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The study of learning styles and its relationship with educational achievement among Iranian high school students

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Abstract

Learning process has been one of the important aspects of human life. Student's learning styles are among the acquired factors. Based on their individual differences, different students use different learning styles for their learning. The main purpose of this study was to investigate the study of learning styles among high school students and its relationship with educational achievement. The statistical population under investigation included girl's high school students in the city of Ilam, Iran in the school year of 2014. The statistical population was consisted of 3958 students. The sample group was selected by the stratified random sampling method based on Morgan's table and through multiple-steps sampling. In order to assess the learning styles, the online questionnaire for learning styles, by Felder and Solomon is used. Collected data analyzed using SPSS software. According to correlation coefficients, among students in experiential field, there is a positive significant relationship between students learning styles who use Visual-Verbal learning style and their score means and among students in mathematics field, there is a positive significant relationship between students learning styles who use Active-Reflective and Visual-Verbal learning style and their score mean. In humanities field, there is no significant relationship between the students learning styles that use Sequential-Global, Visual-Verbal and Sensing-Intuitive learning styles and their score means. The Kruskal-Wallis test shown that there is a significant difference between humanities students score means with mathematics and experiential students that have Active-Reflective learning style. There is a significant difference between score means of grade two students in all fields in Active-Reflective and Visual-Verbal learning styles and similarly in grade three students in all fields in Active-Reflective and Sequential-Global learning styles.

Keywords: Learning styles; Felder and Solomon; Educational Achievement

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1. Introduction

Student's learning styles are among the acquired factors. Based on their individual differences, different students use different learning styles for their learning. Today, all theory-markers believe that individuals understand, organize, analyze, and process information and experiences in different ways. Despite all the different theories and models available in the field of learning styles. Learning styles are different between the two sexes. There is evidence that shows woman's learning style depends more on sympathy, collaboration and careful listening (Grasha, 1996). Learning styles theory suggests changing the traditional instructional methods to benefit from the individuals learning styles.

This study can complement the previous studies by its direct focus on the learning styles of students and its relationship with educational achievement. So it is designed to answer the following research questions:
1. What are the student's general educational characteristics?
2. What are the dominant students' learning styles?

2. Review of related literature

Today, thanks to a respectable stockpile of SLA research, there is a greater recognition of our need to gain a deeper understanding of our students, their learning differences, learning styles, learning difficulties and their predisposition to certain types of tasks to achieve their goals successfully (Pawlak, 2012). Moreover, there is a great deal of evidence that a mismatch between students’ learning styles and teacher’s instructional style may have a negative impact on classroom learning (Felder & Henriquez, 1995; Mulalic, Mohd Shah & Ahmad, 2009). Iranian EFL learners are no exception to this rule; they are perhaps facing even more difficulties due to the mismatch between teaching and learning styles. Many Iranian teachers who are the product of a traditional educational system, do not seem to be aware of their students’ styles and just try to draw upon a limited number of teaching styles within their comfort zone. It should be noted that few studies have addressed the relationship between perceptual learning and teaching styles in Iran (e.g. Alemi, Daftari & Tobolcea, 2011; Azizi-Pajoh, 2007; Hayati, 2008).

2.1. Definition and concept of learning styles

Language learning styles have attracted a great deal of attention and have been the focus of a number of L2 studies since Reid’s influential work in 1987. Reid (1995) categorized the learning styles into three major categories: sensory or perceptual learning style, cognitive learning style, and affective/temperament learning style. Sensory or perceptual learning style lends itself to the physical environment in which we learn, and involves using our senses in order to perceive data. Reid categorized perceptual learning styles into six major types: Visual (visual learners prefer seeing things in writing), Auditory (these learners learn best when they listen), Kinesthetic (these learners prefer active participation), Tactile (these learners prefer hands-on work), and Group (these learners like to participate in group activities), and Individual (these learners learn best when they are alone).

2.2. Dimensions of Felder and Solomon learning styles

The Index of Learning Styles (ILS) is a forty-four-item forced-choice instrument developed in 1991 by Richard Felder and Barbara Solomon to assess preferences on the four scales of the Felder-Silverman model.
Table 1. Dimensions of Learning and Teaching Styles

| Preferred Learning Style       | Corresponding Teaching Style          |
|-------------------------------|--------------------------------------|
| Sensory perception intuitive  | Concrete content abstract             |
| Visual input auditory         | Visual presentation verbal            |
| Inductive organization deductive | Inductive organization deductive   |
| Active processing reflective  | Active student participation passive  |
| Sequential understanding global | Sequential perspective global         |

3. Methodology

3.1. Participants

The statistical population under investigation included female high school students in grade two and three in the city of Ilam, Iran in the school year of 2014. The statistical population was consisted of 3958 students. The sample group was selected from the high school students of the mentioned region by the stratified random sampling method based on Morgan's table. The research statistical sample included 360 students.

Table 2. Frequency distribution of population and sample based on field and grade of students

| Field          | Humanities | Mathematics | Experiential | Total  |
|----------------|------------|-------------|--------------|--------|
| N              | n          | N           | n            |        |
| Grade          |            |             |              |        |
| Two            | 142        | 847         | 1057         | 2046   |
| Three          | 408        | 514         | 990          | 1912   |
| Total          | 550        | 1361        | 2047         | 3958   |
| n              | 13         | 77          | 96           | 186    |
| n              | 37         | 47          | 90           | 174    |
| n              | 50         | 124         | 186          | 360    |

3.2. Instrument

In order to assess the learning styles, the online learning styles questionnaire is used. The research instrument was the “Index of Learning Styles (I.L.S.)”, which is designed based on Felder and Solomon (1997) learning styles model. This questionnaire consists of 44 questions. The questions do not have cultural dependency and are selected keeping simplicity for responding in mind. This questionnaire is able to assess the four aspects of learning, consisting of eight learning styles as follows:

1. Processing aspect: Active-reflective learning styles
2. Perception aspect: Sensory-Intuitive learning styles
3. Input aspect: Visual-Verbal learning styles
4. Understanding aspect: Sequential-Global learning styles

The process of answering the questionnaire was done as a group. The students were informed about how to answer the questions on the questionnaire that had been translated in to Persian (Farsi) and they were asked to answer all questions carefully. The questionnaire is attached to this report as appendix.

3.3. Validity and reliability of instrument

To gain access to the desirable and generalizable data, an instrument must be valid and reliable. A test is valid when it measures what it is supposed to measure. A test is reliable when same questions, have same answers in different situations. In this study, validity and reliability of the tests were not conducted because the used instrument was standardized.
3.4. Procedure and data analysis

Collected data have been analyzed using SPSS win version 21. In differential section, correlation coefficients and nonparametric compare means tests will be reported.

By noting the conducted researches about the learning styles, the current research is a comparison of learning styles. This learning style comparison is between two groups of students (grade two and grade three) and among three groups of different majors. The research also investigates the relationship between learning styles and students' educational achievement and their major and grade.

4. Results and discussion

4.1. Differential statistics

4.1.1. Kruskal-Wallis test for grade two students in all fields

To compare students score means with different learning styles, the Kruskal-Wallis test have been used. The data and Chi-Square show there is a significant difference between score means of grade two students in all fields in Active- Reflective and Visual- Verbal learning styles.

On the other hand, according to mean ranks table, at the %99 significance level, it can be said that there is a significant difference between humanities students score means with mathematics and experiential students score means that have Active- Reflective learning style.

Table 3. Mean ranks in Kruskal-Wallis test for grade two students, in all fields

| Learning Style          |  N  | Mean Rank |
|-------------------------|-----|-----------|
| Active- Reflective      | 96  | 106.60    |
| mathematics             | 77  | 73.22     |
| humanities              | 13  | 116.88    |
| Total                   | 186 |           |
| Experiential            | 96  | 94.05     |
| mathematics             | 77  | 91.42     |
| humanities              | 13  | 101.81    |
| Total                   | 186 |           |
| Sensing- Intuitive      | 96  | 99.42     |
| mathematics             | 77  | 82.09     |
| humanities              | 13  | 117.38    |
| Total                   | 186 |           |
| Visual- Verbal          | 96  | 92.30     |
| mathematics             | 77  | 91.19     |
| humanities              | 13  | 116.04    |
| Total                   | 186 |           |

According to mean ranks table, at the %95 significance level, it can be said that there is a significant difference between humanities students score means with mathematics and experiential students score means that have Visual- Verbal learning style.
Table 4. Chi-Square test statistics for grade two students in all fields

|                | Active-Reflective | Sensing- Intuitive | Visual- Verbal | Sequential- Global |
|----------------|-------------------|--------------------|----------------|-------------------|
| Chi-Square     | 19.458            | .447               | 7.417          | 2.592             |
| df             | 2                 | 2                  | 2              | 2                 |
| Asymp. Sig.    | .000              | .800               | .025           | .274              |

4.1.2. Kruskal-Wallis test for grade three students in all fields

To compare students score means with different learning styles, the Kruskal-Wallis test have been used. The data Chi-Square show there is a significant difference between score means of grade three students in all fields in Active-Reflective and Sequential-Global learning styles.

On the other hand, according to mean ranks table, at the %99 significance level, it can be said that there is a significant difference between humanities students score means with mathematics and experiential students score means that have Active-Reflective learning style.

Table 5. Mean ranks in Kruskal-Wallis test for grade three students, in all fields

| field          | N  | Mean Rank |
|----------------|----|-----------|
| Active- Reflective |    |           |
| Experiential    | 90 | 76.74     |
| mathematics     | 47 | 81.60     |
| humanities      | 37 | 121.16    |
| Total           | 174|           |
| Experiential    | 90 | 91.55     |
| mathematics     | 47 | 76.06     |
| humanities      | 37 | 92.18     |
| Total           | 174|           |
| Sensing- Intuitive |    |           |
| Experiential    | 90 | 84.43     |
| mathematics     | 47 | 83.11     |
| humanities      | 37 | 100.54    |
| Total           | 174|           |
| Visual- Verbal  |    |           |
| Experiential    | 90 | 92.47     |
| mathematics     | 47 | 95.68     |
| humanities      | 37 | 65.03     |
| Total           | 174|           |

According to mean ranks table, at the %99 significance level, it can be said that there is a significant difference between humanities students score means with mathematics and experiential students score means that have Sequential-Global learning style.

Table 6. Chi-Square Test Statistics for grade three students, in all fields

|                | Active-Reflective | Sensing- Intuitive | Visual- Verbal | Sequential- Global |
|----------------|-------------------|--------------------|----------------|-------------------|
| Chi-Square     | 21.770            | 3.407              | 3.324          | 9.866             |
| df             | 2                 | 2                  | 2              | 2                 |
| Asymp. Sig.    | .000              | .182               | .190           | .007              |
4.2. Correlation Coefficients

4.2.1. Correlation coefficients for all of students in experiential field

According to correlation coefficients table, at the %99 significance level, it can be said that there is a negative significant relationship between students learning styles who use Sequential-Global learning style and their score means (Sig.=.009 and Spearman's rho = -.191).

At the %95 significance level, it can be said that there is a positive significant relationship between students learning styles who use Visual-Verbal learning style and their score means (Sig.=.019 and Spearman's rho = .172).

The findings also show that there is no significant relationship between the students learning styles who use Active-Reflective and Sensing-Intuitive learning styles and their score means.

Table 7. Correlation coefficients for all of students in experiential field

|                     | Active-Reflective | Sensing-Intuitive | Visual-Verbal | Sequential-Global |
|---------------------|------------------|-------------------|---------------|-------------------|
| Correlation Coefficient | .186             | .125              | .172*         | -.191**           |
| Sig. (2-tailed)      | .061             | .092              | .019          | .009              |
| N                   | 186              | 186               | 186           | 186               |

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

4.2.2. Correlation coefficients for all of students in mathematics field

According to correlation coefficients table, at the %99 significance level, it can be said that there is a positive significant relationship between students learning styles who use Active-Reflective and Visual-Verbal learning style and their score means (in Active-Reflective: Sig.=.007 and Spearman's rho = .240) and (in Visual-Verbal: Sig.=.000 and Spearman's rho = .530).

The findings also show that there is no significant relationship between the students learning styles in mathematics field who use Sequential-Global and Sensing-Intuitive learning styles and their score means.

Table 8. Correlation coefficients for all of students in mathematics field

|                     | Active-Reflective | Sensing-Intuitive | Visual-Verbal | Sequential-Global |
|---------------------|------------------|-------------------|---------------|-------------------|
| Correlation Coefficient | .240**           | .145              | .530**        | -.033             |
| Sig. (2-tailed)      | .007             | .108              | .000          | .714              |
| N                   | 124              | 124               | 124           | 124               |

** Correlation is significant at the 0.01 level (2-tailed).

4.2.3. Correlation coefficients for all of students in humanities field

According to correlation coefficients table, at the %99 significance level, it can be said that there is a negative significant relationship between students learning styles who use Active-Reflective learning style and their score means (Sig.=.001 and Spearman's rho = -.457).

The findings also show that there is no significant relationship between the students learning styles that use Sequential-Global, Visual-Verbal and Sensing-Intuitive learning styles and their score means.
### Table 9. Correlation coefficients for all of students in humanities field

|                          | Active- Reflective | Sensing- Intuitive | Visual- Verbal | Sequential- Global |
|--------------------------|--------------------|--------------------|----------------|--------------------|
| Correlation Coefficient  | - .457**           | .001               | -.192          | .053               |
| Sig. (2-tailed)          | .001               | .996               | .182           | .715               |
| N                        | 50                 | 50                 | 50             | 50                 |

**. Correlation is significant at the 0.01 level (2-tailed).

### 5. Conclusion

The current research results show that there is a significant relationship between the learning styles and educational achievement. This result is similar to the results of other researches, like Mohammadzadeh and Izadi(2011), Moradkhan and Mirtaher(2011) and Najafi Kalyani et al (2010) which show relationship between learning styles and educational advancement. Najafi Kalyani et al (2010) showed that in investigating the relationship between learning styles by Meyers-Brigs and educational advancement, there is relationship between sensational-intuitive aspect and educational advancement. This was the only relationship from all four aspects of personality by Meyers-Brigz. The research results are different to some other researches such as Esfandabad and Emamipour(2008) which show that there is no relationship between learning styles and educational achievement.

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