Learning Strategies Used by Teacher Candidates

Işıl SÖNMEZ EKTEM

Department of Educational Sciences, Faculty of Education, Necmettin Erbakan University.
isilsonmez79@hotmail.com

Abstract: The aim of this study is to determine the learning strategies used by teacher candidates and to examine whether their use of learning strategies change in terms of various variables. This study has been conducted among 425 teacher candidates at Necmettin Erbakan University. "General Learning Strategies Evaluation Scale" developed by Öztürk (1995) has been used to identify the extent that prospective teachers use learning strategies in their studies, and a questionnaire has been used to identify the situations related to the use of strategies. Descriptive statistics, t test, variance analysis, and Kruskal Wallis test was used while analyzing the data gathared. According to the findings concluded, the teacher candidates frequently use metacognitive strategies and their use of learning strategies vary with their gender, the type of school that they had graduated, and the department they had been trained.

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1. Introduction

Steady development and change forced the societies to keep up with this change and development. The expectations in education also frequently change with this development and it is a must to train individuals to keep up with this change. Instead of training ambiances where the teacher presents knowledge and the student acquires it, new educational ambiances have been introduced where the individuals participate in training procedure, the students investigate knowledge and also they participate in learning process affectively. The participation of a student in learning process requires that this student knows the learning strategies and has the ability of making use of them (Tay, 2004). The researches conducted by cognitive theorist have proven that one of the most important requirements of making learning more effective is to have a rich repertoire of learning strategies and to know under which conditions this strategies can be applied (Weinstein&Mayer, 1986).

Learning strategies were offered as the techniques and the tools activating or paving the way for cognitive procedures under the cognitive learning theory based on data processing and coding principles (Somuncuoğlu&Yıldırım, 2000) and also the answer being looked for how one learns constructed a basement for many studies on the subject. In rewieving the literature, it may have been observed that learning strategies have been defined in various styles. Learning strategies may be defined as the efforts of students on mental processes where they comprehend and take over the knowledge offered to themselves during learning-teaching process or individual's own learning process (Tay, 2004). Weinsten and Mayer (1986) define learning strategies as "behaviours an thoughts that a learner engages in during learning" which are "intended to influence the learner's encoding process. Arends (2007, cited in Senemoğlu, 2006) points out to the attitudes and thought processes used by a student where those attitudes and processes cover the cognitive procedures of him/her like storing in memory or recalling what is stored. Gagne and Diriscol (1988) defined learning strategies as "the ways of a student to learn and the methods used by that student". Woolfolk (1998) described as a plan used to achieve the learning targets.

Learning strategies are defined as putting together the antecedent knowledge that had been acquired before and the new knowledge that will be learned and making use of the attitudes that help to recall this combined knowledge. Therefore, a student shall effectively participate in his/her learning process, shall have the right to comment on his/her learning procedures, and first of all he/she shall learn "how to learn" (Weinstein&McDonald, 1986, cited in Somuncuoğlu and Yıldırım, 2000).

Öztürk (1995) made a comprehensive study on learning strategies and defined seven main groups of strategies as attention strategies, rehearsal strategies, elaboration strategies, storage strategies, retrieval strategies, metacognitive strategies, and affective strategies.

Attention strategies: One of the important processes at learning is the attention. Attention is defined as focusing feelings and thoughts on something and is a situation of being aware of them. One shall have some characteristics that help him/her to select and focus on the stimulus needed between

many stimuli reaching to him/her (Eroğlu, 2007).

Rehearsal strategies: Rehearsal is the repetition of knowledge with sound or mentally over and over without changing its structure and meaning (Eggen&Kauchak, 1994).

Elaboration strategies: These are the strategies that help meaningful learning by constructing relations between information units. The students integrate the new knowledge with the knowledge they had acquired before and hence they learn by attributing meanings to them. While constructing such relationship, the students make use of mental images or verbal structures, and sentences to support their perception (Özer, 1998).

Affective strategies: These are the strategies that help to remove motivational or sensational barriers at learning process (Tunçer&Güven, 2007).

Storage strategies: The tactics included in this strategy leads keeping information in memory in hierarchical categories, by constructing networks, by meaningless data particles, and by memorizing them (Öztürk, 1995).

Retrieval strategies: This is the process of locating information in long-term memory and recalling information from there (Senemoğlu, 2007).

Metacognitive Strategies: Metacognition define as "the knowledge and control children have over their own thinking and learning activities" (Cross and Paris, 1988). In another words, awareness and management of one's own thought (Kuhn and Dean, 2004).

The main supervisor on behaviors of students' learning and studying characteristics is their teacher. In the information era of today, all training steps beginning from primary school to the end of higher education, the students have two primary requirements. These are the subjects in curriculum and how they will learn those subjects. The education shall be planned and executed by taking into consideration all these elements. The need of students in learning to learn may only be fulfilled with the teachers' "teaching to learn" activities (Özer, 1998). Therefore, it is very important for the teacher candidates to have this type of abilities since they will train the next generations in the future. For that purpose, learning strategies of the teacher candidates are reviewed in terms of various variables and the answers to the following questions have been looked for:

1. In what level the teacher candidates make use of learning strategies?

2. Is there any variance between the levels of using learning strategies behavior of teacher candidates in terms of their gender?

3. Is there any variance between the levels of using learning strategies behavior of teacher candidates in terms of their class levels

4. Is there any variance between the levels of using learning strategies behavior of teacher candidates in terms of their departments that they had graduated?

2. Methodology

This is a descriptive research and the purpose of this study is to reveal the usage level of the learning strategies by teacher candidates. During this study, the level of learning strategy usage is compared in terms of gender, department that they have been trained, and the type of school that they had been graduated and it is reviewed if there is any meaningful difference between the students in terms of those variables. From this aspect, this study is also a relational study (Erkuş, 2005).

2.1.The Study Group

The population of the study comprises (44) students from English Language Teaching Department, (34) students from Department of Music Education, (45) students from Department of Biology Education, (44) students from Religious Culture Department, (49) students from Department of Mathematics Education in Primary School, (38) students from Art Teaching Department, (33) students from Science Teacher Department, (44) students from Social Sciences Teaching Department, (50) students from Computer and Instructional Sciences Teaching Department of Education Faculty as a total of 425 teacher candidates. 293 of those students are girls and 132 of them are boys. Since the survey of ten students had not been filled appropriately, by elimination of them 425 students comprise the population of this study.

2.2.Data Gathering Tools

"General Learning Strategies Evaluation Scale" consisting 63 questions developed by Öztürk (1995) have been used in this study. The reliability coefficients of this scale are Attention, Rehearsal, Perception, Memorizing, Recalling, Cognitive Management and Affective Strategies in 7 categories. They have been graded as 0.64 for Attention Strategy; 0.71 for Rehearsal Strategy, 0.74 for Perception Strategy, 0.61 for Memorizing Strategy, 0.71 for Recalling Strategy, 0.79 for Cognition Management Strategy, and 0.64 for Affective Strategy. The answers to the scale are pointed as 1 for never, 2 for very little, 3 for sometimes, 4 for frequently, and 5 for always.

The results of the survey are analyzed by using a rating scale. There are 5 choices in the scale. The four interval coefficients (5-1=4) between in pentad scale is (4/5) 0.80. The intervals are as follows: 1-1.79 for never, 1.80-2.59 for very little, 2.60-3.39 for sometimes, 3.40-4.19 for frequently, and 4.20-5 for always.

Personal data template has been prepared by the researcher although it is mainly based on Öztürk's template.

2.3.Analysis of Data

The analysis of data is performed with SPSS 16 Computer Software. The arithmetical means and standard deviations of the general approaches of the students relating to the learning strategies are calculated.

T test is applied to reveal whether there is a meaningful variance in terms of student's gender. Since the data between sub-categories of the departments where the students being trained and the schools where they had graduated are not periodic, Kruskal Wallis Test is applied to be able to reveal if the relation between those variables are meaningful.

3. Results and Discussions

The average points of general learning strategies of the students being trained in Education Faculty at Necmettin Erbakan University are given in the following Table 1.

Table 1 The Average Points of the Teacher Candidates Relating to their Learning Strategy Usage Level

Strategies	N	Mean	Std. Deviation
Attention str.	425	3,64	3,52
Rehearsal str.	425	3,30	5,32
Elaboration str.	425	3,62	11,26
Storage str.	425	3,46	3,46
Retrieval str.	425	3,60	3,95
Metacognitive str.	425	3,71	4,50
Affective str.	425	3,37	6,96
TOTAL	425	2,22	27,37

According the findings on usage levels of teacher candidates are studied, it is seen that they make use of metacognitive strategies very high with maximum arithmetical average of (3.71) and make use of least the rehearsal strategy with a minimum arithmetical average of (3.30). This result may be evaluated as an indicator of students being aware of their cognitive structure and their own learning characteristics and as an indicator revealing that they have the ability of evaluating and deciding what to learn and how to learn. The average of these strategies varies between 3.71 and 3.37. Other strategies beginning from most used to the least used are as follows: (3.64) for attention, (3.62) for elaboration, (3.60) for retrieval, (3.46) for storage, (3.37) for affective strategies. The views of the students mainly bunched at "sometimes" as 2.60-3.39, and "frequently" as 3.40-4.19" under scale values.

Çiftçi (1998) concluded that the students apply the cognitive management behaviors and attitudes consistently while they study mathematics. This conclusion supports the findings of this study that reveal the teacher candidates make use of metacognitive strategies frequently. Similarly, Öztürk (1995) also concluded that the students make use of metacognitive strategies at top level while making use of rehearsal strategies at a minimum level. This conclusion also coincides with the conclusion of this study. Although the conclusion of this study coincides with the conclusions of Çiftçi (1998), Öztürk (1995), Karakış (2006) and Yıldızlar (2012); Güven (2004) and Arsal (2005) concluded that the students mostly make use of organizing strategies; Özer (1993) concluded that the rehearsal strategy is mostly used by the students. Those conclusions vary with the findings of this study.

The conclusions of the t test that is conducted to reveal if there is a meaningful variance between the gender parameter of the teacher candidates and their usage of learning strategies are given in Table 2 below.

Table 2. The results of the t test that reveals the point relation between gender and students' usage levels of learning strategies

Strategies		N	Mean	Std. Dvt.	df	t	P
Attention	Girl	293	21.89	3.48	423	.358	.720
	Boys	132	21,76	3,62			
Rehearsal	Girl	293	30,15	5,08	423	2,262	,024
	Boys	132	28,90	5,72			
Elaboration	Girl	293	69,92	10,45	423	2,791	,005
	Boys	132	66,65	12,62			
Storage	Girl	293	21,14	3,27	423	3,217	,001
	Boys	132	19,99	3,74			
Retrieval	Girl	293	21,97	3,71	423	2,771	,006
	Boys	132	20,83	4,34			
Metacognitive	Girl	293	22,56	4,47	423	1,935	,054
	Boys	132	21,65	4,54			
Affective	Girl	293	37,48	6,76	423	1,784	,075
	Boys	132	36,18	7,34			

According the table is reviewed, it is observed that the average of girls' strategy usage points in all sub categories is higher than the boys' average points. To be able to conclude if this result is incidental or a real indicator of strategy usage, independent Samples Test t is applied and as a result of this test the degree of freedom value (df), t test value (t), and meaning level (p) points are reviewed and significance value for rehearsal, elaboration, storage and retrieval strategies are found to be 0.05 which is less than our scale's minimum value. In terms of gender variable, the rehearsal, elaboration, storage, and retrieval strategy usage levels of the candidate teachers found to be at a value of 0.05 which is ($p < 0,05$) and which is significant statistically on behalf of girls.

The significance value of attention, metacognitive and affective strategies in terms of gender is at a value of 0.05 significance value and this ($p < 0.05$) value is also significant statistically. This significance is on behalf of girls. Although the significance is meaningless, the average point of learning strategies usage is higher for girls than boys. In another words, it may be concluded that the level of girls at usage of learning strategies is satisfactory. The findings of the researchers Somuncuoğlu and Yıldırım (2000), Saracaloğlu and Karasakaloğlu (2011), Arsal and Özen (2007), Yalız (2010), Medo (2000), and Özer (1993) also concluded that the usage of learning strategies is on behalf of girls. These conclusions also coincide with the results of this study.

When the results of this study is reviewed in terms of gender, it is observed that the learning strategies used by girls and boys are different and there are many significant conclusions on behalf of girls in surveys. On the other hand, Saban&Tümkaya (2008), Sünbül and others (1998) concluded that there are no significance between study behaviors of teacher candidates in terms of gender.

The results of one-way analysis of variance test to define the usage level of learning strategies by the teacher candidates in terms of educational departments are given in Table 3.

Table 3. The results of anova test results showing the relation between educational department and usage of learning strategies

	Variance Source	**Sum of Squares**	**sd**	**Mean Square**	**F**	**P**	**Meaningful Difference**
Attention sum.	Between group	191.960	9	21.329	1.74	.077	
	Within group	5078.285	415	12.237			
	Total	5270.245	424				
Rehearsal Sum.	Between group	734.232	9	81.581	3.004	.002	
	Withingroup	11269.707	415	27.156			
	Total	12003.939	424				
Elaboration Sum.	Between group	2202.616	9	244.735	1.969	.041	
	Within group	51591.162	415	124.316			
	Total	53793.779	424				
Storage Sum.	Between group	172.698	9	19.189	1.623	.106	
	Within group	4906.243	415	11.822			
	Total	5078.941	424				
Retrieval Sum.	Between group	214.604	9	23.845	1.543	.131	
	Within group	6413.645	415	15.455			
	Total	6628.249	424				
Metacognitive Sum.	Between group	149.913	9	16.657	0.816	.602	
	Within group	8471.767	415	20.414			
	Total	8621.68	424				
Affective Sum.	Between group	2717.174	9	301.908	7.014	.000	İ-T, M-T, B-T, D-T, R-T, M-T, S-T, B-T, F-T
	Withingroup	17863.263	415	43.044			
	Total	20580.438	424				

According the Table 3, it is seen that the departments where students trained also effect the points of rehearsal in the ratio of (F=3.004, p<.002), to the points of elaboration in the ratio of (F=1.969, p<.041) and affective strategies in the ratio of (F=7.014, p<.000). In another words, the usage levels of the students of the strategies of rehearsal, elaboration, and affective vary significantly according to the educational departments of the students. This time, Tukey test is applied to conclude which departments affect these results in what ratio.

Affective strategies usage points according to the Tukey test results are found to be (39.52) for English, (39.44) for Music, (38.54) for Computer and Instructional Technologies, (38.20) for Religious Culture, (38.15) for Arts, (37.97) for Mathematics, (36.75) for Social Sciences, (35.93) for Biology, (35.84) for Science whereas it is only (30.50) for Turkish Language and therefore the students other than Turkish Language Department have significant usage levels in using affective strategies.

There is no significance between departments in terms of rehearsal and elaboration according to the Tukey test. The average points in terms of rehearsal strategy found to be (31.76) for Arts, (31.02) for Religious Culture, (30.68) for Biology, (30.66) for Computer and Instructional Technologies, (3052) for Turkish Language, (29.48) for Science, (29.27) for English Language, (28.52) for Social Sciences, (27.97) for Music, and (27.65) for Mathematics. The average perceptional learning strategy usage points found to be (72.30) for Computer and Instructional Technologies, (71.50) for Arts, (70.60) for Biology, (70.50) for Religious Cultures, (68.70) for Social Sciences, (68.63) for Turkish Language, (68.36) for Science, (66.25) for English Language, (66.16) for Mathematics, and (65.32) for Music.

When the literature is reviewed, it is observed that the usage of learning strategies vary with the departments where the students being trained. The reason for this variance may be the curriculum of departments, the presentation of lectures, and may be the activities and approaches preferred by the teachers of related departments. But Kovach, Fleming and Wilgosh (2001) concluded that the departments where the students being trained do not change the strategy usage of the students and Yıldızlar (2012) also concluded that the departments do not change meaningfully the usage levels of strategies in terms of frequency of the strategy usage.

The results of the Kruskal Wallis Test to reveal the relation between learning strategy usage of the teacher candidates and the departments that they had graduated are given below in Table 4.

When the table is reviewed, the school that the students had graduated affected the rehearsal strategy of them at a ratio of (x^2=14.74, p<.005), elaboration strategy of them at a ratio of (x^2=11.37, p<.023), metacognitive strategy of them at a ratio of (x^2=13.08, p<.011), and affective strategy of them at a ratio of (x^2=19.58, p<.001) but not affected attention strategy of them at a ratio of (x^2=6.35, p<.174), storage strategy of them at a ratio of (x^2=3.52, p<.473), retrieval strategy of them at a ratio of (x^2=7.50, p<.112). In another words, it is observed that the students usage of rehearsal, elaboration, metacognitive and affective strategies have significantly changed according to the school they had graduated.

By taking into account these findings, it may be concluded that the students of five different schools has a different strategy usage in terms of rehearsal strategies. When we consider the line averages of the groups, it is observed that the highest usage of rehearsal strategy, metacognitive strategy, and the perception strategy belong to the students of Vocational High Schools. The source of this result may be thought as the performance-oriented curriculum of vocational high schools, more active students of them in educational process, and the learning through experience educational style of those schools. When it is looked from the point of affective strategies, the highest points belong to the others category where Fine Arts High School and Religious Vocational High School are present. Affective strategies help students at remedying their stress originating from the feeling and anxiety of being unsuccessful in the school and they provide motivation, sustain this motivation, and help focusing on the lectures (Eroğlu 2007). This result may be accepted as an indicator of affective strategies that are actively used in such schools.

Eroğlu (2007) concluded that the school where the students had graduated do not affect the usage of learning strategies and Saracoğlu and Karasakaloğlu (2011) concluded that the type of high schools where the students had graduated do not create a significance statistically by taking into account the points they had in these schools in terms of studying and learning strategies. These findings do not coincide with the findings of this study.

Table 4. The Kruskal Wallis Test Results that reveal the relation between students' usage level of learning strategies and the school they had graduated

Learning Strategy	School Graduated	n	Mean Rank	d	Chi-square	p
Attention	Common High School	137	215,29	4	6,355	,174
	Anatolian High School	107	224,85			
	Vocational High School	52	230,55			
	Private High School	12	159,83			
	Other	117	197,14			
	Total	425				
Rehearsal	Common High School	137	212,85	4	14,745	0,005
	Anatolian High School	107	182,00			
	Vocational High School	52	257,86			
	Private High School	12	198,83			
	Other	117	223,04			
	Total	425				
Elaboration	Common High School	137	219,70	4	11,378	0,023
	Anatolian High School	107	202,01			
	Vocational High School	52	255,35			
	Private High School	12	150,38			
	Other	117	202,81			
	Total	425				
Storage	Common High School	137	219,61	4	3,529	,473
	Anatolian High School	107	200,19			
	Vocational High School	52	222,30			
	Private High School	12	169,58			
	Other	117	217,29			
	Total	425				
retrieval	Common High School	137	221,73	4	7,504	0,112
	Anatolian High School	107	192,14			
	Vocational High School	52	242,87			
	Private High School	12	232,08			
	Other	117	206,63			
	Total	425				
Metacognitive	Common High School	137	228,12	4	13,083	0,011
	Anatolian High School	107	204,71			
	Vocational High School	52	230,15			
	Private High School	12	106,12			
	Other	117	206,21			
	Total	425				
Affective	Common High School	137	188,27	4	19,584	0,001
	Anatolian High School	107	219,90			
	Vocational High School	52	218,84			
	Private High School	12	120,71			
	Other	117	242,52			
	Total	425				

4. Suggestions

Learning strategies point at the behavior and mental processes of the students and comprise memorizing, recalling type of cognitive strategies and procedures that manage the cognitive strategies, cognitive processes, and they affect the learning abilities of the students (6-7). The following results are concluded under this study aiming to reveal whether the learning strategy usage of teacher candidates vary in terms of their gender, the school they had graduated, and the department where they had been trained:

1. The teacher candidates make use of cognitive management strategy with a highest arithmetical average of (3.71), and make use of rehearsal strategy with a lowest arithmetical average of (3.30).

2. The average strategy usage point of girls is higher than boys' strategy usage points.

3. The learning strategies of the teacher candidates significantly change according to the departments where they have been trained.

4. The rehearsal, perception, cognitive management, and affective strategy usage levels of the teacher candidates significantly change with reference to high schools that they had graduated.

As a result of this study, it is concluded that the strategy learning programs must take place within curriculum of education faculties from the point of view that making learning process more active and to increase the success of teacher candidates who will train the next generations in the future and hence the students trained by them will benefit most.

Correspondence to:
Isil Sönmez Ektem
Necmettin Erbakan University Faculty of Education
Department of Educational Science
Konya 42090, Turkey
Telephone: 0090-507-3790974
Cellular phone: 0090-332-3238220-5706
Emails: isilsonmez79@hotmail.com

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