)	11(7.4)	3(2)	0(0)	6(4.1)		6(2.8)	6(2.8)	2(0.9)	0(0)	6(2.8)	
<b>Combination learning style</b>												
Low	3(2)	7(4.7)	3(2)	0(0)	8(5.4)	<b>r =0.81**</b>	14(6.5)	13(6)	0(0)	0(0)	2(0.9)	<b>r =0.84**</b>
Averaged	19(12.8)	39(26.4)	20(13.5)	1(0.7)	32(21.6)		61(28.1)	73(33.6)	13(6)	0(0)	17(7.8)	
High	1(0.7)	7(4.7)	2(1.4)	1(0.7)	5(3.4)		10(4.6)	8(3.7)	0(0)	0(0)	6(2.8)	

Cont., 6 - Part II

Learning styles Part (II)	Third year(n=153)						Fourth year(n=123)					
	Excellent	Very good	Good	satisfactory	Fall	Correlation matrix	Excellent	Very good	Good	satisfactory	Fall	Correlation matrix
<b>Visual learning style</b>												
Low	2(1.3)	7(4.6)	5(3.3)	0(0)	3(2)	<b>r =0.58*</b>	2(1.6)	4(3.3)	4(3.3)	0(0)	6(4.9)	<b>r =0.63**</b>
Averaged	38(24.8)	42(27.5)	9(5.9)	0(0)	15(9.8)		3(2.4)	37(30.1)	20(16.3)	0(0)	22(17.9)	
High	7(4.6)	19(12.4)	1(0.7)	0(0)	5(3.3)		2(1.6)	11(8.9)	7(5.7)	1(0.8)	4(3.3)	
<b>Auditory learning style</b>												
Low	5(3.3)	13(8.5)	6(3.9)	0(0)	2(1.3)	<b>r =0.32</b>	1(0.8)	7(5.7)	8(6.5)	0(0)	6(4.9)	<b>r =0.62**</b>
Averaged	31(20.3)	43(28.1)	5(3.3)	0(0)	17(11.1)		4(3.3)	35(28.5)	18(14.6)	1(0.8)	22(17.9)	
High	11(7.2)	12(7.8)	4(2.6)	0(0)	4(2.6)		2(1.6)	10(8.1)	5(4.1)	0(0)	4(3.3)	
<b>Kinesthetic learning style</b>												
Low	9(5.9)	11(7.2)	3(2)	0(0)	4(2.6)	<b>r =0.62**</b>	1(0.8)	9(7.3)	6(4.9)	0(0)	6(4.9)	<b>r =0.35</b>
Averaged	34(22.2)	49(32)	10(6.5)	0(0)	15(9.8)		5(4.1)	40(32.5)	23(18.7)	1(0.8)	21(17.1)	
High	4(2.6)	8(5.2)	2(1.3)	0(0)	4(2.6)		1(0.8)	3(2.4)	2(1.6)	0(0)	5(4.1)	
<b>Combination learning style</b>												
Low	2(1.3)	7(4.6)	5(3.3)	0(0)	4(2.6)	<b>r =0.79**</b>	2(1.6)	5(4.1)	10(8.1)	0(0)	7(5.7)	<b>r =0.76**</b>
Averaged	37(24.2)	49(32)	8(5.2)	0(0)	13(8.5)		3(2.4)	36(29.3)	15(12.2)	1(0.8)	21(17.1)	
High	8(5.2)	12(7.8)	2(1.3)	0(0)	6(3.9)		2(1.6)	11(8.9)	6(4.9)	0(0)	4(3.3)	

N.B: \*\* $r < 0.6 > 10.0$  strong\*  $r < 0.4 > 0.6$  moderate $r < 0.2 > 0.4$  mild

NR: Non-correlation

The visual learning style preferred by four academic year's nursing students displayed in the

**Table (1).** There was a statistical significant difference between four academic year's nursing students as they reported that their notes have lots of pictures, arrows, or other symbols and draw pictures such as tables, maps and graphs to help them understand the material better and prefer the professors when to writing information on the board during lecture ( $P \leq 0.05$ ).

**Table (2):** Showed the auditory learning style preferred by four academic year's nursing students. There was a statistically significant difference between four academic year's nursing students as they often need verbal explanations of graphs and diagrams to understand them, remember material better when they summarize it out loud and remember more about a subject by listening to a lecture than by reading a text ( $P \leq 0.05$ ).

The kinesthetic learning style preferred by four academic year's nursing students presented in **Table (3)**. There was a statistical significant difference between four academic year's nursing students as they enjoy classroom activities, where they can participate in practical activities in the labs, enjoy working with their hands, often tap their foot or pencil when thinking, get restless when they are required to sit still for an extended period of time and have high athletic abilities ( $P \leq 0.05$ ).

**Table (4):** Displayed the visual, auditory, kinesthetic and combination learning styles preferred by four academic year's nursing students. It revealed the highest percentage of the study sample according to total preferred learning styles were Uni – mode learning styles. Furthermore, the most prominent mode of information presentation among all four academic year's nursing students was kinesthetic, visual and auditory learning styles (85.5%, 85.2% & 84.9%) respectively.

Consequently, the highest percentage of the preferred learning style according to (Uni-mode) learning styles in the first year, nursing students was kinesthetic learning style (91.9%). As regards to the second year, nursing students prefer auditory learning style (88.0%). Regarding the third and fourth year, nursing students prefer visual learning style (88.9% & 87.0%) respectively.

Moreover, the highest percentage of the preferred learning style according to (Bi- mode) learning styles. In the

first and third year was auditory and kinesthetic learning style (54.1% & 58.8) respectively, while in the second year was visual and kinesthetic learning style (59.9%). Lastly, the fourth year was visual and auditory learning style (61.8%). Whereas, there was a statistically significant difference among four

academic year's nursing students regarding the auditory with kinesthetic, and visual with kinesthetic learning styles ( $P \leq 0.05$ ).

Finally, the highest percentage of the preferred learning style according to (Multi- mode or combination) learning styles was in the fourth year (27.6%), compared among four nursing academic year's.

Academic achievement by grade point average (GPA) for four academic year's nursing students is depicted in the **Table (5)**. The highest percentage of the first year nursing students had the very good and fail grade (35.8% & 30.4%), respectively. While in the second year nursing students had very good and excellent grade (43.3% & 39.2%) respectively. Similarly, in the third year, nursing students had the very good and excellent grade (44.4% & 30.7%) respectively. Finally, the fourth year nursing students had the very good grade (42.3%).

**Table (6):** Demonstrated the correlation matrix between preferred learning styles by four academic year's nursing students and their academic achievement by grade point average (GPA). As regards the first year nursing students, there was found a strong correlation between visual, kinesthetic and combination learning styles and their academic achievement ( $r = 0.65^{**}$ ,  $0.74^{**}$  &  $0.81^{**}$ ) respectively. While in the second year nursing students, there was found a strong correlation between auditory, kinesthetic and combination learning styles and their academic achievement ( $r = 0.66^{**}$ ,  $0.61^{**}$  &  $0.84^{**}$ ) respectively. Concerning the third year nursing students, there was found a strong correlation between kinesthetic and combination learning style and their academic achievement ( $r = 0.62^{**}$  &  $0.79^{**}$ ) respectively. Meanwhile, a moderate and mild correlation between visual and auditory learning styles and their academic achievement ( $r = 0.58^*$  &  $0.32$ ) respectively. Finally, as regards to fourth year nursing students, there was found a strong correlation between visual, auditory and combination learning styles and their academic achievement ( $r = 0.63^{**}$ ,  $0.62^{**}$  &  $0.76^{**}$ ) respectively. Meanwhile, a mild correlation between kinesthetic learning style and their academic achievement ( $r = 0.35$ ).

## Discussion

Teaching nursing is a complex activity that integrates art and science of nursing process and clinical practice into the teaching-learning process. The nursing curriculum is designed to expose the learner to a variety of learning environments including classroom, nursing laboratories, clinical areas in various health care institutions. It is important to

understand the theoretical foundation for describing how people learn and perform within an organization. If learning methods were to differ from teaching methods staff will never develop a full understanding of the subject and theory can never be completely applied to practice. Much of the available research conclusions that teaching should not be confined to the classroom and should include practical as well as theoretical aspects. There are wide individual differences among learners. Some are ear-oriented, some can be helped through visual demonstration while others learn better by doing. The use of a variety of audio-visual aids helps in meeting the needs of different types of students. ( **Mohamed & Helal, 2012**)

Learning styles help students learn more easily, remember information longer, think more positively about school and learning subjects, achieve academic goals quickly and utilize information effectively. Mismatched teaching and learning styles can lead to poor performance, challenges and uncomfortable learning experiences for the students. Thus, identifying students learning style preferences (LSPs) is essential for providing successful learning opportunities. (**Abdollahimohammad, & Ja'afar, 2014**)

Consequently, the current study was aimed to determine the learning styles preferred by the faculty of nursing students and its impact on their academic achievement and compare preferred learning style among four academic years nursing students enrolled in the Faculty of Nursing at Assiut University.

The present study findings regarding the visual learning style preferred by four academic year's nursing students displayed in the table (1). The highest percentage of the third year nursing students reported that their notes have lots of pictures, arrows, or other symbols and draw pictures such as tables, maps and graphs to help them understand the material better. The highest percentage of the fourth year nursing students prefer the professors when to writing information on the board during lecture. These findings supported by the findings in the table (4) that revealed the preferred learning style in the third and fourth year nursing students was visual learning style. Furthermore, there was a statistically significant difference between four academic year's nursing students.

Otherwise, regarding the auditory learning style preferred by four academic year's nursing students, the highest percentage of the third year nursing students often need verbal explanations of graphs and diagrams to understand them. The highest percentage of the fourth year nursing students remember material better when to summarizing it out loud. These findings in the table (2) contradicted by the findings

in the table (4) that revealed the preferred learning style in the third and fourth year nursing students was visual learning style. This may be related to the fact that the third and fourth year nursing students were more prone to receive information and restored by visual demonstration because the nature of nursing curriculum course includes obstetrics and gynecological, pediatric, critical, community health and geriatric nursing, may need that.

With the same line, the present study findings in the table (2) showed that the highest percentage of the second year nursing students remember more about a subject by listening to a lecture than by reading a text. These findings supported by the findings in the table (4) that revealed the preferred learning style in the second year, nursing students was auditory learning style. This may be related to the fact that the second-year nursing students were more prone to receive information and restored by auditory or lecture presentation because the nature of nursing curriculum course includes medical and surgical, psychiatric nursing, may need that. Furthermore, there was a statistically significant difference between four academic year's nursing students.

As regards the kinesthetic learning style preferred by four academic year's nursing students. The highest percentage of the first year nursing students enjoy classroom activities, where they can participate in practical activities in the labs, enjoy working with their hands, often tap their foot or pencil when thinking, get restless when they are required to sit still for an extended period of time (Table 3). These findings supported by the findings in the table (4) that revealed the preferred learning style in the first year nursing students was kinesthetic learning style. This may be related to the fact that the first year nursing students were more prone to receive information and restored by practical areas or sections because the nature of nursing curriculum course includes fundamentals of the adult nursing, medical academic course, and computer science, may need that.

With the same line, the present study findings in the table (3) showed that the highest percentage of the third year nursing students have high athletic abilities. These findings contradicted by the findings in the table (4) that revealed the preferred learning style in the third year nursing students was visual learning style. Furthermore, there was a statistically significant difference between four academic year's nursing students.

The present study findings regarding the visual, auditory, kinesthetic and combination learning styles preferred by four academic year's nursing students, demonstrated in the table (4). The highest percentage of the study sample according to total preferred learning styles were preferred Uni – mode learning

styles. In agreement with the study findings of **(Mohamed, & Helal, 2012)** study of the learning styles of community health nursing students at Faculty of Nursing and Technical Institute of Nursing - In Alexandria based on the VARK (Visual, Auditory, Reading and Kinesthetic) model of learning style, found that the majority of nursing students in both faculties of nursing and technical institute of nursing are unimodal. Also, **Abou – Shousha, & Abd El Rahman, (2014)**. study of the learning styles of nursing administration students and their teaching mode efficiency at Damanhour Faculty of Nursing, found that the majority of students had a unique learning mode preference and more than one third preferred two modes of presentation and discussed that this may be related to the learners, who prefer mode of learning that is related to the sensory modality or the neural system by they prefer to take in the new information; although which learners can use all sensory modes of learning.

However, these present study findings disagreement with previous studies of **(AlKhasawneh, 2013)** study of the using VARK (Visual, Auditory, Reading and Kinesthetic) model to assess changes in learning preferences of nursing students at a public university in Jordan, found that almost fifty-five of students have a multimodal learning preference, forty-five of students who have one dominant preference. Also, **Anu, et al., (2012)** study of the assessment of learning style preference among undergraduate medical students - using VAK (Visual, Auditory and Kinesthetic) assessment tool, found that the most preferred learning style of the medical students about more than two third of them have preferred multiple learning styles and **(Abidin, et al., 2011)** study of the learning styles and overall academic achievement in a specific educational system, found that the majority of students surveyed have multiple learning styles or a combination of different learning styles.

Consequently, the present study findings in the table (4) revealed that the preferred learning style in the first year nursing students was kinesthetic learning style. As regards to the second year, nursing students preferred auditory learning style. Regarding the third and fourth year, nursing students preferred visual learning style. In agreement with the study findings of **(Fleming, 2010)** study of the VARK (visual, auditory, reading and kinesthetic) highlighted the different learning capabilities of students straight from high school and university, with the emphasis that first year students prefer kinesthetic modes of information presentation, such as practical sessions, or case studies during tutorial sessions; however, second, third and fourth year students develop or mature in their learning to prefer visual, aural or read/write modes as they tackle more challenging

manual skills projects in clinical placements and, concluded that students can develop the ability to adopt different preferred modes of information presentation depending on their current situation or activity, such as kinesthetic mode during a practical class or aural mode in lectures, which may also need to be developed in students as they move from high school to gratify the increased workload and emphasis on self-learning. Otherwise, these findings contradicted with the previous study of **(Abou – Shousha, & Abd El Rahman, 2014)**. found that the most favorable learning style for the nursing students in both third and fourth year was the kinesthetic learning style.

With the same line, the present study findings in the table (4) showed that the most prominent mode of information presentation among all four academic year's nursing students was kinesthetic, followed by visual and then auditory learning styles. These findings completely congruence with the previous study of **(Dongui-is, et al., 2014)** study of the learning and teaching styles of student nurses at the school of Nursing, found that the majority of student nurses is kinesthetic learning style. Also, these findings partially congruence with the previous study of **(Mohamed & Helal, 2012)** found that the most preferred learning style among nursing students of faculty of nursing is auditory style; while, among technical institute, the nursing student is kinesthetic style. Otherwise, these findings contradicted with the previous studies of **(Ozbaş, 2011)** study of the investigation of the learning styles of University students, found that the most common learning style about half of the students is visual learning style. While another half of the students have kinesthetic and auditory learning mode.

Furthermore, the current study findings in the table (4) illustrated that there was a statistically significant difference among four academic year's nursing students according to preferred (Bi- mode) learning styles regarding the auditory with kinesthetic, and visual with kinesthetic learning styles. These findings congruence with previous studies of **(Rusian, 2005)** study of the preferred learning styles for respiratory care students at Texas state university, found that there a statistically significant difference between learning styles and years of study. Also, **Mohamed, & Helal, (2012)** found a statistically significant difference between learning styles and years of study and **(Eittah, & Ahmed, 2013)** found highly statistically significant difference regarding the academic year and learning style. **(Abou - Shousha & Abd El Rahman, 2014)** found a significant difference between studying year and learning styles preference.

The current study findings in the table (6) demonstrated the correlation between preferred learning styles by four academic year's nursing students and their academic achievement through grade point average (GPA). As regards the first year nursing students, there was found a positive strong correlation between preferred kinesthetic learning style and their academic achievement. These findings partially supported by the findings in the table (5) that revealed the highest percentage of their academic achievement about one-third of them was very good grade. This may be related to the fact that preferred kinesthetic learning style was greater matching with nature of nursing curriculum course that included fundamentals of the adult nursing and computer science. Whereas, slightly less than one-third of them had the fail grade. This may be related to the fact that preferred kinesthetic learning style was mismatching with nature of another nursing curriculum course that included medical academic courses like anatomy, microbiology, and parasitology, this may need them to use more than one preferred learning style to be more impact on their academic achievement. This agreement with (Vaishnav, 2013) study of the learning style and academic achievement of secondary school students, that found there was a positive high correlation between kinesthetic learning style and their academic achievements.

Regarding the second year nursing students, there was found a positive strong correlation between preferred auditory learning style and their academic achievement. These findings supported by the findings in the table (5) that revealed the highest percentage of their academic achievement had very good, followed by excellent grade. This may be related to the fact that preferred auditory learning style was greater matching with nature of nursing curriculum course that included medical and surgical, psychiatric nursing. At the same line, with this respect (Vaishnav, 2013) found that there was a positive low correlation between auditory learners and their academic achievements.

Concerning the third year nursing students, there was found a positive moderate correlation between preferred visual learning style and their academic achievement. These findings supported by the findings in the table (5) that revealed the highest percentage of their academic achievement was very good, followed excellent grade. This may be related to the fact that preferred visual learning style was relatively matching with nature of nursing curriculum course that included obstetrics and gynecological, pediatric nursing, this may need them to use more than one preferred learning style to be more impact on their academic achievement. Also, this may be related to the fact that other factors may have a

greater impact on their academic achievement than their preferred visual learning style. These findings consistent with Godwin, & Bassey, (2013) revealed that several factors affecting students' academic achievement included students related factors like age, gender, educational level, motivation and recently learning styles, teachers related factors like teaching styles and methods, societal factors, governmental infrastructural problem and language problem.

Finally, as regards to fourth year nursing students, there was found a positive strong correlation between preferred visual learning style and their academic achievement. These findings supported by the findings in the table (5) that revealed the highest percentage of their academic achievement was very good grade. This may be related to the fact that preferred visual learning style was greater matching with nature of nursing curriculum course that included critical, community health and geriatric nursing. At the same line, with this respect (Vaishnav, 2013) found that there was very a negligible correlation between visual learners and their academic achievements.

Otherwise, these findings contradicted with the previous studies of (Mohamed, & Helal, 2012) failure to find a statistically significant difference between the different learning styles and academic achievement. Also, Ghaffari, et al., (2013) study of the analysis of learning styles and their relationship to academic achievement in medical students of basic sciences program at Tabriz University of Medical Sciences, found that no significant relationship between students learning styles and their academic achievement.

Furthermore, according to these findings concluded the combination of learning style has a greater impact on their academic achievement than use one preferred learning style. This may be related to the fact that nursing education is a complex activity that integrates art and science of nursing process and clinical practice into the teaching-learning process. This findings consistent with Abidin, et al., (2011), study of the learning styles and overall academic achievement in a specific educational system, concluded that students retain 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say as they talk, and 90% of what they say as they do something. These facts revealed that each learning style has its own strengths and weaknesses. Some students learn in many ways while others might only favor one or two. Those students with multiple learning styles tend to gain more and obtain higher scores compared to those who rely solely on one style. Also, (Vaishnav, 2013) found that different learning styles

are more effective on academic achievements of students than use one preferred learning style.

### Conclusion & Recommendations

Based on the present study findings, it concluded that the highest percentage of the study sample according to total preferred learning styles in the four academic year's nursing students were preferred Uni – mode learning styles. Overall, the combination of learning style has a greater impact on their academic achievement than use one preferred learning style.

#### The current study suggested recommendations included the following

- Encourage nursing students at Faculty of Nursing - Assiut University to use all three learning styles when appropriate than to rely solely on one preferred learning style.
- Nursing educators should be aware of their own teaching styles and how to compatible with their students learning styles.
- Also, guides nursing educators to select the appropriate instructional methods, aids, and materials and how to compatible with their students learning styles.
- Conduct a workshop for nursing educators about "the importance of learning styles to improve learning and teaching process.
- The study recommended further, future researchers to verify the relationship between learning styles and teaching styles and also explore the other factors that may have a greater impact on their academic achievement.

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