

WCES-2011

## The effect of matching learning styles with teaching styles on success

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### Abstract

This study aims to examine the matching between the learning styles of instructors and teacher candidates and between the teaching styles of instructors and learning styles of teacher candidates. Our research also examines the effect of this matching on the success of teacher candidates. Grasha-Riechmann Learning Style Scale was applied to the teacher candidates and to the instructors. Teaching Styles Inventory was applied to the instructors. Students' grades related to the Chemistry and Teaching Pedagogy Courses in the spring term of the 2009-2010 academic years were taken as a success criterion. It is concluded that matching learning styles of instructors with that of teacher candidates and matching teaching styles of instructors with the learning styles of the teacher candidates has not significant effect on the success of the teacher candidates.

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*Keywords:* Teaching styles, learning styles, success, Grasha-Riechmann learning style scale, Teaching styles inventory.

### 1. Introduction

Recent studies in the field of education show new approaches whereby students take active roles, bear the responsibility of learning and are compelled to use their cognitive skills (Taşkın, 2008). These approaches assert that individuals associate all new information obtained through the interaction with their environment to the existing preliminary information in their memories. This association causes changes in both existing and new information, and therefore learners shape the information in their unique style (Bilgin and Bahar, 2008). At this point, it is inevitable to accept individual differences. Learning styles are also one of these individual differences (Bahar and Bilgin, 2003). The concept of learning style was first put forward by Rita Dunn in 1960. There are various definitions of learning styles. For Kolb (1984), learning style means the ways a person prefers to acquire and process information. According to Dunn and Dunn (1993), individuated learning style is the way people begin to concentrate on new and difficult information, process and internalize it. According to Grasha (1996), learning style is the student's personal ability to acquire information together with the learning experiences. In his study, Kuchinskas (1979) reached a conclusion that the instructor's teaching style is one of the most important factors that influence the learning environment. Teaching styles are the leading factors that shape and assure the success of a highly complex teaching-learning process (Artvinli, 2010). Grasha (2002) defined teaching style as the continuous and consistent behaviors of teachers in their interactions with students during the teaching-learning process. A review of the literature shows various opinions regarding the matching or mismatching between learning and teaching styles and between the learning styles of students and teachers. Uzuntiryaki (2007), Karataş (2004), Tucker (1998) and

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Demirci (2009) indicate such matching between the styles does not have an effect on success, while Dasari (2006), Felder (1993) and DeBello (1990) suggest matching between the styles can influence the success. Our study aims to research the effect of the matching between teaching and learning styles and between learning and learning styles on success.

### 1.1. Aim of the study

This study aims to examine the matching between the learning styles of instructors and teacher candidates and between the teaching styles of instructors and learning styles of teacher candidates. It also seeks to research the effect of this matching on the success of teacher candidates. In this aspect, we are guided by the following research questions:

1. How is the distribution of teacher candidates' learning styles according to Grasha's Learning Style? 2. How are the teaching and learning styles of instructors according to the Grasha's Learning and Teaching Style? 3. Is there a significant difference between the success of the teacher candidates in cases where the learning styles of instructors and the learning styles of teacher candidates match or mismatch? 4. Is there a significant difference between the success of the teacher candidates in cases where the teaching styles of instructors and the learning styles of teacher candidates match or mismatch?

### 1.2. Study Group

Sixty-eight teacher candidates and three instructors from Hacettepe University Faculty of Education, Department of Science and Mathematics Education, Chemistry Education Program participated in the study.

## 2. Method

### 2.1. Data Collection Tool

*Grasha-Riechmann Learning Style Scale:* The inventory was originally developed by Grasha (1996) and adapted into Turkish by Uzuntiryaki, Bilgin and Geban (2003). Cronbach alpha coefficient for internal consistency of the inventory was found 0.89 by Tatar, Tüysüz and İlhan (2008). The inventory is composed of a total of 60 items with 5-point Likert-type scales under six categories: competitive, collaborative, avoidant, participant, dependent and independent. Each category contains ten items.

*Teaching Styles Inventory:* The inventory was originally developed by Grasha (1996) and adapted into Turkish by Bilgin, Uzuntiryaki and Geban (2002). Cronbach-alpha reliability coefficient of the inventory was found 0.89 by Bilgin and Bahar (2008). The inventory is composed of 40 items with 7-point Likert-type scales under the categories of expert, formal authority, personal model, facilitator and delegator. Each category contains eight items.

### 2.1. Procedure

This study used Grasha-Riechmann Learning Style Scale to determine the learning styles of the instructors and teacher candidates. Teaching Styles Inventory was used to determine the teaching styles of the instructors. Grades earned by students in the courses Curriculum Development and Instruction (CDI), Introduction to Teaching Profession, Chemistry Education Seminar I (ITP and CES I) and General Chemistry II (GC II) were taken as success criteria for each course. The grades of the teacher candidates were coded as  $A_1=9$ ,  $A_2=8$ ,  $B_1=7$ ,  $B_2=6$ ,  $C_1=5$ ,  $C_2=4$ ,  $D_1=3$ ,  $D_2=2$ ,  $F_3=1$ .

## 3. Findings

The data obtained from the Grasha-Riechmann Learning Style Scale were analyzed according to the Grasha's (1996) learning style grouping. To determine the learning style group in which the instructors and teacher candidates

are included, mean scores for each group of learning styles were computed. Style groups were formed according to the highest mean score and separate groups were formed for each course.

Table 1 shows the distribution of teacher candidates by learning style groups and Table 2 shows the learning styles of the instructors.

Table 1. Distribution of teacher candidates by learning style groups

	Clusters	Combinations of Learning Styles	Distribution %
CDI	Group 1	Dependent, avoidant, participant, competitive	7.14
	Group 2	Participant, dependent, collaborative	64.28
	Group 3	Collaborative, participant, independent	0
	Group 4	Independent, collaborative, participant	28.58
ITP and CES I	Group 1	Dependent, avoidant, participant, competitive	3.85
	Group 2	Participant, dependent, collaborative	42.31
	Group 3	Collaborative, participant, independent	11.53
	Group 4	Independent, collaborative, participant	42.31
GC II	Group 1	Dependent, avoidant, participant, competitive	17.86
	Group 2	Participant, dependent, collaborative	46.43
	Group 3	Collaborative, participant, independent	10.71
	Group 4	Independent, collaborative, participant	25

Table 2. Learning styles of the instructors

	Clusters	Combinations of Learning Styles
Instructor of CDI	Group 1	Dependent, avoidant, participant, competitive
Instructor of ITP and CES I Instructor of GC II	Group 2	Participant, dependent, collaborative

To determine the teaching style group in which the instructors are included, mean scores for each teaching style group were computed. Style groups were formed according to the highest mean score. The results are shown in Table 3.

Table 3. Teaching styles of instructors

	Clusters	Combinations of Learning Styles	Corresponding teaching style combinations
Instructor of CDI and Instructor of GC II	Group 1	Expert, formal authority	Dependent, avoidant, participant, competitive
	Group 2	Personal model, expert, formal authority	Participant, dependent, collaborative
Instructor of ITP and CES I	Group 3	Facilitator, personal model, expert	Collaborative, participant, independent
	Group 4	Delegator, facilitator, expert	Independent, collaborative, participant

Taking Grasha’s learning styles into account; the teaching style of each course’s instructor was converted to the corresponding learning style group. It was determined that the instructor of CDI and GC II courses was in Group 1, and the instructor of ITP and CES I courses was in Group 3.

Secondly, independent samples t-tests for each course were conducted to determine whether there is a significant difference between the success of teacher candidates in cases where learning styles of the instructors and teacher candidates match or mismatch.

Table 4 shows the comparison of success in the groups where learning styles of the teacher candidates and the instructors match or mismatch.

Table 4. Comparison of success in the groups where learning styles of the teacher candidates and the instructors match or mismatch

	Learning Style Group	N	$\bar{X}$	s	sd	t	p
CDI	Matching	1	7.00	.	12	.180	.860
	Mismatching	13	6.76	1.23			
ITP and CES I	Matching	11	8.18	0.87	21.09	0.926	0.365
	Mismatching	15	7.86	0.83			
GC II	Matching	13	3.92	2.81	25.84	0.716	0.480
	Mismatching	15	3.13	3.02			

Thirdly, independent samples t-tests for each course were conducted to determine whether there is a significant difference between the successes of teacher candidates in cases where their learning styles match or mismatch with the teaching styles of instructors.

Table 5 shows the comparison of success in the groups where learning styles of the teacher candidates match or mismatch with the teaching styles of the instructors.

**Table 5. Comparison of success in the groups where learning styles of the teacher candidates match or mismatch with the teaching styles of the instructors.**

	Learning-Teaching Style Group	N	$\bar{X}$	s	sd	t	p
CDI	Matching	1	7.00	.	12	.180	.860
	Mismatching	13	6.76	1.23			
ITP and CES I	Matching	3	7.00	0.00			
	Mismatching	23	8.13	0.81	24	-2.36	0.02
GC II	Matching	5	3.00	3.24	5.47	-0.388	0.713
	Mismatching	23	3.68	2.88			

#### 4. Conclusion and Discussion

In this study, learning styles of the teacher candidates and instructors were analyzed according to Grasha's (1996) learning styles grouping. Of the teacher candidates enrolling in the CDI course, 64.28% fell into Group 2; 28.58% fell into Group 4; and 7.14% fell into Group 1. The learning style group of the instructor responsible for the CDI course was determined as Group 1. Of the teacher candidates enrolling in the ITP and CES I courses, 42.31% fell into Group 2; 42.31% fell into Group 4; 11.53% fell into Group 3; and 3.85% fell into Group 1. The learning style group of the instructor responsible for the ITP and CES courses was determined as Group 2. 25 % per cent of the teacher candidates enrolling in the GC II course fell into Group 4; 46.43% fell into Group 2; 17.86% fell into Group 1; and 10.71% fell into Group 3. The learning style group of the instructor responsible for the GC course was determined as Group 2. Although the teacher candidates are dominant in the sub dimension of the learning styles, they also showed the features of other sub dimensions (Table 1 and 2). As shown in the Table 3, taking Grasha's learning styles into account; the teaching style of each course's instructor was converted to the corresponding learning style group. It was determined that the instructor of CDI and GC II courses was in Group 1, and the instructor of ITP and CES I courses was in Group 3.

This study examined the effect of the matching between learning styles of teacher candidates and instructors on success for each course. As shown in Table 4, the mean scores of success of the matching group for the CDI course was  $X=7.00$ , while that of the mismatching group was  $X= 6.76$  ( $p=0.86$ ). The mean scores of success of the matching group for the ITP and CES I courses was  $X=8.18$ , while that of the mismatching group was  $X= 7.86$  ( $p=0.36$ ). The mean scores of success of the matching group for the GC II course was  $X=3.92$ , while that of the mismatching group was  $X=3.13$  ( $p=0.48$ ). Although the mean scores of success of matching groups were higher for all courses than that of the mismatching groups, such a difference was not significant.

This study examined the effect of the matching between learning styles of teacher candidates and teaching styles of the instructors. As shown in Table 5, the mean scores of success of the matching group for the CDI course was  $X=7.00$ , while that of the mismatching group was  $X= 6.76$  ( $p=0.86$ ). The mean scores of success of the matching group for the ITP and CES I courses was  $X=7.00$ , while that of the mismatching group was  $X= 8.13$  ( $p=0.02$ ). The mean scores of success of the matching group for the GC II course was  $X=3.00$ , while that of the mismatching group was  $X=3.60$  ( $p=0.71$ ). While there was not a significant difference between the mean scores of success of CDI and GC II courses, a significant difference was determined between the mean scores of success of ITP and CES I courses in favour of the mismatching group.

In the light of these results, matching was proven not to have a significant effect on the success of the teacher candidates in both cases. There are many studies in the literature supporting this result. Uzuntiryaki (2007) indicated that matching of the teaching styles of chemistry teachers with the learning styles of high school students did not have any effect on the chemistry success. Karataş (2004) concluded that there was not a significant influence on academic success rates of students when matched in a relationship between the instructors' teaching styles and students' learning styles. Tucker (1998) used the Canfield Instructional Styles Inventory and the Canfield Learning

Styles Inventory in his study to determine the teaching styles of the participant teachers and the learning styles of the participant students. He determined that matching of the teachers' teaching styles with students' learning styles did not have a significant impact on the students' success. Demirci (2009) concluded in his study that matching or mismatching of learning styles of students and instructors did not affect students' success in the Department of Turkish Folk Literature.

Generally, it is thought that matching learning styles of instructors with that of teacher candidates and matching teaching styles of instructors with the learning styles of the teacher candidates affects the success of the teacher candidates positively. However, the results of this study determined that such a matching does not have an impact on the success of teacher candidates. The reasons may be the adaptation of teacher candidates to the different teaching methods, flexibility of their learning styles, and their adaptation to the different environments and different applications used by their teachers. Spoon and Shell (1998) indicated that matching of the learning and teaching styles did not significantly impact success, and the learning style could change depending on the age, subject and environment. In her study, Demirci (2009) established that the reason why matching the learning styles of the teachers and students does not have a significant impact on success might be the adaptation of students to different learning styles.

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