The Factor Structure of Learning Styles in Light of Entwistle and Tait's Model among Students at Najran University

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Abstract:

The present study aimed to investigate the nature of the factor structure for the styles of learning in light Entwistle and Tait's Model for Students at Najran University, the effect of gender (male - female) on the degrees of learning styles in light of Entwistle and Tait's Model among Students at Najran University, and the effect of specialization (humanities - scientific) on the degrees of learning styles in light of Entwistle and Tait's Model among Students at Najran University. The study sample consisted of(400) students at Najran University students. The scale of Entwistle and Tait's model oflearning styles was applied." The findings showed that the saturation of the three dimensions of learning stylesof one general factor with a latent root (4.584).This factor (70.285) which is interpreted within the total variation refers that there are statistically significant differences at the level of (0.01) between male and female students in learning styles in favor of female students. There are also statistically significant differences at the level of (0.01) between specialization "humanities and scientific" in learning styles in favor of scientific faculties. However, there is no a statistically significant interaction between the two variables of the study: gender and specialization in the learning styles of students at Najran University.

1. Introduction:

Learning styles has gained a great rankin the field of education during the past three decades, as one of the main components of the efforts that have been exerted in order to understand the factors affecting the educational-learning process.

The research started with learning styles and strategies in different regions, but in sync times. In Gothenburg, Sweden there were Martton, et al. In the United Kingdom, there were Entwistle et al. In Newcastle, Australia, there wereBiggs, et al. All of them used different methods and tools in their studies (Clark, 1986). In Gothenburg, (Marton& saljo, 1976) conducted some experiments to investigate how students tackle the task of reading a text, and link between the quality of learning outcomes and the learning style adopted, thus reaching two styles of learning: deep style and surface style. These findings were supported by other researchers whohave applied different search techniques (Newble& Hajka, 1991).

Ramsden added a third style, called the strategic style in which students showed high levels in the strategic organization of their time and mental abilities to gain high grades (Entwistle & Waterston, 1988).

This current study adopts Entwistle's model (Entwistle, 1981). This model depends onthe relationship between the learning styles of the individual and the level of learning outcomes. This model contains three trends associated with different motives, resulting in specific learning styles used by the individual in different learning situations during the learning process that leads to different levels of comprehension, and the most important trends that result in different learning styles: Personal Meaning Orientation, Reproducing Orientation, and Achievement Orientation. Based on these trends, Entwistle claims that there are three methods of learning:

(A) Deep Style: those who master this style are characterized by their ability and willingness to search for meaning and use of similarity and uniformity in the idea description in an integrated manner, as well as linking them to previous experiences. They also tend to use evidence in learning.

(B) Surface Style: this style distinguishes those who are able to remember some facts related to the questions about a subject. They rely in their studies on clear instructions and specific curriculum, memorization, and logical stylein searching detailed facts in details.

(C) Strategic Style: this style distinguishes those who are unable to organize revision times for lessons and

negative attitudes toward the study, external motivation to learn in order to pass only. They always try to gain some hints and indications from the teacher in the learning situation.

In light of this, a plenty of studies were conducted such the study by Ghanimah (1994), which aimed to verify the factor reliability of the questionnaire on Entwistle's learning styles." The findings showed that there are three basic factors: deep style, surface style, and strategic style.

Abu Nashi (1996) conducted a study which aimed to perform a factor analysis for the learning styles in the light of the questionnaire of Entwistle's learning styles, and the questionnaire of learning processes for "Schmeck" and the questionnaire study processes for "Biggs". The findings of analysis showed four factors: variousprocesses, "achievement deep processes ", surface processes, deep learning style, and organized study processes, the thing that emphasizes the independence and distinction of Entwistle's learning styles from the rest of the styles and processes of learning and study.

 (Abdel-Gani, 1996) presented a study aimed to identify the preferred learning style in the Department of English, Faculty of Education, as well as to identify the differences among students with high and low academic achievement in their adoption to different learning styles. The findings indicated that English language students prefer the achievement learning style in comparison with other learning styles. There were also statistically significant differences between students with high achievement and their low achievement classmates in adopting Meaning orientation style in favor of students with high achievement. Moreover, the findings indicated to the predictability of students' learning styles through their academic achievement.

 (Duff, 1997) conducted a study which aimed to verify the validity and reliability of the short version of the questionnaire of Entwistle's learning styles. The findings of the study showed the questionnaire in its various dimensions gained a high degree of validity and reliability. They also showed saturation of the questionnaire items in three factors: deep style, surface style, and strategic style.

Yasser and Kazem (1998) studied the learning styles by students at Garyounis University in light of the variables of gender, specialization, and block study. The study found that the sample students use learning styles invarious degrees, and the lowest average was in the methodology of the study. Findings did not show significant differences belonging to gender, specialization or block study in the four learning styles, except forthe variable of specialization in the style of keeping facts in favor of humanities students.

Smith & Tsang (1998) tried to investigate the reliability of the questionnaire of revised approaches to studying inventory and to compare learning styles among Hong Kong students and the United Kingdom, as well as the relationship between age, gender and learning styles. The findings indicated to the presence of three factors resulted in the factor analysis for each of both samples: deep style, surface style, and strategic style.The findings also indicated the lack of learning styles to predict academic performance for the sample of Hong Kong students, whereas there were weak links between learning styles and level of performance ofthe sample of the United Kingdom students. Moreover, there were statistically significant differences in the means of learning styles (deep, surface, strategic) between the two samples of the study for the benefit of the sample of the United Kingdom. In addition, there was a statistically significant interaction between gender and chronological age in the adoption of the students for the deep and strategic learning stylesin Hong Kong sampleonly, where older male students showed a greater tendency to adopt the deep style compared to younger females. As for the strategic style, older male students showed more tendency toward it, compared to older females.

Snyder (Snyder, 2000) attempted to examine the relationship between learning styles, intelligence, and academic achievement among high school students. The findings showed that there was a positive correlation between academic achievement and learning styles. The study also found statistically significant differences between male and female students in the measured learning styles.

 (Loo, 2004) conducted a study on a sample of 201 male and female university students; (113) males, and (88) females. A questionnaire by Kolb Inventory (LSI) learning styles (1985) was applied to them. The findings showed the variation of learning styles according to gender.

Balaawi (2012) studied the preferred learning styles among students at Qassim University, Saudi Arabia, and how different these styles are depending on the type of student, cumulative GPA, specialization, level of study, and place of residence. The findings showed statistically significant differences between male and female students in four types of learning styles, where males outweighed females in three of them: group, movement, and individuality. However, females outperformed males in the touch learning style. There were no differences between students in all learning styles are attributed to cumulative GPA and specialization.

In light of the above, the present study attempts to identify the nature of the factor structure of learning styles in light of Entwistle and Tait's Model and its relationship to gender and specialization among Najran University students.

2.1Problem of study:

The present study is determined by identifying the nature of the factor structure of learning styles in light of Entwistle and Tait's Model and its relationship to gender and specialization among Najran University students via answering the following questions:

1. What is the nature of the factor structure of learning styles in light of Entwistle and Tait's Model among Najran University students?

2-What is the effect of gender (males - females) on the degrees of learning stylesin light of Entwistle and Tait's Model among Najran University students?

3. What is the effect of specialization (humanities - scientific) on the degrees of learning styles in light of Entwistle and Tait's Modelamong Najran University students?

4. What is the effect of mutual interactions between type and specialization on learning styles in light Entwistle and Tait's Model among Najran University students?

2.2 Objectives of the study:

The present study aimed to identify:

1. The nature of the factor structure of learning styles in light Entwistle and Tait's Model among Najran University students.

2-The effectof gender (males - females) on the degrees of learning stylesin light of Entwistle and Tait's Model among Najran University students.

3-The effect of specialization (humanities - scientific) on the degrees of learning styles in light of Entwistle and Tait's Model among Najran University students.

4-The effect of mutual interactions between type and specialization on learning styles in light Entwistle and Tait's Model among Najran University students.

2.3Terminology of the study:

Learning style: psychologists use the concept of learning style to describe the various mediate processes used by the learner during his interaction with the learning stances, which leads him in the end to the development of new learning experiences to be added to the learner's cognitive stock. And this indicates that learning style is a description of the appropriate adaptive processes that make the student respond to various environment stimuli in line with hisemotional, social and physical characteristics, (Entwistle, 1991).

Learning styles are defined procedurally in the degrees gained by students in the three sub-scales of the questionnaire prepared by (Entwistle& Tait). They are deep style, surface style, and strategic style.

2.4 Hypotheses of the study:
Based on the findings of previous studies and research, the hypotheses were outlined as follows:

1-Learning styles in light Entwistle and Tait's Model among Najran University students are a generally latent factor circled by the other three seen factors.

2-There is a statistically significant interaction between the study variables gender (male and female) and specialization (humanities-scientific) and learning styles among Najran University students.

2.5 Limitations of the study:
The study is determined by human, time, and geography as follows:

-Human: The present study was restricted to Najran University male and female students.

-Time: The present study was determined by the academic year 2014-2015 for data collection, application of tools, analysis and discussion, and comprehensive findings of the studied phenomenon.

-Geography: The present study was limited to Najran University- Saudi Arabia.

3.Methodology and procedures:

A-Study approach:

To achieve the objectives of the present study, the descriptive approach was applied.

B-Population of the study:

The Population of the current study consists of Najran University students for the academic year 2014-2015.

 Preliminary sample of the study:

Preliminary sample consisted of 100 students at Najran University.

Basic sample of the study:

The study sample consisted of (400) students at Najran University, as shown in the following table:

Table 1. Basic Sample of the Study

Faculty	Males	Females
Education	30	50
Administrative sciences	30	50
Dentistry	30	-
Medical Sciences	30	-
Human Medicine	30	-
Pharmacy	30	-
Islamic Studies	-	50
Engineering	20	-
Arts and Sciences	-	50
Total	200	200

3.1Tools of the study:

The modified Questionnaire of learning styles:

The modified Questionnaire of learning styles is an upgraded version of the questionnaire of the learning styles prepared by Enttwistle& Ramsden, (1983), which measures the three styles of learning are: deep style, surface style, and strategic style as well as learning pathologies, which has been used in several psychological and educational studies and research in different cultures.

The current questionnaire was prepared by Enttwistle& Tait in 1994, and consists of (38) items of self-report to measure the attitudes and styles of learning among university students. It contains five sub scales: Deep style, surface style, strategic style- each has ten o items, as well as Lack of direction and self- academic confidence that has only four items. The participants' responses to the questionnaire are through choosing one the five –point Likert scale degrees, starting with strongly agree and ending with strongly disagree (Waugh & Addison, 1998).

  The researchers translated and introduced the scale to the specialist colleagues in the field of curriculum and methods of teaching English. It was also reviewed by five reviewers in the field of educational psychologyin order to ensure the language formulation for items. The researchers have made the modifications referred by the reviewers.

The items of the scale were ordered circularly (where every three consecutive items 1,2, and 3 belong to the deep style, items 4, 5 and 6 belong to the surface method, and items 7, 8, and 9 belong to the strategic style, and so on until the end of the scale). The responseswere graded as follows (very highly applicable,highly applicable, average applicable, lowly applicable, and not applicable). The degrees were also gradedby giving grades (1.2.3.4.5), respectively for positive items and vice versa for negative items (5.4.3.2.1) respectively. The following table shows the distribution of items on the scale:

Table 2. Distribution of items on the scale of learning styles

serial	Dimension	The numbers of items belonging to the dimension	No.of items
1	Deep style	1.2.3.10.11.12.19.20.21.28	10
2	Surface style	. 4.5.6.13.14.15.22.23.24.29	10
3	Strategic style	7.8.9.16.17.18.25.26.27.30.	10
Total scale			30

Table (2) shows that the final total number of the scale items is (30).

3.2 Reliability and validity of the scale:

1-relability of the scale: The following two methods were usedto calculate the scale reliability:

1-Reviewers' testimony:

The tool was reviewed by five experts with previous experience in this field to express their opinions on eachitem of the scale items. All of the five reviewers agreed on the appropriateness of the tool to measure the learning styles among the students of special diploma in education, the affiliation of each group of items for the dimension they belong to, the modification of some items, the exclusion of some of them, and the addition of some new items.

2-Reliability of internal consistency:

The reliability of the scale of learning styles was calculatedthrough internal consistency, which is the factor correlation between the degree of the items and the degree of the dimension it belongs, as well as the factor correlation between the degree of each dimension and the total degree of the scale. The findings were as follows:

Table 3.Internal consistency of the items of the learning styles scale with the dimension they belong to

First dimension			Second dimension			Third dimension		
S. no.	Item no.	Correlation	S. no.	Item no.	Correlation	S. no.	Item no.	Correlation
1	1	**0.70	1	4	**0.68	1	7	**0.63
2	2	**0.63	2	5	**0.66	2	8	**0.67
3	3	**0.71	3	6	**0.57	3	9	**0.79
4	10	**0.53	4	13	**0.58	4	16	**0.68
5	11	**0.62	5	14	**0.67	5	17	**0.59
6	12	**0.57	6	15	**0.57	6	18	**0.63
7	19	**0.63	7	22	**0.69	7	25	**0.59
8	20	**0.49	8	23	**0.70	8	26	**0.68
9	21	**0.58	9	24	**0.63	9	27	**0.59
10	28	**0.69	10	29	**0.72	10	30	**0.58

(**) a statistical significance at the level of 0.01.

Table (3) shows that all items are statistically significant at the level of (0.01), and the following table shows the internal consistency between the score of each dimension and the total score of the scale:

Table 4.Internal consistency between the scores of the dimensions of learning stylesscale and its total score

Dimension	Correlation	Level of significance
Deep style	0.81	0.01
Surface style	0.86	0.01
Strategic style	0.82	0.01

Table (4) shows that the correlations between dimensions overall scores and the total score of the scale are statistically significant at the level of (0.01), indicating that the scale is reliable in measuring the targeted learning styles in the current study.

Second, the validity of the scale:

Cronbach's alpha equation was applied to calculate validity and the method of test-retest. The findings were as follows:

Table 5.Ways and coefficients of the scale validity

No.	Dimension	Cronbach's alpha	Test –retest
1	Deep style	0.70	0.73
2	Surface style	0.80	0.78
3	Strategic style	0.83	0.81
4	Total scale	0.91	0.85

Table (5) shows that the scale dimensions receive a high degree of validity, where the validity coefficients ranged from 0.70 - 0.91, all of these values are high, thus indicating the validity of the scale.

4 Findings and discussion:

4.1 Findings of the first hypothesis and discussion:

The hypothesis "Learning styles in light Entwistle and Tait's Model among Najran University students are a generally latent factor circled by the other three seen factors.

To validate the first hypothesis,the factor exploratory analysis was used in the manner of the basic components with rotating the axes based on Varimax's way for the students' degrees in the three dimensions in the statistical program SPSS. The findings were as follows:

-The factor exploratory analysis:

The findings of the exploratory factor analysis for the three dimensions resulted in the saturation of all dimensions on one general factor. The findings were as follows:

Table 6.Matrix of Correlation coefficients among the three-dimensions

Learning styles dimensions	Deep style	Surface style	Strategic style
Deep style			
Surface style	**0.772		
Strategic style	**0.832	**0.691	

Table (6) shows that the values of the correlation coefficients among the three dimensions of learning styles are limited between (0.691, 0.832), which are statistically significant at the level of (0.01).

Table 7.Findings of the exploratory factor analysis of the three dimensions of self-regulatory learning style

Learning styles dimensions	Deep style	Surface style	Strategic style
Interactions	٠,753	٠,629	٠,687
Saturations	٠,788	٠,867	٠,629

Table (7) shows the saturation of the three dimensions of learning styles on one general factor with a latent root (4.584), and this factor explains (70.285) of the total variation.

In other words, the exploratory factor analysis provided evidence of the reliability of the factorstructure of the dimensions of learning styles, and they are a latent factor surroundedthe three dimensions.

It can be inferred that the dimensions of learning methods operate somewhat independently and contribute to one general factor, which is considered as a further proof for the upgraded model by Entwistle and Tait.

The findings of the current study matched with the findings of the studies by of each of the Ghnimah (1994), (Duff, 1997), (Waugh & Addison, 1998), (Smith & Tsang, 1998), (Busato& et al., 1998, and (Waugh, 1999). The study concluded to the existence of three factors brought about by the factor analysis: deep style, surface style, and strategic style.

4.2 Findings of the second hypothesis and discussion:

The second hypothesis "There is a statistically significant interaction between the study variables gender (male and female) and specialization (humanities-scientific) and learning styles among Najran University students."

To validate this hypothesis, the analysis of variation 2×2 (2 gender $\times$ 2 Specialization) was used to demonstrate the effect of the variables of gender and specialization and the interaction between them on performance on the scale of learning styles. The findings were as follows:

Table 8.The findings of the analysis of internal design variation 2 × 2 (2 gender × 2 Specialization) to indicate the effect of the variables of gender and specialization and the interaction between them on performance on the scale of learning styles

Variables	Source of variation	Sum of squares	Freedom degrees	variation	Alpha ratio	Level of significance
Overall degree of learning styles scale	Students (A)	15684.370	4	3921.043	642.201	0.01
	Specialization(B)	665.725	1	665.725	108.083	0.01
	Interaction A*B	298.963	4	298.963	1.695	No significance
	Inside groups (error)	1160.250	390	2.034		
	Total	18699.995	399			

Table (8) shows the following:

1-There are statistically significant differences at the level of (0.01) between male and female students in learning styles.

2-There are statistically significant differences at the level of (0.01) between specialization "humanities and scientific" in learning styles.

3-There is no statistically significant interaction between the two variables of the study: students (male and female) and specialization (humanities and scientific) on learning styles.

The finding of this hypothesis can be explained as follows:

1-The differences between male and female students in learning styles:

Table (8)shows that the value of "F" significance on the ratio between the variation of independent variable gender (male and female) and the variation inside groups (error) is statistically significant at the level of (0.01). To find out in favor of which variables the differences were, means for males and females were calculated (69.685, 77.370) in learning styles "total degree", respectively, which means that the differences are in favor of females.

This finding also means that females are superior to males to focus on the completion of the requirements of the assigned task to them only. They are also superior to them in concentration memorizing information to pass exams, receive a degree, and to succeed and excelin later stages.

In addition, the finding means that females are better than males in learning for comprehension, attention, activity, search for meaning, organization of new ideas, linking their knowledge witheveryday life experiences, and in the use of evidence-and link them with conclusion and vigorous interaction with content. They also prefer lectures and situationswith competition and motivation; therefore, their intention is to get the highest possible grades, to excel in the ability to organize and manage time and effort, to use the previous tests to predict the test questions, and to exert efforts in study.

Moreover, the findings matched withthose of the study by Snyder (2000), which showed females are superior to males in the visual, analytical, and individual learning style.

Additionally, the findings agreed with the findings of the study by (Loo, 2004), which reached the differences of learning styles according to gender.

However, the findings of the current study differed with those of the study by Yasser and Kazem(1998), which concluded that there were no statistically significant differences in learning styles attributed to gender.

2- The differences between specialization "humanities and scientific" in learning styles:

Table (8) shows that the value of "F" significance on the ratio between the variation of the independent variable, specialization (humanities and scientific) and the variation inside groups (error) is statistically significant at the level of (0.01). To find out to which variable the differences are in favor of, the means of specialization (humanities and scientific) were calculated (67.684, 75.876) in learning styles "total degree", respectively which means that the differences are in favor of scientific specialization.

This finding means that the students of scientific specialization are better than students of humanities specializationin learning for comprehension, attention, activity, search for meaning, organization of new ideas, linking their knowledge with everyday life experiences, and in the use of evidence-and link them with conclusion and vigorous interaction with content. They also prefer lectures and situations with competition and motivation; therefore, their intention is to get the highest possible grades, to excel in the ability to organize and manage time and effort, to use the previous tests to predict the test questions, and to exert efforts in study.

The findings of the current study differed with those of the study by Yasser and Kazem (1998), which concluded that there were no statistically significant differences in learning styles attributed to specialization.

They also differed with those of the study by Balawi (2012), which concluded that there were no statistically significant differences in learning styles attributed to specialization.

These findings are attributed to the difference in the course content for each of the humanities and scientific disciplines, as well as to the different nature of the tasks and difficulty. The researchers estimate that the difficulty perceived by the students of scientific disciplines regarding the content of subjects make them in a state of constant focus targeting mastery of learning, and getting high grades. They support themselves by comparing their performance to their classmates', as well as they try to revitalize themselves by making learning more fun, in an attempt to increase the internal motivation to complete the educational tasks.

This finding is also due to the nature of specialization. Students of scientific specialization needto implement learning styles effectively in the educational situation more than students of humanities specialization. Thus, they excel students of humanities specialization in learning styles.

3-Interaction between gender and specialization in learning styles:

Table (8) shows that the value of "F" significance on the ratio of the interaction variation between the two independent variables gender and specialization and the variation inside groups (error) is not statistically significant.

This refers to the lack of statistically significant interaction between the two variables ofthe study: gender and specialization in learning styles among Najran University students.

The finding means that the gender effect on learning style does not depend on the specialization of the student; humanities or scientific. The effect of specialization; humanities or scientific on learning styles does not depend on the gender of the student, male or female.

This finding is attributed to the learning styles based on the role of the learner (male or female, humanities or scientific) in learning for comprehension, attention, activity, search for meaning, organization of new ideas, linking their knowledge with everyday life experiences, and in the use of evidence-and link them with conclusion and vigorous interaction with content.

While students with learning surface style starts the learning situation with the intention to complete for the task requirements, and are characterized by focus and memorizing information for assessment and focus on separate elements without an integrated view of the subject, and the difficulty in understanding the readable context in the distinction between principles.

As for the students with the learning strategic style, they direct their intention to obtain the highest possible degrees, are characterized by the ability to organize and to manage time and effort, use previous tests to predict the test questions, and exert efforts to study.

This finding emphasizes that the use of learning styles is based on the role of the learner and not on gender and specialization.

5. Recommendations of the study:
In light of the findings of the current study, the researchers recommend the following:

1-The need for training programs for the development of learning styles among university students.

2-The need for advising seminars to enlighten students with learning styles they have, how to identify them and their effect on the educational process as well as the factors that lie behind the adoption of only one style and training on how to deal with information effectively .

3-Urging students to adopt the deep style in learning, and to focus on comprehension and application rather than memorization and recall.

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