Zeybek, G., & Şentürk, C. (2020). Analysis of pre-service teachers' learning styles according to Vermunt learning style model. *International Online Journal of Education and Teaching (IOJET), 7*(2). 669-682.

https://iojet.org/index.php/IOJET/article/view/766

Received: 22.10.2019
Received in revised form: 28.01.2020
Accepted: 30.01.2020

ANALYSIS OF PRE-SERVICE TEACHERS' LEARNING STYLES ACCORDING TO VERMUNT LEARNING STYLE MODEL

Research Article

Gülçin Zeybek

Karamanoğlu Mehmetbey University

gulcinzeybek@kmu.edu.tr

Cihad Şentürk

Karamanoğlu Mehmetbey University

cihadsenturk@kmu.edu.tr

Gülçin Zeybek works currently as an Assistant Professor Doctor at the Department of Educational Sciences, Faculty of Education, Karamanoğlu Mehmetbey University, Karaman, Turkey.

Cihad Şentürk works currently as an Assistant Professor Doctor at the Department of Educational Sciences, Faculty of Education, Karamanoğlu Mehmetbey University, Karaman, Turkey.

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Gülçin Zeybek
gulcinzeybek@kmu.edu.tr

Cihad Şentürk
cihadsenturk@kmu.edu.tr

Abstract

This study aims to identify the learning styles of pre-service teachers who had pedagogical formation education according to Vermunt Learning Style Model and to examine the learning styles of pre-service teachers considering their demograpichs such as gender and age. The study was carried out with 442 pre-service teachers who attended the certificate program of pedagogical formation education delivered at Karamanoğlu Mehmetbey University Education Faculty in 2017-2018 academic year. "Vermunt Learning Styles Inventory" was used to identify the learning styles of pre-service teachers participated in the study. The findings reveal that pre-service teachers predominantly had "deep processing" and "intake of knowledge" learning styles, and the differences in learning styles according to gender and age variables were significant. While there are a great number of studies on learning styles, limited studies on Vermunt Learning Style appear in the literature. It is considered that arranging educational environments and learning experiences according to the learning styles of individuals would increase the success and efficiency in education. It is anticipated that this study is essential in this regard and contributes to the literature and raises awareness among educators and students.

Keywords: learning styles, Vermunt learning style model, pre-service teachers

1. Introduction

Every individual realizes a variety of learning by interacting with the people around since birth. Learning is as important as the basic physiological needs for individuals to survive (Maslow, 1943a, 1943b, 1954). Because no living being can live for a long time without learning how to benefit from the surrounding to supply with the basic needs. It is seen that living creatures constantly realize various learning and most of their behaviors are learned behaviors in order to survive, to be effective in adapting to the environment and to meet their needs in a wide range of environments (Senemoğlu, 2012). In this context, the concept of learning needs to be re-defined and explained to reveal how the behaviors of living beings emerge and why they behave so.

Various studies were conducted on how learning occurs in line with this need and different ideas, arguments, definitions and explanations of learning emerge from ancient times to the present (Şentürk & Zeybek, 2019). Scientists, on the one hand, conduct studies on what is learning and provide definitions in this direction, on the other hand, they try to explore and explain the ways that individuals prefer in the learning process.

While learning is defined as "permanent changes in the behavior of the organism through repetition or experience" (Curzon, 2004; Dembo, 1994; Mayer, 1982; Senemoğlu, 2012, Terry, 2009), in particular today, it is stated that learning cannot be explained only by

behavior change in line with contemporary theories and constructivist conceptions and involves complex processes that include various factors along with behavior change. For instance, whilst, Schunk (2012, p.2) defines learning as "a process involving the acquisition and development of knowledge, skills, strategies, beliefs, attitudes and behaviors". Slavin (2006) states that learning is "a set of changes in the individual as a result of experiences". In another definition, learning is considered "a process that can be realized individually or collaboratively in formal or informal environments, which may vary according to the individual and context" (Robinson, Molenda & Rezabek, 2008). The definition of learning is shaped in line with the findings or theories emerged as a result of the studies conducted for learning. Cognitive learning theories, for example, describe learning as the mental processes that individuals embrace to understand the world, and define learning as changes in the mental structure of individuals (Jonassen, 1991; Senemoğlu, 2012). According to another learning theory, brain-based learning theory, learning is related to brain cells and the learning process is considered as a biochemical change in the individual by indicating that new axon strands are formed in the neurons in the brain and that each learning experience means the formation of new synaptic bonds (Bonomo, 2017; Given, 2002; Paul, 2019). In this respect, as the studies on learning continue, different definitions and perspectives on learning will continue to emerge in the literature.

Students participating in the education process come to the education environment with individual characteristics (Kurt & Ekici, 2013). Students who come to the educational environment with their individual characteristics may differ from each other in terms of their many features. Some of these differences can be stated as age, gender, interest, ability, preliminary learning, readiness, physical, mental and emotional development levels, and motivation (Eddy, 2012; Fer & Cırık, 2007; Kuzgun & Deryakulu, 2004). Another of these differences is the learning styles defined as the ways individuals prefer to realise learning. Scientists studying on learning styles proposed various definitions of learning styles. For instance, whilst McCarthy (1987) describes the learning style as "preferences of individuals in the perception and processing of information", Grasha (1996) defines the learning style as "the ability to combine skills and learning experiences in the process of acquiring knowledge". According to Kolb (1981), the learning style is "the method that individuals prefer personally in the process of receiving and processing information". According to Dunn and Dunn (1993), each individual's learning style is unique like the fingerprint. In this context, the learning style is that each student uses different and unique ways as they prepare, learn and remember new and difficult information. Vermunt (1992), whose learning styles scale used in this study, defines it as "processing strategies that include an awareness of the goals and objectives of the learning activities practiced to determine what has been learned, regulatory strategies for monitoring learning, mental learning models that include the individual's perceptions of the learning process and learning orientations defined as personal goals, intentions and expectations based on past learning experience".

A great number of teachers conduct the lesson in accordance with their own learning style and consider that their students have learned in this way. Although some students in the classroom learn according to the teacher's learning style, this may cause to ignore other students. For instance, a teacher with an aural learning style often handles the lesson according to the aural learning style. Although this method is beneficial for students who find the aural learning style appropriate for themselves, there may be a handicap for students with visual and tactile learning styles. Therefore, teachers should plan and conduct the lesson considering the learning profiles of all students (Tomlinson, 2001). In the 21st century, the progressive education movement based on pragmatism, which takes into account the individual differences of students and embraces a student-centered conceptions of education,

and the constructivist learning-teaching approach that emerged in line with this philosophy become widespread. Learning-teaching processes and educational environments are organized according to these conceptions. The curricula have been designed in line with the constructivist approach since 2005 in Turkey and updated from time to time. In this context, it is essential to explore the individual differences of students and especially their preferred ways/methods of learning, in other words, their learning styles.

It can be said that identifying the learning styles of individuals is crucial both for individuals and educator in this century, in which learning to learn and lifelong learning gained importance. Because an individual who is aware of their learning style can arrange the learning experiences accordingly and the teacher who is aware of their students' learning styles can arrange the teaching processes accordingly. In this case, effective, efficient and permanent learning is ensured. Vermunt (1992) developed an inventory of learning styles in order to reveal the ways in which higher education students perform learning activities in 1992 and proposed Vermunt Learning Styles Model in this direction. Later, this model was revised and finalized by taking the opinions of scholars in various congresses (Vermunt, 1994). The aim of the inventory is to determine how students in higher education perceive their own learning in their learning processes (Vermunt, 2005). The relevant literature indicates that Vermunt's Learning Styles Inventory is used by researchers in countries such as Netherlands, Finland, Cyprus, United States, Brazil, Argentina, Indonesia and Srilanka (Vermunt & Vermetten, 2004). However, although a lot of studies carried out with a variety of learning styles model appear in Turkey, studies with Vermunt Learning Styles seem to be extremely limited. In this regard, this study is considered to make significant contributions to the relevant literature.

1.1. Aim of the Study

The main purpose of this study is to identify learning styles of pre-service teachers who receive pedagogical formation education in an education faculty, considering the Vermunt Learning Styles Model and to examine the learning styles of pre-service teachers in terms of gender and age variables. In this context, the following questions were sought in the study:

1. What is the distribution of learning styles of pre-service teachers?

2. Do the pre-service teachers' learning styles differ significantly according to gender and age?

2. Methodology

In this part of the study, information about the research model of the study, participants, data collection instruments, data collection process and data analysis are given.

2.1. Research Model

The survey model was used in this study. The survey model is an approach that aims to describe, illustrate and explain the past and present situation, current cases, groups, objects and features. The case, an individual or an object as the subject of the study is tried to be described in its own conditions and as it is in the survey model (Büyüköztürk, Çakmak, Akgün, Karadeniz, Demirel, 2014). It was examined whether the learning styles of pre-service teachers who had pedagogical formation education showed statistically significant difference according to Vermunt Learning Styles in terms of gender and age variables.

2.2. Participants

The study was carried out with 442 pre-service teachers who attended the pedagogical formation certificate program conducted in Karamanoğlu Mehmetbey University Education

Faculty in 2017-2018 academic year. 66.5% of the pre-service teachers who participated in the study on a voluntary basis were female (n = 294) and 33.5% (n = 148) were male. In addition, 50.5% (n = 223) of the participants were in the 20-25 age range, 29% (n = 128) were in the 26-30 age range, and 20.5% (n = 91) of the 31-35 age range.

2.3. Data Collection Instruments

"Vermunt Learning Styles Inventory, which was introduced by Jan D. Vermunt (1994) and adapted to Turkish by Tektaş (2010), was used in the study. The scale consists of a total of 120 items, all of which are 5-point Likert type. The scale consists of two parts. Part A was formed as "Study Activities" and part B as "Study Motives and Views on Studying". There are two dimensions in each section and various sub-dimensions in each dimension (Tektaş, 2010). For the sake of clarity, the parts, dimensions and sub-dimensions of the scale are presented visually in Figure 1.

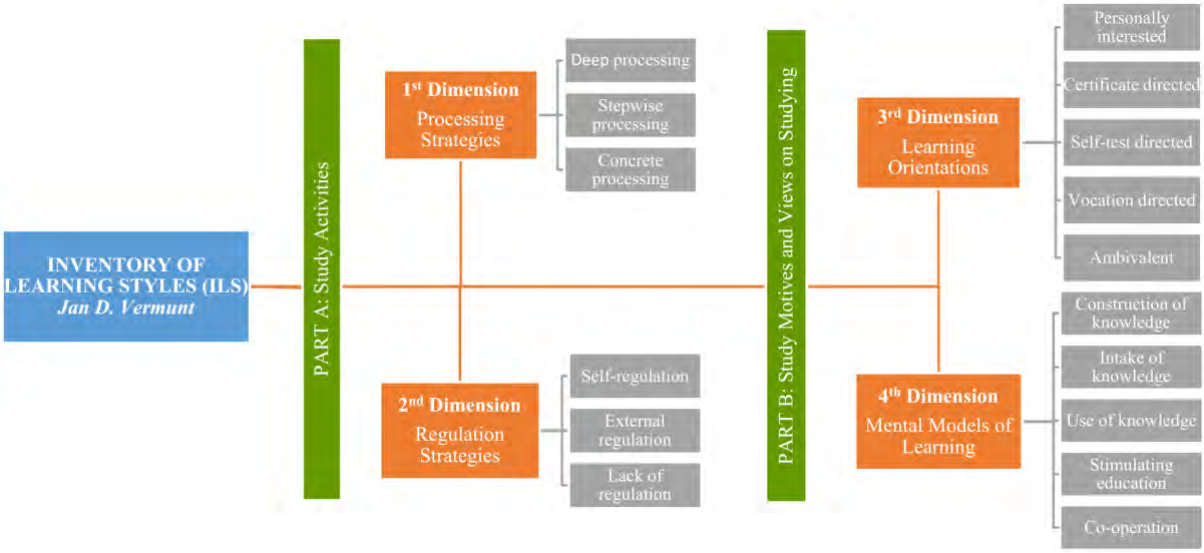

Figure 1. Dimension and sub-dimensions of learning styles inventory

The internal consistency coefficients between the sub-dimensions of the inventory ranged between .69 - .84 in processing strategies, 60 - .83 in regulation strategies, .44 - .70 in learning orientations, and .73 - .87 in mental models of learning dimensions. Furthermore, the results of the confirmatory factor analysis applied to the scale are $\chi 2$ / sd = 1477.72 / 15.08; GFI = .82; AGFI = .75; CFI = .91; RMSEA = .13 (Tektaş, 2010). In line with these values, it can be stated that the confirmatory factor values of the scale are quite good.

2.4. Data Collection Process

Required permissions were obtained from the Dean of Education Faculty of Karamanoglu Mehmetbey University to collect the data. Then, the researchers applied the scales to the pre-service teachers face-to-face. The pre-service teachers were informed about the purpose of the study, the features of the scale in order to apply the scale without any problem. In addition, it was ensured that the responses given in the scale would not be used for any purposes other than the scope of the study. The implementation of the scale was completed approximately in four weeks. The pre-service teachers participated in the study on a voluntary basis.

2.5. Data Analysis

The data were analyzed using SPSS 20.0 statistical package program. First of all, normality test was applied to determine whether the data showed normal distribution and it

was observed that the data did not show normal distribution (K-S(Learning styles) = 0.056, p<0.05). Therefore, it was decided to use non-parametric tests for data analysis. In this respect, the data were analyzed by using descriptive statistical techniques and chi-square test.

3. Findings

The findings revealed in line with the aim and sub-objectives of the study are given in this section. Descriptive statistics and chi-square test results related to the distribution of learning styles of pre-service teachers are discussed below.

Table 1. *Descriptive statistics and Kruskal Wallis-H test results of pre-service teachers' learning style scores*

PART A: Study Activities						
Processing Strategies	n	%	$\bar{x}$	sd	Minimum	Maximum
Deep processing	169	38.2	36.040	7.473	15.00	55.00
Stepwise processing	70	15.8	35.855	7.599	13.00	55.00
Concrete processing	126	28.5	15.348	3.452	7.00	25.00
Regulation Strategies						
Self-regulation	43	9.7	33.004	6.459	18.00	52.00
External regulation	9	2.0	17.217	3.921	8.00	28.00
Lack of regulation	25	5.7	34.692	6.988	17.00	52.00
Total	442	100				
χ_2= 262.416, sd=5, p=.000						
PART B: Study Motives and Views on Studying						
Learning Orientations	n	%	$\bar{x}$	sd	Minimum	Maximum
Personally interested	72	16.3	16.502	3.420	7.00	25.00
Certificate directed	44	10.0	16.556	3.732	7.00	25.00
Self-test directed	62	14.0	15.393	3.808	5.00	25.00
Vocation directed	48	10.9	17.221	3.677	7.00	25.00
Ambivalent	40	9.0	16.312	3.928	6.00	25.00
Mental Models of Learning						
Construction of knowledge	44	10.0	27.633	5.504	13.00	45.00
Intake of knowledge	39	8.8	27.764	5.290	11.00	44.00
Use of knowledge	21	4.8	19.384	3.926	9.00	29.00
Stimulating education	40	9.0	25.868	5.520	9.00	40.00
Co-operation	32	7.2	25.009	5.016	13.00	40.00
Total	442	100				
χ_2= 41.937, sd=9, p=.000						

Table 1 shows the percentage, frequency, mean and standard deviation values of the pre-service teachers' learning styles. As a result of the chi-square test conducted for one variable in order to identify whether there is a significant differences between the learning styles scores of the pre-service teachers for Part A of the scale (Study Activities), it was found that the difference between the learning styles scores of the pre-service teachers is statistically significant [$\chi_{2(5)}$ = 262.416, p<.05]. The findings reveal that while the pre-service teachers participated in the study had the most *"deep processing"* learning style for Part A of the scale, this is followed by *"stepwise processing"*, *"lack of regulation"* and *"self-regulation"*.

In addition, it was found that pre-service teacher had the least "concrete processing" and "external regulation" learning styles.

As a result of the chi-square test for one variable in order to identify whether there is a significant difference between the learning styles scores of the pre-service teachers for Part B of the scale (Part B: Study Motives and Views on Studying), it was found that the difference between learning styles of pre-service teachers is statistically significant [$\chi_{2(9)} = 41.937$, $p<.05$]. The findings reveal that while the pre-service teachers participated in the study had the most *"intake of knowledge"*, this is followed by *"construction of knowledge"*, *"stimulating education"*, *"co-operation"* and *"use of knowledge"* learning styles in the context of reasons for work and opinions about the work in part B. In addition, it was identified that pre-service teachers had the least *"self-test directed"* learning style, which was followed by *"ambivalent"*, *"personally interested"*, *"certificate directed"* and *"vocation directed"*. The chi-square test results related to the distribution of pre-service teachers' learning styles according to gender variable are given in Table 2. below.

Table 2. *The chi-square test results of the distribution of pre-service teachers' learning style scores according to gender*

PART A: Study Activities								
Gender		***Processing Strategies***			***Regulation Strategies***			Total
		Deep processing	Stepwise processing	Concrete processing	Self-regulation	External regulation	Lack of regulation	
Female	n	119	40	76	39	7	13	294
	%	40.5	13.6	25.9	13.3	2.4	4.4	100
Male	n	50	30	50	4	2	12	148
	%	33.8	20.3	33.8	2.7	1.4	8.1	100
Total	n	169	70	126	43	9	25	442
	%	38.2	15.8	28.5	9.7	2.0	5.7	100

χ_2= 20.255, sd=5, p=.001

PART B: Study Motives and Views on Studying												
Gender		***Learning Orientations***					***Mental Models of Learning***					Total
		Personally interested	Certificate directed	Self-test directed	Vocation directed	Ambivalent	Construction of knowledge	Intake of knowledge	Use of knowledge	Stimulating education	Co-operation	
Female	n	55	30	46	35	22	27	31	11	20	17	294
	%	18.7	10.2	15.6	11.9	7.5	9.2	10.5	3.7	6.8	5.8	100
Male	n	17	14	16	13	18	17	8	10	20	15	148
	%	11.5	9.5	10.8	8.8	12.2	11.5	5.4	6.8	13.5	10.1	100
Total	n	72	44	62	48	40	44	39	21	40	32	442
	%	16.3	10.0	14.0	10.9	9.0	10.0	8.8	4.8	9.0	7.2	100

χ_2= 20.941, sd=9, p=.013

Table 2 shows the chi-square test results related to the distribution of pre-service teachers' learning style scores according to gender variable. As a result of the chi-square test for one variable in order to identify whether there is a significant difference between the learning styles scores of the pre-service teachers for Part A of the scale according to gender variable, it

was fond that the difference between learning styles is statistically significant [$\chi_{2(5)} = 20.255$, $p<.05$]. The findings reveal that while female pre-service teachers had the most *"deep processing"* learning style, male pre-service teachers had the most *"deep processing"* and *"concrete processing"* learning styles for the part A: Study activities.

As a result of the chi-square test for one variable in order to identify whether there is a significant difference between the learning styles scores of the pre-service teachers for Part B of the scale (Part B: Study Motives and Views on Studying), according to the gender variable, it was found that the difference between learning styles was statistically significant [$\chi_{2(9)} = 20.941$, $p<.05$]. The findings reveal that while female pre-service teachers had the most *"personally interested"* learning style, male pre-service teachers had the most *"stimulating education"* learning style. The chi-square test results related to the distribution of the learning styles of the pre-service teachers according to the age variable, which is another variable, are given in Table 3.

Table 3. *Chi-square test results related to the distribution of pre-service teachers' learning style scores according to their age*

PART A: Study Activities								
Age		***Processing Strategies***			***Regulation Strategies***			Total
		Deep processing	Stepwise processing	Concrete processing	Self-regulation	External regulation	Lack of regulation	
20-25	n	71	40	56	37	4	15	223
	%	31.8	17.9	25.1	16.6	1.8	6.7	100
26-30	n	53	21	44	2	3	5	128
	%	41.4	16.4	34.4	1.6	2.3	3.9	100
31-35	n	45	9	26	4	2	5	91
	%	49.5	9.9	28.6	4.4	2.2	5.5	100
Total	n	169	70	126	43	9	25	442
	%	38.2	15.8	28.5	9.7	2.0	5.7	100

χ_2= 34.360, sd=10, p=.000

PART B: Study Motives and Views on Studying												
Age		***Learning Orientations***					***Mental Models of Learning***					Total
		Personally interested	Certificate directed	Self-test directed	Vocation directed	Ambivalent	Construction of knowledge	Intake of knowledge	Use of knowledge	Stimulating education	Co-operation	
20-25	n	22	27	32	21	22	29	23	13	22	12	223
	%	9.9	12.1	14.3	9.4	9.9	13.0	10.3	5.8	9.9	5.4	100
26-30	n	27	8	15	17	12	10	9	7	10	13	128
	%	21.1	6.2	11.7	13.3	9.4	7.8	7.0	5.5	7.8	10.2	100
31-35	n	23	9	15	10	6	5	7	1	8	7	91
	%	25.3	9.9	16.5	11.0	6.6	5.5	7.7	1.1	8.8	7.7	100
Total	n	72	44	62	48	40	44	39	21	40	32	442
	%	16.3	10.0	14.0	10.9	9.0	10.0	8.8	4.8	9.0	7.2	100

χ_2= 29.448, sd=18, p=.043

Table 3 shows the chi-square test results related to the distribution of pre-service teachers' learning styles scores according to their age. As a result of the chi-square test for one variable in order to identify whether there is a significant difference between the learning styles scores of the pre-service teachers for Part A of the scale according to age variable, it was found that the difference between learning styles is statistically significant [$\chi^2_{(10)} = 34.360$, $p<.05$]. The findings reveal that pre-service teachers of all ages (20-25, 26-30 and 31-35) had the most *"deep processing"* learning style.

Similarly, as a result of the chi-square test for one variable in order to identify whether there is a significant difference between the learning styles scores of the pre-service teachers for Part B of the scale (Part B: Study Motives and Views on Studying), according to the age variable, it was found that the difference between learning styles was statistically significant [$\chi^2_{(18)} = 29.448$, $p<.05$]. The findings reveal that pre-service teachers in the 20-25 age group had the most *"self-test directed"* learning style, while pre-service teachers in the 26-30 and 31-35 age groups had the most *"personal interest"* learning style.

4. Discussion, Conclusion and Suggestions

It was revealed that the difference between the learning styles scores of the pre-service teachers for study activities part of the scale was statistically significant within the scope of the study. Looking in detail, it was identified that the pre-service teachers had the *"deep processing"* learning style the most, followed by *"stepwise processing"*, *"lack of regulation"* and *"self-regulation"* learning styles. It can be said that these preference frequencies for learning styles are generally positive. Because it is consistent that one of the learning styles required for a qualified higher education is *"deep processing"* and that the individuals attending higher education should have *"self-regulation"* learning styles rather than *"external regulation"*.

This finding of the study is partly consistent with some of the study findings in the literature. Considering the findings of the study of Gülpınar (2014) conducted with pre-clinical medical students, the students frequently used the most *"deep processing"*, *"stepwise processing"*, and *"concrete processing"* strategies among cognitive processing strategies, while *"self-regulation"*, *"external regulation"* and *"lack of regulation"* among metacognitive strategies were the most frequently used strategies. As a result of the study conducted by Topal, Sarıkaya, Baştürk and Büke (2015) with the students of medical faculties, while the first-year students use *"deep processing"*, *"self-regulation"* and *"external regulation"* strategies, the second-year students use *"concrete processing"*, and *"lack of regulation"*, and the third-year students use *"deep processing"* and *"external processing"* strategies more than others.

It was revealed that the difference between the learning styles scores of the pre-service teachers for study motives and views on studying part of the scale was statistically significant. According to the findings, it was revealed that the pre-service teachers had the most *"intake of knowledge"* learning style, followed by *"construction of knowledge"*, *"stimulating education"*, *"co-operation"* and *"use of knowledge"* learning styles within the scope of the study. In addition, the participants had the least *"self-test directed"*, *"ambivalent"*, *"personally interested"*, *"certificate directed"* and *"vocation directed"* learning styles. Similarly, the study findings of Topal, Sarıkaya, Baştürk and Büke (2015) indicate that the learning model of the students in general were *"acquisition of knowledge"*. The fact that knowledge-oriented learning styles are more common than others can explained by the intense content of higher education programs, focusing on the acquisition of content rather than the acquisition of learning strategies, assessing mostly knowledge acquisition in exams and the perspectives of the educators on knowledge, learning and teaching. It was

considered that the structure and implementation of the education programs are important in forming the learning styles and strategies. According to the study of Levinsohn (2007) in which students' learning styles and their approaches to learning were compared, some of the students had mostly *"result-oriented"* and sometimes *"undecided"* approaches for their education. These students asked mostly questions such as *"Will there be questions about this topic in the exam?"* and *"Should I take this course again to improve my grade?"*. Some of the students approached to the subject mostly "vocation oriented. These students mostly had thoughts such as *"What will I do when I graduate from this department?"*.

It was found that the difference between the learning styles scores of the pre-service teachers for the study activities part of the scale was statistically significant according to gender variable. The findings revealed that while female pre-service teachers had the most *"deep processing"* learning style, male pre-service teachers had the most *"deep processing"* and *"concrete processing"* learning styles. The difference between learning styles scores of the pre-service teachers for the study motives and views on studying part of the scale was found to be statistically significant according to gender variable. The findings revealed that while female pre-service teachers had the most "personally interested" learning style, male pre-service teachers had the most "stimulating education" learning style. As a result of the study of Deniz and Can (2018) conducted with pre-service physical education teachers, it was revealed that study motives and views on studying of participants did not vary significantly according to gender variable.

It was revealed that the difference between the learning styles scores of pre-service teachers for the study activities part of the scale was statistically significant according to the age variable. The findings indicated that pre-service teachers of all ages (20-25, 26-30 and 31-35) had the most *"deep processing"* learning style. The study of Kalaca (2004) conducted with medical students in pre-clinical (grades 1-3) and clinical term (grades 4-6) indicated that there was an increase in the preference of *"concrete"* strategies among the students in these two semesters, even it was not significant, however, their preferences of *"deep processing"* and *"self-regulation"* did not vary significantly. In the study of Gülpınar (2014), it was observed that the difference in the distribution of preference frequencies related to learning strategies by years was not significant except for *"stepwise processing"* and *"external regulation"*.

The difference between the learning styles scores of pre-service teachers for the study motives and views on studying part of the scale was found to be statistically significant according to the age variable. The findings indicated that pre-service teachers in the 20-25 age group had the most self-test directed learning style and those in the 26-30 and 31-35 age groups had the most *"personally interested"* learning style within the scope of the study activities and views on studying part of the scale. As a result of the study conducted by Deniz and Can (2018), it was found that the study activities and study motives of the pre-service teachers did not change significantly depending on the age variable.

Learning is the most important feature that distinguishes individuals from other beings. Every individual learns, but not at the same pace and level. Learning conditions of an individual do not match others as learning is unique to the individual like fingerprints (Babadoğan, 2000). Variation of learning from individual to individual is due to individual differences (Felder and Brent, 2005). Learning styles are one of the individual difference formed by age, ability, intelligence, motivation, and socio-cultural factors that affect learning (Mariani, 1996). Researchers in the education field agree that students have different ways of learning. Although approaches to learning styles differ, there is a common consensus that learning styles have an impact on learning.

Fer (2014) states that taking into account the learning styles in teaching enriches the course, and improves the curriculum, teaching methods, assessment methods and guidance to the students. Since the individual learn in their own ways, learning takes place more permanently and easily (Bilasa, 2014). Students can learn and succeed faster in a learning-teaching process that is relevant to their own learning style. On the other hand, ignoring the fact that students have different learning styles and only students who prone to this type of learning can be successful, other students may experience learning difficulties in the case of uniform teaching. Hein and Budny (2000), in a meta-analysis study on the findings of different studies, identified that the harmony between the learning styles of the students and their learning activities increased their academic achievement. As a result of the study conducted by Yazıcılar and Güven (2009), it was found that teaching activities prepared in accordance with the learning styles of the students increased the academic achievement and retention levels of the students.

Being aware of individuals' learning styles enables to identify their strengths and weaknesses during learning, take measures to develop their weaknesses and bring together ideal individuals to work together and observe diversity in the classroom. It also contributes to the preparation of learning environments and educational programs that will positively affect students' success, interests and motivation (Cassidy, 2004). Studies show that students' positive attitudes towards teaching increase significantly when they learn with their preferred learning style and a positive improvement emerges in their classroom behaviors (Veznedaroğlu & Özgür, 2005). When educating pre-service teachers who will play an important role in higher education and especially in the education of future generations, it is considered that being aware of qualifications of the students including learning styles and taking them into account during the education process would facilitate identifying appropriate learning strategies.

Information about individuals' learning styles may provide a sound basis for making changes to the learning and teaching process and improve teaching practices. It is considered important to be aware of learning styles in setting goals, selecting appropriate strategies and monitoring progress. One of the basic professional responsibilities of educators is to maximize the learning opportunities of their students. Being aware of students' learning styles can also be beneficial to encourage them to improve their learning and enable students to adopt the most appropriate learning strategy from a wide range of options. However, it is noteworthy that students should be divided into major classes in terms of their learning styles. Learning styles should not lead to labeling of students knowingly or unintentionally. In addition, as Dunn (1996) states, learning style preferences of an individual should not be perceived as invariant structures, but as preferences that can vary over time according to their personality and the characteristics of the learning environment.

It is stated that different learning environments, teaching methods, measurement and assessment methods and factors such as motivation affect students' learning styles. Therefore, the effect of factors such as learning environment, quality and duration of learning and teaching process and culture as well as affective factors such as self-efficacy, attitude, anxiety and motivation can be explored in the preference of learning styles. Distribution of students' learning styles according to different faculty, departments and class levels can be investigated. Thus, different aspects of learning styles can be revealed and explained further. It is well-known that thinking and learning cannot be considered separately. Exploring the relationship between thinking styles and learning styles can be an important research topic. In addition, experimental studies can be conducted by arranging different learning environments in line with different learning styles and planning different activities. However, there may be an issue that makes research difficult. It is considered that a wide variety and complex

learning styles have been proposed to date and the lack of common synthesis makes it difficult to conduct studies in this area.

Acknowledgements

This study was presented at the International Congresses on Education ERPA (June 2018) Symposium in İstanbul, Turkey.

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