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# The Effect Of Cognitive Flexibility On Higher School Students' Study Strategies

Ayşem Seda Önen<sup>a</sup> \*, Canan Koçak<sup>a</sup>

<sup>a</sup> Education Faculty, Hacettepe University, Ankara, 06800, Turkey

## Abstract

Cognitive flexibility has been defined as the person's being aware of alternative ways and options, being flexible in accommodating to new situations, and feeling competent in the situations when the person is flexible. In the study, the effect of cognitive flexibility on higher school students' study strategies has been investigated. The sample of the study consists of 554 students. The Cognitive Flexibility Scale used to collect data for this study has been designed by Bilgin (2009). The scale used to specify study strategies has been developed by Öztürk, Koç and Çetin (2004). At the end of the study, it is seen that there is a significant relation between sub-dimensions of Cognitive Flexibility Scale and Study Attitudes Inventory.

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## 1. Introduction

Schools prepare students for the social life's working environment with providing study strategies and learning outputs, as well as gathering information's real world under its roof. According to Wittrock (1986); affective variables such as success, motivation, sense of self and attitude are the primary of learning outputs. Also, the strategies that are learned at schools increase the efficiency more in work life later (Açıkgöz, 2003; Önder, 2009). Therefore, one of the basic aims of education given at schools should be to make students gain learning and studying strategies (Derry & Murphy, 1986). In order to make them gain effective study strategies, it is important to investigate their attitudes towards studying. According to Morgan (1991), attitudes affect one's behaviors to a great extent. Thus, in the studies that investigate this topic, it is found that the students with positive attitudes towards studying use studying strategies more effectively (Grabill, Lasane, Povitsky, Saxe, Munro, Phelps, & Straub, 2005; Erdamar, 2010) and there is a significant relation between their study habits and academic achievements (Houtte, 2004). Additionally, Özgüven (1987) states that the studies that investigate students' study habits and attitudes are

\* Ayşem Seda Önen Tel. +90 0312 297 67 83; fax: +90 0312 297 86 00  
E-mail address: [aysemseda@gmail.com](mailto:aysemseda@gmail.com)

based more on judgment. These findings bring a question into mind whether there are any other factors that affect students' attitudes towards studying. For instance, whether students' attitudes towards studying are affected by their cognitive processes? Cognition, because, is the process during which sensory inputs are transformed, decreased, processed, saved, retreated and used (Neisser, 1967). Thus, the theories that are based on the investigation of cognition, take thought, attitude and similar cognitive processes into account in explaining behaviors (Bandura 1989). The concept of cognitive flexibility has a great importance in the theories that are based on the cognition. Cognitive flexibility is defined as one's being aware of alternatives, adapting to new situations and feeling competent (Martin & Anderson, 1998; Martin, Anderson & Thweatt, 1998; Martin & Rubin, 1995). In any situation, individuals have the alternatives about how they will act. However, they should see the options and alternatives before deciding how to act. The ones, who are aware of potential alternatives (behaviors, solutions, etc.) of a situation, are more cognitively flexible when compared to others who see only the right behavior (Martin, Anderson ve Thweatt, 1998; Diril, 2011). Cognitive Flexibility Theory is based on the use of individual's existing knowledge flexibly. In this theory, required knowledge should be organized, taught and presented mentally through many different ways (Spiro, 1980). Cognitive flexibility is the result of individual's flexible thinking (Brown & Campione, 1981). However, it is not enough to think flexibly. It is also required that the presentation and the gain of the knowledge is successfully fulfilled in order to use the knowledge flexibly. If the knowledge is not organized neatly in one's mind, the flexible usage of knowledge is hindered, and thus the individual's cognitive flexibility ability cannot develop enough (Spiro, Feltovich, Coulson, & Anderson, 1989). Therefore, in order to get rid of learning disabilities in individuals, it is necessary to inculcate them with more cognitive flexibility during learning processes (Spiro, Vispoel, Schmitz, Samarapungavan, & Boerger, 1987). In addition to this, it is necessary to find out whether students' cognitive flexibility abilities have an effect on their attitudes towards studying. However, there is not such a study that investigates the relation between students' attitudes towards studying and their cognitive flexibility abilities in literature. Thus, the aim of this study is to investigate the relation between high school students' cognitive flexibility abilities and their attitudes towards studying. In the study, whether there is a relation between students' cognitive flexibility levels and their eagerness to study, giving importance to study and making the habit of studying are questioned.

## 2. Method

The data of research have been collected using the quantitative method. The quantitative data obtained from The Cognitive Flexibility Scale and The Attitudes towards Studying Scale used in the research were analyzed using SPSS 15 package program. The Cognitive Flexibility Scale used to collect data for this study has been designed by Bilgin (2009). The Scale is composed of 27 items, and it consists of three factors. The Cronbach Alpha reliability of the scale is .92. On the other hand, the best way of investigating students' study strategies is thought to be determining their attitudes towards studying. The sample of the study consists of 554 students who are studying at grades 9, 10, and 11. The scale used to specify study strategies has been developed by Öztürk, Koç and Çetin (2004). There are 27 items in the scale, and its Cronbach alpha reliability is .72.

## 3. Findings

The scores obtained from Cognitive Flexibility Scale used in the study ranges between from 21 to 105. The increase of the scores means that the individuals have more cognitive flexibility levels. In this study, cognitive flexibility is defined as the scores that are obtained from Cognitive Flexibility Scale. The descriptive statistical values of students' scores that they get from Cognitive Flexibility Scale are specified and shown in Table 1.

Table 1. Investigation of students' cognitive flexibility scores

The descriptive statistical values	Mean	80.30	Distribution of Students According to Their Cognitive Flexibility Scores	The ones that scored from 31 to 53	% 6
	Minimum	31.00		ones that scored from 54 to 79	% 34
	Maximum	95.00			
	Std. Deviation	14.563		The ones that scored from 80 to 95	% 60

As it can be seen in Table 1, the mean score of the students' cognitive flexibility scores is determined as 80.30. The students who participated in the study get 31 as the lowest score and 95 as the highest score from Cognitive Flexibility Scale. When we look at the distribution of students according to their scores from the scale, it is seen that

60% of them scored higher than the mean score. Therefore, according to these findings, it can be said that students' cognitive flexibility abilities are pretty good.

### 3.1. Investigation of Students' Attitudes Towards Studying

The attitudes of the students towards studying are investigated, and the findings are shown in Table 2.

Table 2. Investigation of students' attitudes scores towards studying

The attitudes of the students towards studying	Mean	Std. Deviation
Giving importance to studying	3.15	1.71
Being eager to study	3.42	.89
Making the habit of studying	4.09	.80
The students' overall attitudes towards studying	3.36	.65

The findings that are obtained as the result of the investigation of students' attitude dimensions towards studying are seen in Table 2. Since the students' overall attitudes towards studying is higher than the average score (Mean= 3.36), it can be said that the students have positive attitudes towards studying. Additionally, when the dimensions of attitudes of the students towards studying are investigated separately; it is seen that, especially, the scores (Mean= 4.09) obtained from "Making the Habit of Studying" sub-dimension are higher than other sub-dimensions, and even overall attitudes. It is seen that the scores obtained from "Giving importance to Studying" sub-dimension are lower than other dimensions (Mean= 3.15), but they are still above the average. Therefore, it can be said that students have positive attitudes towards studying, and especially they have more positive attitudes towards making the habit of studying.

### 3.2. Investigation of The Relation Between Students' Cognitive Flexibilities and Their Attitudes Towards Studying

In order to find out whether there is a significant relation between students' cognitive flexibilities and their attitudes towards studying, Pearson Correlation Coefficient (r) is calculated, and the results are shown in Table 3.

Table 3. Correlation between cognitive flexibility scale scores and study attitudes inventory scores (\*\* p < 0.01)

The attitudes towards studying		Giving importance to studying	Being eager to study	Making the habit of studying	Overall attitudes towards studying
Cognitive flexibility	r	-.024	.262**	.233**	.165**
	Sig. (2-tailed)	.641	.000	.000	.000

In Table 3, it is found that there is a significant and positive correlation between students' cognitive flexibility levels and their attitudes towards studying ( $r=.165$ ;  $p<0.01$ ). Also, there are significant and positive relations in Being eager to Study and Making the Habit of Studying sub-dimensions of Study Attitudes Inventory Scale ( $r=.262$ ,  $r=.233$ ;  $p<0.01$ ). But, there is not a significant relation in Giving Importance to Studying sub-dimension. Therefore, it can be said that as the students' cognitive flexibility levels get higher, they have more positive attitudes towards studying, especially being eager to study and making the habit of studying.

## 4. Conclusion

The aim of this study is to investigate students' attitudes towards studying in terms of their cognitive flexibility abilities since it is required for a student to be aware of her own cognitive and affective characteristics and to use them effectively in order to organize the knowledge. In this study, students' cognitive characteristics, cognitive flexibility abilities, affective characteristics are investigated in terms of their attitudes towards studying. The influence of these characteristics upon one another is evaluated separately. Attitudes towards Studying Scale designed by Öztürk, Koç ve Çetin (2004) is used in this study to determine students' "Being Eager to Study",

“Giving Importance to Studying”, and “Making the Habit of Studying” features separately. Since the differences of students’ attitudes towards studying in these sub-dimensions are estimated to affect the findings of the study to a great extent, the investigation of these sub-dimensions are thought to be useful. According to the findings, it is found out that students’ cognitive flexibility abilities are good according to the percentage distribution of their scores since 60% of them get higher scores than the average score. The reason of this is presenting the information to the students with mainly other methods and techniques apart from traditional methods. According to Spiro, Coulson, Feltovich and Anderson (1988), it is necessary to present information with different aims and ways in order to improve students’ cognitive flexibility abilities. Also, it is important to have a learning environment in which students engage actively to improve their cognitive abilities (Spiro, 1980). According to Spiro ve Jehng (1990), computer mediated learning environments should be popularized to minimize messy organized knowledge areas because of traditional teaching methods. It is known that in computer mediated learning environments, students’ cognitive flexibility abilities increase more according to the results of previous studies (Spiro & Jehng, 1990; Jacobson, & Spiro, 1991). The use of computers has become popular at schools as the result of technological advances. Thus, students continue their learning in multiple learning environments thanks to computers in addition to traditional teaching. That the students are involved in activities that help to improve problem solving skills to pass the university entrance exam is thought to affect their cognitive flexibility developments in a positive way because the increase of the activities that improve students’ problem solving skills is another factor for developing cognitive flexibility. Another reason for the students’ sufficient cognitive flexibilities in this study could be their parents’ attitudes. Cognitive flexibility starts to develop since childhood, so it is highly affected by parents’ attitudes. The child develops some cognitive structures as the result of the relation with his parents since his birth, and this affects individual’s life. Especially, authoritative attitudes affect cognitive flexibility development negatively. Another finding that is related to how the parents’ attitudes affect cognitive flexibility shows that the father’s authoritative and strict attitudes lower the teenager’s cognitive flexibility in developing social skills (Melby, Conger, Conger ve Lorenz, 1993; Diril, 2011). At the same time, the results of another study show that there is a significant relation between teenager’s good relations with friends and democratic parents’ attitudes (Putallaz, 1987; Mize, Pettit, & Brown, 1995; Engels, Dekovic, & Meeus; 2002). Other findings obtained from the study show that as students’ cognitive flexibility levels develop, they have more positive attitudes towards studying, especially to studying eagerly and making the habit of studying. According to Bilgin (2009), cognitive flexibility can lead individual to positive thinking, because if thoughts become positive, feelings, behaviors and attitudes change in a positive way. In the study conducted by Erdamar (2010), it is found that freshman students’ attitudes, strategies and perceptions towards studying are more positive than senior students. In another study conducted by Güven (2004), it is found that there is a significant relation between students’ learning styles and their use of learning strategies, especially affective executive cognitive strategies. So, it is found in this study that there is a significant relation between students’ cognitive flexibility levels and their attitudes towards studying.

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