

## THE RELATIONSHIP BETWEEN GENDER DIFFERENCES AND LEARNING STYLE PREFERENCES OF PRE-SERVICE TEACHERS AT ELEMENTARY LEVEL

### İLKÖĞRETİM DÜZEYİ ÖĞRETMEN ADAYLARININ ÖĞRENME STİLLERİ TERCİHLERİ İLE CİNSİYETLERİ ARASINDAKİ İLİŞKİNİN İNCELENMESİ

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**ABSTRACT:** Individual differences play an essential role in teaching and learning. Students differ in their learning styles which indicate the way they learn. The purpose of this study was to determine pre-service teachers' learning style preferences and investigate whether there was a significant difference between males and females in their learning styles. 121 students from department of elementary science education were enrolled in the study. All students were administered Learning Style Inventory developed by Grasha (1996) in order to determine their learning styles. This inventory consists of six types of learning style as independent, avoidant, collaborative, dependent, competitive and participant. Multivariate Analysis of Variance (MANOVA) was used to analyze the data. The findings indicated that there was no significant difference in learning style preferences between males and females. Generally, the majority of students preferred collaborative type learning style. This study suggests that instruction should be based on students' learning styles for effective teaching and learning.

**Keywords:** learning style, gender, pre-service teachers.

**ÖZET:** Bireysel farklılıklar öğretme ve öğrenmede önemli rol oynar. Öğrenciler nasıl öğrendiklerini gösteren öğrenme stilleri bakımından farklılık gösterirler. Bu çalışmanın amacı öğretmen adaylarının öğrenme stillerini belirlemek, kız ve erkek öğrenciler arasında öğrenme stilleri açısından anlamlı bir fark olup olmadığını araştırmaktır. Çalışmaya ilköğretim bölümü fen bilgisi öğretmenliği ana bilim dalından 121 öğrenci katılmıştır. Öğrencilerin öğrenme stilleri belirlemek amacıyla Grasha (1996) tarafından geliştirilen Öğrenme Stilleri Envanteri uygulanmıştır. Bu envantere göre öğrenme stilleri bağımsız, pasif, işbirlikçi, bağımlı, rekabetçi ve katılımcı öğrenme stili olmak üzere altı başlık altında toplanmıştır. Verilerin analizi çok yönlü varyans analizi kullanılarak yapılmıştır. Sonuçlar, öğrencilerin işbirlikçi öğrenme stilindeki ortalamalarının en yüksek olduğunu göstermiştir. Diğer taraftan kız ve erkek öğrenciler arasında öğrenme stilleri açısından anlamlı bir fark bulunmamıştır. Bu çalışma verimli öğretim ve öğrenme için öğrenme stillerinin belirlenmesi gerektiğini önermektedir.

**Anahtar sözcükler:** öğrenme stilleri, cinsiyet, öğretmen adayları.

#### 1. INTRODUCTION

Learning can be defined as a change in an individual's way of seeing, experiencing, understanding and conceptualizing something in the world (Ramsden, 1991). Every person develops his own approaches to learning. Some people may prefer auditory sensory mode while others make use of visual sensory mode. These preferences reflect one's learning style. Learning style refers to individual's preference in how to learn. Physiological, cognitive and affective factors determine one's learning style. The physiological factors involve sensory perceptions, environmental characteristics, times of day for learning and need for food during study. The cognitive factors involve encoding, processing, storing and retrieving information. The affective factors include emotional and personality characteristics such as motivation, attention, locus of control, interest, persistence, responsibility and sociability (Cornett, 1983). In addition, genetic factors, edu-

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cational experiences and environment affect one's learning style preferences and cause some styles to be dominant (Grasha & Yangarber-Hicks, 2000; Kolb, 1984). As a result, people differ in learning style preferences, and this difference is reflected in the classrooms. For example, if a student prefers auditory sensory mode, he may need to hear the material to be learned, and lecturing or other oral instructional methods may be useful for him. Thus, educators should focus on students' learning styles in order to improve learning and teaching. In this study, pre-service science teachers' learning styles were identified by using Learning Style Inventory developed by Grasha (1996). Also, the relationship between their learning style preferences and gender differences was investigated.

Recent research studies related to learning styles examined the difference in learning styles between male and female students. Hickson & Baltimore (1996) reported that females prefer visual tasks compared to males. Another study has shown that male students prefer more peer interaction and kinesthetic activities than female students, female students were self-motivated, teacher and parent motivated, more persistent and more responsible (Honigsfeld & Dunn, 2003). In order to interpret gender differences in learning styles, Severiens & ten Dam (1997) investigated gender identity instead of gender. Gender identity reflects the point of view that the extent students view themselves as feminine or masculine. The researchers claimed that gender identity explained more variation in learning styles compared to gender. It was concluded that if a student saw himself or herself as both masculine and feminine, he or she learned deeply and independently. Students in femininity dimension used stepwise processing strategies, depended on external sources and defined learning as taking knowledge.

On the other hand, there have been research studies in the related literature in which no significant difference between male and female students was found in terms of learning style preferences (Jones, Reichard & Mokhtari, 2003; Truluck & Courtenay, 1999).

It has been revealed that students' learning style has a strong influence on achievement. Thus, in order to enhance learning, determination of learning styles is important. Based on students' learning styles, new instructional strategies can be developed and all students in the class can be successful. In the present study, the purpose is to determine pre-service science teachers' learning styles by using Grasha's (1996) Learning Style Inventory which consists of six learning styles as competitive, collaborative, avoidant, participant, dependent and independent. Also, the relationship between learning style preferences and gender difference of pre-service science teachers was examined.

## **2. METHOD**

### **2.1 Subjects**

121 pre-service teachers from the department of elementary science education participated in the study. Of 121 students, 45 were male and 76 were female.

### **2.2 Instrument**

Learning Style Inventory developed by Grasha (1996) was used in this study. It was administered to all students in the study. This instrument consisted of 60 items in a 5-point likert type. Students were required to rate each item from strongly disagree to strongly agree. Grasha (1996) described six learning styles as competitive, collaborative, avoidant, participant, dependent and independent. These learning styles have the following characteristics:

**Competitive:** Students compete with other students in the class in order to perform better. They want to take attention and receive recognition for their achievement in the class. They expect rewards as a result of their achievements.

**Collaborative:** Students learn by sharing their ideas and talents. They enjoy cooperating with teachers and other students. They like discussions in which they can state their ideas freely and see others' ideas.

**Avoidant:** Students are not enthusiastic about learning. They are uninterested in classroom activities. They do not like attending classes and participating with teachers and other students. They interact slightly with the teacher and other students.

**Participant:** Students like to attend classes and participate in class activities. They prefer to take responsibility in class activities. They are eager to learn. They represent good citizens in the class.

**Dependent:** Students follow the teacher and students as authorities who give information. They have no intellectual curiosity. They only learn what is required for the class.

**Independent:** Students prefer to work alone on course projects. They are confident in their learning abilities. They like to decide the content they will study.

This instrument was translated into Turkish by the researchers and checked by the experts in English. Also, the content validity of the instrument was checked by the experts in terms of appropriateness of the instrument to the Turkish culture. The reliability (Cronbach's alpha) of the instrument was found to be 0,79. Sample items for each learning style are shown in Table 1.

### **2.3 Procedure**

Learning Style Inventory was administered to all students in the study. The data obtained were analyzed by using SPSS (Statistical Package for Social Sciences) program.

**Table 1:** Sample items from Learning Style Inventory

#### **Independent**

I prefer to work by myself on assignments in class.

When I don't understand something, I first try to figure it out for myself.

#### **Avoidant**

Classroom activities usually are boring.

I don't want to attend most of the class sessions.

#### **Collaborative**

I enjoy discussing my ideas about course content with other students.

I study for tests with other students.

#### **Dependent**

I rely on my teacher to tell me what is important for me to learn.

I only do what I am absolutely required to do in a course.

#### **Competitive**

It is necessary to compete with other students to get a good grade.

I try to solve problems or answer questions before anybody else in class can.

#### **Participant**

Class sessions typically are worth attending.

Classroom activities are interesting.

### 3. RESULTS

Based on the data obtained by Learning Style Inventory, students' mean and standard deviation scores for six types of learning styles were found as shown in Table 2.

It is seen that students preferred collaborative learning style mostly with a mean score 3.77 out of 5. This type of learning style favors studying with other students. Students in this style prefer to share their ideas through discussions or group projects.

In order to investigate whether there was a significant difference between male and female students in terms of learning style preferences, multivariate analysis of variance (MANOVA) was used by taking six learning styles as dependent variables and gender as an independent variable.

One of the MANOVA assumptions is multivariate normality. All of the individual dependent variables must be distributed normally. In order to check this assumption, scatter diagrams of dependent variables were plotted, bivariate normality indicates multivariate normality. Also, skewness and kurtosis values were computed. Skewness and kurtosis should be zero for a normal distribution. Table 3 shows skewness and kurtosis values for dependent variables which are six learning styles. Generally, these values are around zero with a few exceptions that are tolerable and it can be said that there is no violation to this assumption.

**Table 2:** Mean scores and standard deviations of learning styles

| Learning Style | Mean | Std. Deviation |
|----------------|------|----------------|
| independent    | 3.44 | 0.39           |
| avoidant       | 2.40 | 0.49           |
| collaborative  | 3.77 | 0.48           |
| dependent      | 3.70 | 0.42           |
| competitive    | 3.29 | 0.56           |
| participant    | 3.57 | 0.46           |

**Table 3:** Skewness and Kurtosis values for dependent variables (learning styles)

| Dependent Variables | Skewness | Kurtosis |
|---------------------|----------|----------|
| Independent         | 0,32     | -0,37    |
| Avoidant            | -0,12    | -0,16    |
| Collaborative       | -0,86    | 3,35     |
| Dependent           | -0,27    | 0,36     |
| Competitive         | -0,27    | -0,29    |
| Participant         | -0,30    | 0,09     |

variables is equal across gender. All significance values for dependent variables were greater than 0,05, which means that equality of variances assumption was not violated.

After checking whether the assumptions were violated, Hotelling's  $T^2$  was used in order to test whether six learning styles differ between males and females. This analysis showed that there was no significant difference between males and females with respect to learning style preferences ( $F=1,515$ ;  $df=6$ ;  $p>0,05$ ). Table 4 presents means scores and standard deviations of learning styles for males and females.

Another assumption of MANOVA is homogeneity of covariance matrices. In order to test this assumption, Box's Test was used. This analysis revealed that the observed covariance matrices of the dependent variables are equal across gender ( $F=1,298$ ,  $p>0,05$ ). This assumption was not violated, either.

Levene's Test was used in order to check that error variance of the dependent

### 4. CONCLUSION AND SUGGESTIONS

The purpose of the present study was to identify pre-service teachers' learning styles and investigate the difference between learning style preferences of males and females. The result of the analysis has shown that students mean score for collaborative type learning style was the highest of all styles. Also, no significant difference was found between males and females in terms of learning styles. This finding supports the studies of Truluck & Courtenay (1999) and Jones, Reichard & Mokhtari (2003).

Interaction between the teacher and students plays an essential role during the learning process. The quality of this interaction determines the learning (Keefe, 1987). Therefore, teachers should develop appropriate activities for students. It has been accepted that students differ in many ways. We cannot expect all students to learn in the same way. Without considering learning styles, effective teaching cannot be achieved. For this reason, teachers should have knowledge about learning styles, identify their students' learning styles and use different teaching strategies to meet all types of learning styles. Therefore, integrated model of teaching and learning should be developed. As well as knowing students' learning styles, teachers also should know about their own learning and teaching styles so that they can adapt their styles to students' learning styles. In addition, using appropriate teaching strategies according to students' learning styles requires appropriate assessment techniques for different learning styles. As a result, higher student achievement can be observed. Instruction based on students' learning styles may also enhance students' motivation, develop positive attitudes and reduce their anxiety, which lead to success in class (Keefe, 1991; Sloan, Daane & Giesen, 2002; Hancock, Bray & Nason, 2002).

On the other hand, it is important that students should be aware of their learning styles so that they can comprehend the nature of instruction and have maximum benefit from it. Every student has a variety of learning styles; however, some of them are dominant due to genetic factors, environmental factors or educational experiences (Kolb, 1984). This study has shown that students preferred collaborative learning style mostly. They tend to study in groups with their peers. They learn by sharing their ideas. As a teaching strategy, they prefer group projects, group inquiry or discussion methods. Therefore, it can be inferred that students give importance to interaction in class. Interaction among the students and between the students and the teacher provides metacognitive awareness, evaluation of learning process, and thus, greater achievement.

Even though there was no significant difference between the male and female students' learning styles, the female students' mean scores for avoidant, dependent, participant and competitive learning styles were higher than those of the male students. Students in these styles prefer to learn through lectures, teacher-centered discussions, teacher-centered questioning, technology-based presentations or term papers. The reason why no significant difference was found might be due to the educational experiences. The students participated in this study studied together during their education in the elementary science education program for four years and received the same courses from the same instructors. Since individuals' educational experiences influence their learning style preferences, in this study, the students' learning style has been affected by the same factors causing them to be similar. Further research is needed for different student groups and different grade levels. Also, the effect of different teaching strategies based on students' learning styles on their achievement can be investigated.

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