TIP FAKÜLTESİ ÖĞRENCİLERİNDE ÖĞRENME STRATEJİLERİ ALANINDA BİR ÇALIŞMA

A STUDY ON LEARNING STRATEGIES OF MEDICAL STUDENTS

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**Sorumlu yazar

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ABSTRACT:

Background: *One of the goals of medical education should be not only to provide basic knowledge and skills but also to train physicians who have self-regulation skills of their own learning considered to be a life-long learning skill. Students with self-regulation skills can control the learning process and make necessary arrangements by using cognitive and metacognitive strategies. There is an obvious relationship between self-regulated learning and concepts of metacognition, learning strategies and motivation. Learning strategies can be learned and taught. Education provided in this area is reported to increase students' knowledge and implementation of learning strategies and to have positive effects on their motivation and performance.*

The study aims to investigate the relationship between metacognitive awareness and learning strategies training on the implementation of learning strategies.

Methods: *The study population comprised 315 first-year students studying at Dokuz Eylul University Faculty of Medicine in the 2012-2013 academic year. In the study, the students had the training on learning strategies after they were administered the Learning Strategies Inventory as the pretest in January 2013. Descriptive variables and Metacognitive Awareness Inventory were also implemented during the pretest. The Learning Strategies Scale was administered as the posttest in May 2013.*

Results: *Eighty-four students who responded the questions in the pretest and posttest, and participated in the learning strategies training comprised the study sample. In this study, the mean posttest scores for the overall Learning Strategies Inventory and its social-kinesthetic strategies and*

elaboration strategies subscales were found to be significantly higher than those of the pretest. A weak positive relationship was found between the mean scores obtained from the repetition strategies and metacognitive awareness levels.

Conclusion: *It is thought that there is a relationship between learning strategies training and implementation of learning strategies, and that training to be conducted on this issue can contribute to the implementation of the strategies.*

BACKGROUND

Today, a variety of information in the medical field and rapid changes in information have brought about an increasingly complex process in medical education and medical practices. Physicians are supposed to have critical thinking, problem solving and life-long learning skills all of which are considered as the requirement of their profession (1,2). At this point, one of the goals of medical education should be not only to provide basic knowledge and skills but also to train physicians who have self-control skills of their own learning considered to be a life-long learning skill. On the other hand, trainers should play a guiding role both in 'what to learn' and in 'how to learn' (2,3).

Students with self-regulation skills display such behaviors as identifying their purpose by recognizing the learning needs, identifying the resources necessary to fulfil learning, choosing the appropriate learning strategies and putting them into practice, assessing the process and outcomes of learning, and having high motivation (4-10). Students with self-regulation skills can control the learning process and make necessary arrangements by using cognitive and metacognitive strategies (11).

Flavell defines 'metacognition' or 'metacognitive awareness' as "a person's understanding and monitoring his/her capabilities" and "regulating these cognitive processes to maximize his/her learning" (12). The terms metacognition and self-regulation are often used together or interchangeably in the literature since they both indicate that the learner assumes responsibility for learning and actively participates in learning (10, 13, 14). As pointed out in many studies, there is an obvious relationship between self-regulated learning and concepts of metacognition, learning strategies and motivation (15,16).

Another important concept we encounter in this network of relationships is learning strategies. According to Senemoğlu, learning strategies can be defined as students' understanding the knowledge offered to them during the learning process or their individual studies through mental processes, and making efforts necessary to internalize that knowledge (7). For the effective implementation of learning strategies, high levels of metacognitive awareness and self-regulation skills are needed. The effective implementation of metacognitive strategies also has a positive impact on the regulation of metacognition (17).

Considering the assumption that learning strategies can be learned and taught, some universities have organized training programs in the field of learning strategies. Investigation of the training programs of universities in the field of learning strategies revealed that the programs usually lasted a semester, that students attending the education gained credits and that they were given opportunities to share their experiences they gained in other courses. The investigation also revealed that some universities conducting short-term workshop activities dealt with a particular group of learning strategies during each workshop (17-20). Training provided

in this area is reported to increase students' knowledge and implementation of learning strategies and to have positive effects on their motivation and performance (17, 21).

In the light of this information, this study was aimed to investigate the effect of learning strategies training on the implementation of learning strategies and the relation between medical students' metacognitive awareness levels and implementation of learning strategies.

MATERIAL AND METHODS

The study population comprised 315 first-year students studying at Dokuz Eylul University Faculty of Medicine in the 2012-2013 academic year.

Dokuz Eylul University School of Medicine has been implementing Problem-Based Learning (PBL) in its undergraduate curriculum since the 1997-1998 academic year. PBL is the main educational strategy in the first three years of undergraduate medical education (22).

In this study a pretest-posttest design was used. Of the students, 84 who voluntarily responded to the questions on the pretest and posttest, and participated in training activities comprised the study sample.

In January 2013, the first-year students were administered the pretest which included the Learning Strategies Scale (LSS), Metacognitive Awareness Inventory (MAI) and socio-demographic data (23, 24). Learning strategies training was performed after the pretest. In May 2013, they were administered the posttest which included only the LSS. The students were asked to write down their names and last names in both tests in order to find out who the test belonged to.

LSS and MAI are 5-point Likert type scales. Social-affective strategies, elaboration strategies, repetition strategies and attention strategies are the subtitles of the LSS. After the administration of the pretest, reliability and validity studies were conducted for each of the two scales.

Cronbach's alpha and item - total correlations were used for the reliability analysis of the two scales; factor analysis was used to assess the scales' construct validity. After the factor analysis was performed, while the number of the items in the LSS was reduced from 41 to 29, the number of the subscales remained the same. However, the social - affective strategies subscale was renamed social – kinesthetic strategies. Cronbach's alpha value of the LSS was 0.867. The number of the items in the MAI was reduced from 30 to 15. Cronbach's alpha value of the MAI was 0.965.

Data analysis was performed according to the restructured scales. For the comparison of the mean scores obtained from the pre- and post-tests on learning strategies, the t test for dependent groups was used. The relationship between the metacognitive awareness and the use of learning strategies was analyzed with the Pearson's correlation analysis.

Learning strategies training material was based on the information processing theory (7). Interactive lecture methods were used in the training. The training included the topics of metacognitive and learning strategies.

The study was conducted after the approval of the Ethics Committee of Dokuz Eylül University for Non-interventional studies was obtained.

RESULTS

The mean item scores the participants obtained from the learning strategies scale on the pre and post-tests and the results of the statistical analysis are given in Table 1.

The highest mean pretest scores were obtained from the following items of the social-

kinesthetic strategies subscale: 'I pay attention that the study environment is quiet' and 'I do not study for hours uninterruptedly; I study at intervals' whereas the highest mean posttest score was obtained from the item 'I do not study for hours uninterruptedly; I study at intervals'. The lowest mean score was obtained from the following item of the social – kinesthetic strategies: 'while studying, I move around the room' both on the pre-test and on the post-test.

The mean scores obtained from the following items were statistically significantly higher on the posttest than on the pretest: 'I paraphrase what I study as if someone else were listening to me', 'I do not study for hours uninterruptedly; I study at intervals', 'I paraphrase what I have studied to someone else', 'If the sub-sections of the topic I study have sub-sections, I classify them' and 'I place punctuation marks such as "?, *, !" if I do not understand something' (Table 1).

The mean pre- and post-test scores obtained from the learning strategies scale and its subscales, and the results of the statistical analysis are given in Table 2. The mean posttest scores obtained from the Learning Strategies Scale and its subscales were higher than the mean pretest scores. The mean posttest scores for the whole scale and for the social – kinesthetic and elaboration subscales were statistically significantly higher than the mean pretest scores (Table 2).

The mean item scores the participants obtained from the Metacognitive Awareness Inventory are shown in Table 3. The mean score for the overall scale was determined as 3.47 ± 0.37, and the mean scores obtained by 57.1% of the students were higher than the overall mean score. The highest mean item scores were obtained from the items that 'I think about how much time I need to complete the study', ´I think about whether my study has been successful' and 'I think about to what extent I have achieved my expectations of the study´ (Table 3).

The relationship between the mean scores of the Metacognitive Awareness Inventory and those of the Learning Strategies Scale was analyzed with the Spearman correlation, because the data did not have a normal distribution. The results are shown in Table 4.

A weak, positive, significant relationship was found between the mean scores the students obtained from the metacognitive awareness strategies and repetition strategies subscales (Table 4).

DISCUSSION

Social-kinesthetic strategies are associated with cooperation with others and activities displayed during the study. According to the results of this study which are consistent with the results of the study in which the original scale was used, the items favored most by the participants both before and after the study were as follows: ' I pay attention that the study environment is quiet' and 'I do not study for hours uninterruptedly; I study at intervals' (24).

Unlike Celikkaya's study, the statement 'I read aloud what I study in order to remember it permanently' was favored less. Although the item that 'I paraphrase what I have studied to someone else' was favored significantly more after the training, it was one of the social-kinesthetic strategies favored least by the students, which is in line with the results Naçar and Baykan obtained in their study (24, 25). This result is thought to stem from the fact that the students preferred this strategy to share their knowledge with the other members of the group during the PBL sessions held between the pretest and posttest.

Elaboration strategies are used to relate target information to previous information and to create a meaningful whole while it is stored in

the long-term memory. In this study, the item that 'I try to learn by building bridges between what I already know and what I am learning' was one of the most favored elaboration strategies, which was consistent with the literature (24, 25). Of the items of elaboration strategies, the only one whose score increased statistically significantly was the item that 'If the sub-sections of the topic I study have sub-sections, I classify them'. It is thought that learning strategies may have been used more after training because they were recommended as an effective strategy in the learning strategies training when complex information was learned, and were emphasized by giving examples related to them.

In a study conducted with first-grade students attending the faculty of medicine, it was noted that they took notes during the lectures even though they already had printed notes (26). In Çelikkaya's study, the item that 'I take notes in the classroom while the teacher is lecturing' was one of the most favored elaboration strategies (24). In this study, the same item was one of the relatively less favored elaboration strategies. The item that 'I study the notes I have taken before' was the most favored item of the elaboration strategies subscale of the learning strategies inventory both on the pretest and on the posttest. While the strategy that 'I study the notes I have taken before' was more favored in some studies, it was the least favored one in some other studies (25, 27).

One of the important points in the use of learning strategies is to select and use appropriate strategies in accord with the learning style. In the first three years of our faculty, PBL sessions are at the core of the training program. The program includes fewer presentations compared to medical schools where education is given through the classical method. In addition, students can then access presentation materials through the Learning Resources Center. In order for PBL sessions to achieve their goals, students are supposed to fulfil their learning using different sources. Therefore, taking notes during presentations is less common whereas creating their own summary notes while studying alone, and then studying these notes is more likely.

Repetition strategies help a person to store information in the long-term memory and to process it. Repeating the topic learned in a short while after the presentation and then at intervals is considered a part of time management which is defined as one of the key elements of academic achievement (6, 28). However, repetition strategy can also be used to rehearse something. Similar to the results of other studies in the literature, repeating the same subject at regular (one-day, one-week, etc.) intervals was the repetition strategy favored by the participants (24, 25). Of the repetition strategies on the scale, the one favored much was the item that 'I pay more attention to key points in the text and paraphrase it to myself'. This statement is an expression of a strategy used for memorizing information. This result can be the indicator of the students' approaches towards memorization, which is consistent with the results of Stegers-Jager et al.'s study conducted with medical school first-year students indicating a negative relationship between their achievement scores and deep learning strategies they use (6). The students may have maintained their previous study habits of formal education since they were in their first year at university and may have inclined to learn by heart when they encountered with a lot of new information. The item that 'I study the points I cannot understand by reading them repeatedly' may indicate both the tendency towards memorization and the tendency towards understanding through repetition.

The most important process which ensures

the transfer of the part of the information acquired from the environment necessary for an individual into the short-term memory is attention. Strategies used to fulfill this goal are defined as attention strategies. In this study, of the attention strategies, the one favored most by the students both on the pre-test and on the post-test was 'When I start studying, I read the captions underneath figures, graphics or tables', which reveals the importance of using visual material in training. The item that 'I place punctuation marks such as "?, *, !" if I do not understand something' was the most favored in Çelikkaya's study by students (24). In our study, the same item was favored significantly more in post-training practices than in pre-training practices, which suggests that the students may have adopted this item more than the other items of attention strategies.

Based on the mean item scores of the Metacognitive Awareness Inventory, it can be said that the item that 'I think about how much time I need to complete the study' was one of the two items which received the highest mean scores. The other item with the highest mean score was 'I think about whether my study has been successful'. However, it is surprising that the item that 'After completing my study, I feel I should review my study method' had the lowest mean score because it is normally expected to receive a high score since it questions the same thing as does the above item. When these three items are evaluated together, it seems that the students preferred to evaluate the study topic in general not in detail.

Comparison of the relationship between metacognitive awareness and the frequency of the use of learning strategies revealed that there was a weak, positive, significant relationship only with the mean scores for the repetition strategies. This is probably because the participating students' metacognitive awareness levels were high in general. The difference regarding the repetition indicates that these commonly used repetition strategies are a habit which needs to be replaced since they are based on memorization.

Many universities organize learning strategies training targeting especially the first-year students' academic success and their adaptation to higher education (17-20). Some universities publish educational materials and information sources on their websites, which students can easily access (29, 30). It is expected that planning educational activities related to learning strategies in all the stages of medical education in the future and enhancing their scope and time assigned to them will greatly contribute to students. It is also thought that conducting studies aiming to compare first-year students with upper-term students would be guiding since this can demonstrate changes observed in students during the process.

TABLES

Table 1. Comparison of the mean Learning Strategies Inventory scores obtained on the pretest and posttest *

Subscale	Item	Pretest $\bar{x} \pm S$	Posttest $\bar{x} \pm S$	p**
Social _ Kinesthetic Strategies	I pay attention that the study environment is quiet	4.04±0.97	4.18±0.93	0.242
	I do not study for hours uninterruptedly; I study at intervals	4.04±0.83	4.30±0.90	**0.029**
	I prefer to study at a desk	4.02±1.04	4.08±0.92	0.572
	I pay attention that the study environment organized	3.79±1.11	3.79±1.17	1.000
	While studying, I eat or drink something	3.04±1.02	3.15±1.11	0.408
	I read aloud what I study in order to remember it permanently	2.60±0.98	2.60±1.11	1.000
	I paraphrase what I study as if someone else were listening to me	2.51±1.08	2.73±1.05	**0.043**
	I paraphrase what I have studied to someone else	2.38±0.92	2.65±0.88	**0.012**
	I study together with my friends	2.36±0.87	2.43±0.96	0.559
	While studying, I move around the room'	2.19±1.05	2.26±1.13	0.552
Elaboration Strategies	I study the notes I have taken before	3.96±1.03	4.06±0.83	0.465
	I try to learn by building bridges between what I already know and what I am learning	3.88±0.81	3.85±0.81	0.763
	I try to learn by picturing or visualizing what I'm studying	3.76±0.93	3.80±0.92	0.758
	I take brief notes	3.52±1.07	3.71±1.07	0.095
	If the sub-sections of the topic I study have sub-sections, I classify them	3.49±1.12	3.76±0.99	**0.047**
	I try to permanently remember the key ideas in the text by encoding them	3.49±1.12	3.50±1.05	0.918
	I study by writing summaries	3.40±1.16	3.55±1.16	0.272
	I first preview the text and then underline key points in the text	3.23±1.10	3.44±1.14	0.174
	To make it easier to remember, I try to relate the	3.08±1.04	3.29±1.08	0.110

	concepts to the events in my everyday life			
	I take notes in the classroom while the teacher is lecturing	2.90±1.32	3.15±1.25	0.081
	After class, I review the lecture notes I took	2.88±1.11	3.07±1.24	0.178
	I study by creating a story of what I am learning	2.81±1.21	2.82±1.04	0.936
Repetition Strategies	I study the points I cannot understand by reading them repeatedly.	3.79±0.98	3.83±0.95	0.140
	I pay more attention to key points in the text and paraphrase it to myself	3.79±0.88	3.85±0.98	0.717
	I repeat the same subject at regular (one-day, one-week, etc.) intervals	2.40±0.97	2.62±1.09	0.676
Attention Strategies	When I start studying, I read the captions underneath figures, graphics or tables	3.80±1.03	3.77±1.08	0.449
	I place punctuation marks such as "?, *, !" if I do not understand something'	3.69±1.25	3.74±1.29	**0.037**
	I write notes on the book while studying	3.32±1.29	3.63±1.30	0.820
	I write down key points on small pieces of paper and I hang them somewhere in the study room	2.56±1.29	2.45±1.32	0.710

*Scores: 1= minimum, 3 = Moderate and 5 = maximum

** t test for dependent groups

Table 2. Comparison of the mean scores obtained from the subscales of the Learning Strategies Inventory on the pretest and posttest

	Pretest	Posttest		
Subscale	$\bar{x} \pm S$	$\bar{x} \pm S$	**p**	**95% CI**
Social – Kinesthetic Strategies	3.10±0.43	3.22±0.44	**0.018**	-0.222 – (-0.021)
Elaboration Strategies	3.37±0.57	3.50±0.56	**0.040**	-0.258 – (-0.006)
Repetition Strategies	3.33±0.68	3.43±0.72	0.303	-0.313 – 0.098
Attention Strategies	3.34±0.88	3.40±0.91	0.486	-0.217 – 0.104
Total	3.27±0.44	3.38±0.41	**0.011**	-0.203 – (-0.028)

Table 3. Mean scores obtained from the Metacognitive Awareness Inventory *

Item	$\bar{x} \pm S$
I think about whether my study has been successful.	**3.63±1.16**
I think about how much time I need to complete the study.	**3.63±1.12**
I think about to what extent I have achieved my expectations of the study.	**3.61±0.99**
I think about which method I should use.	3.57±0.96
I think about how I can use my time I need to study.	3.55±1.14
I think about whether I am using the correct method to study.	3.54±1.16
I think about what I should do to solve problems or difficulties arising while I study.	3.52±1.11
I think about how and when I can use the methods I use while I study by taking into account the success levels of my study and these methods	3.50±1.04
I think about what else I should do besides what I already do while studying.	3.50±0.99
I think about what methods I can use to complete the study.	3.50±0.94
I try to remember whether I have studied a topic similar to the one I am studying at present.	3.45±0.95
I think about which of the methods I have used in previous studies has been more successful.	3.44±1.02
I think about what difficulties I may encounter in my present study.	3.31±1.01
I think about what I already know before I begin to study a topic.	3.21±0.87
After completing my study, I feel I should review my study method.	3.11±1.23
Total	3.47±0.37

*Scores: 1= minimum, 3= moderate and 5=maximum

Table 4. Correlation analysis of mean pretest scores obtained from the metacognitive awareness inventory and learning strategies inventory

	Spearman ρ	p
metacognitive awareness score– social kinesthetic strategies	0.135	0.222
metacognitive awareness score – elaboration strategies	0.118	0.284
metacognitive awareness score – repetition strategies	0.259	**0.017**
metacognitive awareness score – attention strategies	0.179	0.102
metacognitive awareness score – whole scale	0.172	0.118

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