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Analyzing learning styles of students to improve educational practices for computer literacy course

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Abstract

Analyzing the students' learning style is a rather important factor in the preparation of learner-centered instructional design activities. The purpose of the present study was to determine the learning styles of students at Uludağ University Faculty of Education in order to develop teaching strategies for the Computer Literacy Courses to be conducted in the future years. The study was conducted during the spring semester of the 2010 academic year. A total of 921 students from different departments of the faculty participated in this study. According to the data obtained from the study, it was concluded that students' learning style profiles were similar across all of the departments.

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Keywords: Learning styles, learning preferences, Computer literacy course, Felder and Soloman Index of Learning Styles;

1. Introduction

Popularity of studies on students' learning styles is increasing nowadays. Although definition of the learning style varies according to the perspective of the researchers, most researchers argue that designing teaching activities according to learning styles may help students to increase their learning outcomes (Liegler & Janicki, 2006; Yazici, 2005).

Defining learning styles depends on the theory of learning. Riechmann and Grasha (1974) defined learning styles as personal qualities that influence a student's ability to acquire information, to interact with peers and the teacher, and to participate in learning experiences. Kolb (1984), in his Experiential Learning Theory, defined the learning style as a reflection of how thought is processed. According to Felder and Silverman (1988) the learning style is defined as the way a person receive and process the information. Moreover, James and Gardner (1995) suggested that the ways individual learners react to the overall learning environment make up the individual's learning style. There are numerous learning models in the literature but mostly researchers use the term "learning style" to classify the ways that people prefer while learning.

An investigation of the literature reveals many studies investigating the relationship between students' learning styles and their academic performance. For example, one of these studies was conducted by Wang, Wang, Wang, and Huang (2006). They investigated the effects of formative assessment and learning style on student achievement in a Web-based learning environment and they reported that the learning style is a significant factor affecting student achievement. Dunn et al. (2009) reviewed forty-two experimental studies conducted at 13 universities between 1980–1990 using the Dunn and Dunn learning-style model and conducted a meta-analysis. They reported that matching students' learning styles with compatible educational settings has a positive impact on their academic

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achievement. A study conducted by Manochehr (2006), displays the point that learning style is a significantly important factor especially in web based learning environments. There are several other studies investigating the relationship between students' learning styles and their academic performance. Research conducted by Nelson, Dunn, Griggs and Primavera (1993), Lenehan, Dunn, Ingham and Signer (1994) and Scribner and Anderson (2005) are examples of such studies.

Computer Literacy Course is one of the common courses in all of the departments in Education Faculties. It is a compulsory course consisting of two semesters in all departments except the Computer Education and Instructional Technologies department. The course is offered as two hours of theory and two hours of practice. Therefore, there can be different types of learners in different departments taking the course. Considering this situation and the information given above, it was decided to conduct a research investigating the learning preferences of the students at Uludag University Faculty of Education and the research questions were constructed as follows:

1. What are the learning styles of the students at Uludag University Faculty of Education?
2. Are there any department-related differences on the learning styles of students?

2. Method

2.1. Participants

The study was conducted during the spring semester of 2010-2011 academic year. Students totaling 909 from different departments of Faculty of Education at Uludag University participated in the study. Department names and number of students can be seen in Table 1.

Table 1. Department names and number of students participated in the study

Department names	Abbreviation	Number of students (N)
Science Education	SCE	45
Physical Education and Sports	PHE	58
Religious And Moral Studies Education	RLE	63
English Language Teaching	ELT	247
Special Education	SE	49
Educational Sciences	ES	46
Arts Education Program	AEP	66
Primary Education Program	PEP	242
Social Sciences Education Program	SSE	41
Turkish Language Education	TLE	52

2.2. Research Model

The data were analyzed through the descriptive statistics to analyze students' learning preferences. Mean scores were compared across departments.

2.3. Instrument

In order to determine the learning styles of the students, Index of Learning Styles (ILS) developed by Felder and Solomon (1991) was used as an instrument. ILS is an instrument consisting of 44 questions in order to analyze learning preferences of students on the four dimensions of Felder and Silverman (1988) learning style model. These dimensions are active-reflective, sensory-intuitive, visual-auditory and sequential-global. ILS has 11 questions for each of these dimensions and answers to these questions are in a dichotomous format. In other words, each answer is either the statement "a" or "b". In order to calculate a score for a dimension, the number of "a"s and "b"s are counted and the smaller number is subtracted from the larger number. After this calculation the results range from 1 to 11 (Only odd numbers). The higher the number means the stronger the learning preference. For instance 11 "a"s represent a very strong preference for the active learning style, 11 "b"s indicate a very strong preference for the reflective learning style. Table 2 shows learning style preference levels corresponding to the calculation values.

Table 2. Learning style preference levels corresponding to the calculation values for ILS

a-b (if a>b) ←					→ b-a (if b>a)						
11	9	7	5	3	1	1	3	5	7	9	11
Strong		Moderate			Balanced			Moderate		Strong	
1		2			3			4		5	

ILS was translated into Turkish by Samancı and Keskin (2007). The alpha reliability coefficient of ILS was calculated as .70 for the whole index. The alpha reliability coefficient of sub dimensions was found as .43 for active-reflective, .54 for sensory intuitive, 0.59 for visual-auditory and .32 for sequential-global sub dimensions.

3. Results

In order to analyze students' learning styles, mean scores of the students' ILS scores for each sub dimension was examined for each department. Mean scores of the students grouped by their departments can be seen for active-reflective dimension of the ILS in Figure 1.

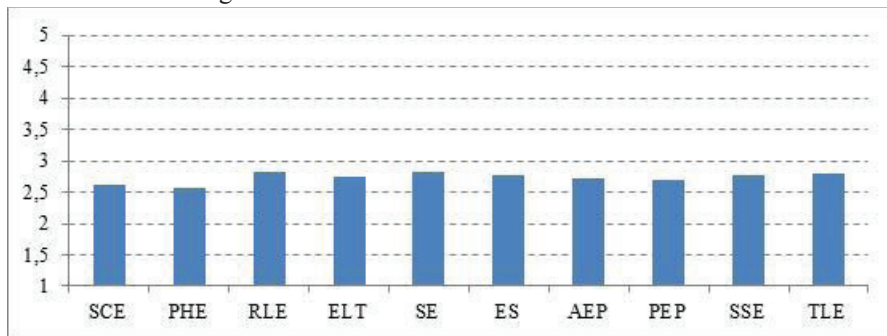


Figure 1. Mean scores of students grouped by their departments on active-reflective dimension of ILS.

As seen in Figure 1, most of the students were well-balanced on active-reflective dimension of ILS. Mean scores changed between 2.5 and 3. It can be concluded that all departments had similar profiles as they are between moderate active and therefore balanced on this dimension.

Mean scores of the students grouped by their departments can be seen for sensory-intuitive dimension of the ILS in Figure 2.

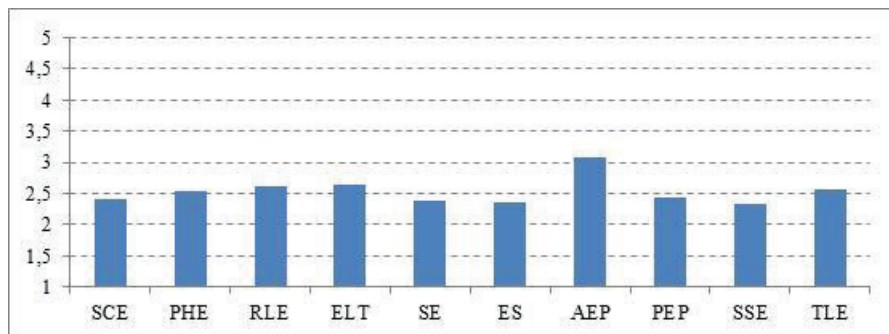


Figure 2. Mean scores of students grouped by their departments on sensory-intuitive dimension of ILS.

The results in Figure 2 indicate that students in all departments except AEP had similar profiles as because they fall between moderate sensory and balanced sensory-intuitive on this dimension. Only students in AEP were balanced on sensory-intuitive dimension.

Figure 3 shows the mean scores of the students grouped by their departments for visual-auditory dimension of the ILS.

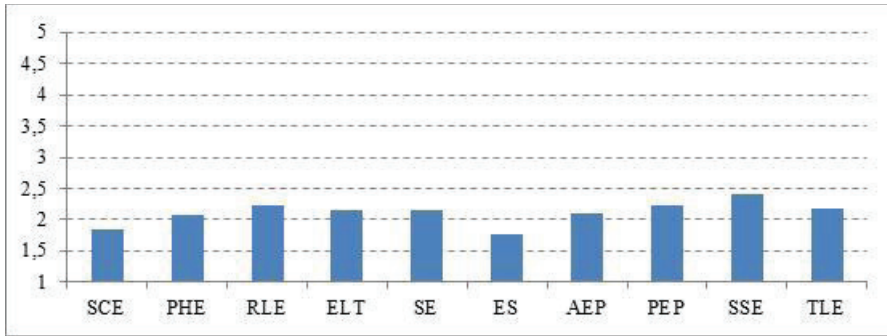


Figure 3. Mean scores of students grouped by their departments on visual-auditory dimension of ILS.

According to Figure 3, students in all departments again had similar profiles as they were between strong visual and moderate visual on this dimension.

For sequential-global dimension of the ILS, mean scores of the students grouped by their departments can be seen in Figure 4.

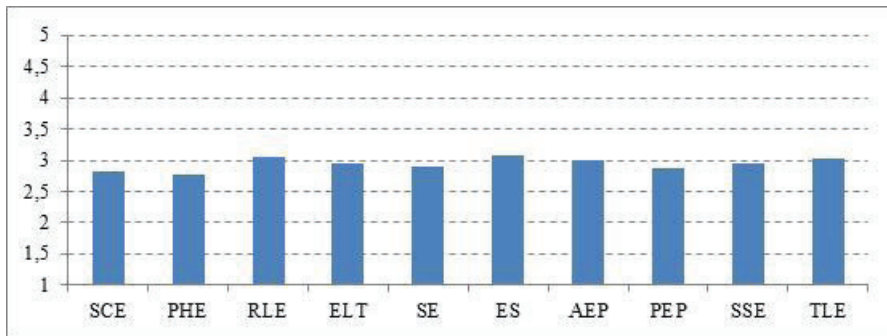


Figure 4. Mean scores of students grouped by their departments on sequential-global dimension of ILS.

Similar to all three dimensions mentioned above on sequential-global dimension of ILS students had quite similar profiles (Figure 4).

General mean scores and standard deviations on four dimensions of ILS were given in Table 3.

Table 3. Mean scores and standart deviations on subdimensions of ILS

	Active-Reflective	Sensory-Intuitive	Visual-Auditory	Sequential-Global
Mean	2,73	2,55	2,14	2,93
SD	0,64	0,83	0,89	0,63

According to Table 3, it can be concluded that the sequential-global dimension had the mean score that is closest to the balanced point. On the other hand the visual-auditory dimension was the farthest to the balance point.

4. Discussion

The purpose of this study was to determine learning styles of students in Faculty of Education at Uludag University in order to develop teaching strategies for future Computer Literacy Courses. The following conclusions can be drawn according to the participants’ learning preferences with regard to dimensions of ILS;

1. Students in all departments had similar learning style profile. In other words, based on the simple statistics there were no department related differences according to learning preferences of students in Uludag University Faculty of Education.
2. Students were balanced on active-reflective dimension of ILS.
3. Students’ learning style profile can be defined as between moderate sensory and balanced on sensory-intuitive dimension of ILS.
4. Most of the students in all departments were more visual then auditory according to the mean scores on

visual-auditory dimension.

5. Students were balanced on sequential-global dimension.
6. The sequential-global dimension had the mean score that is closest to the balanced point. This means that the students were not in favor of any of the poles of the sequential-global dimension. The visual-auditory dimension had the smallest mean score (and was the farthest to the balance point) indicating that the dimension was the most favored one. The students tended to be mostly visual in this sense.

According to the results given above, the future design endeavors for the learning environment and teaching activities for Computer Literacy Course should consider the learning styles of students at Uludag University Faculty of Education. Therefore it would be appropriate to direct the design efforts towards the course materials that are more visual, that support active learning, and that appeal sensory learning.

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