ARAŞTIRMA / RESEARCH

Learning approach preferences of medical students in different grades

Farklı düzeylerdeki tıp fakültesi öğrencilerinin öğrenme yaklaşımı tercihleri

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Abstract

Purpose: In order to support medical students' learning-the manner in which their learning occurs - the quality and development of the learning process needs to be better understood. This research aims to determine the learning approaches preferred by medical school students and the changes that occur over time.

Materials and Methods: A Cross-sectional study was applied, including in the follow-up study. The study group comprised first-year students enrolled at Hacettepe University Faculty of Medicine from 2011 to 2015 (n = 2714). The follow-up study was conducted in May 2016. This time 1195 students participated. The "Learning Approaches and Study Skills Scale" (ASSIST) was utilized. The scores of the students' learning approaches in the first year were compared to examine the changes in the learning approaches they preferred in the research over the years. In addition, students' first and second scores were compared.

Results: Participation rate of the study was 80%. Students who completed the ASSIST both times (n = 1195) resulted in a response rate of 55%. Learning approaches scores of students between 2011 and 2014 were ranked strategic, deep, and surface learning approaches, respectively. However, in 2015 it was ranked deep, strategic, and surface learning. cohorts. Medical students preferred the strategic learning approach in the first year. Their preference differed in the second assessment. Surface learning scores increased when compared with the first assessment.

Conclusion: Learning skills of students should be supported not only in the first year but also throughout the entire teaching period. Strategic and deep learning scores decreased in the second assessment, while the mean score of the surface learning approach increased in all.

Keywords:. learning approaches; medical students; learning preferences; learning skills; medical education

Öz

Amaç: Tıp öğrencilerinin öğrenmelerini desteklemek için - öğrenmelerinin gerçekleşme şekli - öğrenme sürecinin kalitesi ve gelişiminin daha iyi anlaşılması gerekmektedir. Bu araştırma tıp fakültesi öğrencileri tarafından tercih edilen öğrenme yaklaşımlarını ve zaman içinde meydana gelen değişiklikleri belirlemeyi amaçlamaktadır.

Gereç ve Yöntem: İzlem çalışması dahil olmak üzere kesitsel bir çalışma yapılmıştır. Çalışma grubunu 2011-2015 yılları arasında Hacettepe Üniversitesi Tıp Fakültesi'ne kayıtlı birinci sınıf öğrencileri (n = 2714) oluşturmaktadır. İzlem çalışması Mayıs 2016'da 1195 öğrenci katılımıyla gerçekleştirilmiştir. Araştırmada Öğrenme Yaklaşımları ve Çalışma Becerileri Ölçeği" kullanılmıştır. Çalışmada öğrencilerin yıllar içinde tercih ettikleri öğrenme yaklaşımlarındaki değişiklikleri incelemek amacıyla ilk yıl öğrenme yaklaşımlarının puanları karşılaştırılmıştır. Ek olarak öğrencilerin ilk ve ikinci puanları da karşılaştırılmıştır.

Bulgular: Çalışmaya katılım oranı %80'dir. Çalışma ASSIST ölçeğini iki kez yanıtlayan öğrencilerin oranı (n = 1195) ise %55'dir. 2011-2014 yılları arasında öğrencilerin öğrenme yaklaşımları puanları sırasıyla stratejik, derin ve yüzeysel öğrenme yaklaşımları olarak sıralanmıştır. Bununla birlikte, 2015 yılı kohort puanları derin, stratejik ve yüzeysel öğrenme olarak sıralanmıştır. Tıp öğrencileri ilk yıl stratejik öğrenme yaklaşımını tercih ettikleri görülmektedir. İkinci değerlendirmede tercihleri farklılaşmaktadır. Yüzeysel öğrenme puanları ilk değerlendirmeye göre artmıştır.

Sonuç: Öğrencilerin öğrenme becerileri sadece ilk yıl değil, tüm öğretim süresi boyunca desteklenmelidir. İkinci değerlendirmede öğrencilerin stratejik ve derin öğrenme puanları azalırken, yüzeysel öğrenme yaklaşımının ortalama puanı toplamda artmıştır.

Anahtar kelimeler: Öğrenme yaklaşımları, tıp öğrencileri, öğrenme tercihleri, öğrenme becerileri, tıp eğitimi

INTRODUCTION

It is recommended that future physicians possess learning skills to eliminate and integrate relevant information to diagnose and solve their patients' problems in the best possible way.[1] At a time when the body of medical knowledge is rapidly expanding, the learning approaches and study skills of medical students are substantial, because the approaches they adopt influence the quality and quantity of their learning [2]. In first study, Newble and Entwistle [2] indicated that, "most medical schools emphasize the development of curriculum content, teaching methods and assessment methods" and subsequently, their idea that "the effects of these factors on student learning need to be explored" [2] has been followed by numerous researchers.

Initial studies on learning approaches conducted by Marton and Saljo [3-4] identified two learning approaches: deep and surface. Following the influence of assessment procedures on learning and studying, the necessity of a third learning approach —strategic—emerged [5, 6]. The deep learning approach is a part of innate motivation that requires completing the learning task appropriately and meaningfully [7, 8]. Students adopting the deep approach are motivated by an interest in the subject material and/or recognition of its vocational relevance [9]. Conversely, in the surface learning approach, learning is perceived as a difficulty and the aim is to complete the task with minimum effort, time, and cognitive activities [7, 8]. Thus, learners solely focus on "key topics/points"; learning task is not perceived in entirety and since the contents are not related to each other, learners concentrate only on memorization and recitation [8]. Lastly, in the strategic learning approach, the primary aim is to be successful and learners are motivated by high grades [2]. Learners adopt strategic approaches, using any strategy ranging from rote memorizing to understanding basic principles, in order to maximize their chances of academic success [10]. They also manage time and methods perfectly for this purpose [11].

Previous researches primarily investigated the learning approach and its relationship to academic performance using cross sectional design. Results of these studies reveal that, in terms of academic performance, a deep and strategic approach to learning is beneficial while a surface approach is not [12, 13, 14, 15]. Besides, a deep approach to studying is widely associated with long-term success in undergraduate education including medical education [16]. Mattick et al. [16] found that a deep approach to studying at the beginning of medical school was associated with higher scores in applied medical knowledge, and the strength of this relationship increased over time. However, strategic learning is crucial to understand the learning approaches adopted by medical students. Recent studies involving medical students indicate that a strategic approach to learning focused on exam performance is highly correlated with academic success more so than a deep approach. Authors state that this association between medical school success and strategic learning differs from nonmedical courses where deep learning has a more robust correlation with performance [15]. These results provoke new research questions about teaching and assessment methods employed in medical schools.

It is wiser to compare evidence of medical students' learning approaches in preclinical years to students from different undergraduate education. However, medical education is varied and specialized during clinical years. Nevertheless, the results are the same in both classroom and clinical settings. The positive relation between clinical skills and deep learning [17] and a negative correlation between clinical skills and surface approach is reported [18, 19]. The conflict between deep and strategic learning has also been reported in clinical years. Fox et al. [20] found that both deep and strategic learners sought more clinical experience opportunities than surface learners.

Since the exploration of the relationship between learning approaches and achievement, inventories to monitor students' learning approaches are widely employed. However, some earlier studies reported that students exhibited increasing surface learning approach and decreasing deep learning approach in undergraduate courses [21, 22 ,23]. This problem is common among medical students. Research indicated that as students gain more experience, they become less deep learning oriented and more surface [24, 25] or adopt a strategy of teacher-directed learning [26]. Although studies reveal that learning approach scores shift towards deep and strategic learning in postgraduate years, when students undertake real patient cases [27,39], there are not sufficient research concerning this change. Therefore, identifying and monitoring the learning approaches of medical students and investigating how their use of learning approaches differs over the years is important.

Essentially, we wish to see all medical students

adopting the "deep learning" approach that is widely associated with long-term success and life-long learning skills [9, 40]. We believe that students' learning approaches change, and more adaptive approaches can be learned. Moreover, we believe that the way in which their learning occurs, its nature and development of the process must be better understood in order to improve students' learning quality. Therefore, this study aims to investigate medical students' approaches to learning based on their school year and investigate the changes in their learning approaches throughout the curriculum. The following research questions were raised: Which learning approaches preferred by medical students in terms of their enrollment years and grades? How the learning approaches of medical students differentiate throughout the medical curriculum?

MATERIALS AND METHODS

The study was cross sectional design, including in the follow-up study. It was conducted during the period of October 2011 to 2015, and then a follow up study was conducted on May 2016. Ethical approval was obtained from the Ethics Committee of Hacettepe University (431.10-1377) in May 02, 2016. Ethical standards of the Helsinki Declaration were followed, and informed consent of participants were obtained.

All cohorts of first-year medical students (n = 2714) from 2011–2015 at the Hacettepe University Faculty of Medicine were invited to participate in the study. First-year medical students from 2011 to 2015 completed the Approaches and Study Skills Inventory for Students (ASSIST) at the beginning of their first term during the orientation week. Students were asked to re-answer the questionnaire at the end of the 2015–2016 academic year (May 2016). Therefore, students were in different grades when the second assessment was performed. Students' numbers were used to pair the questionnaire. Students were informed and asked to their permission before the baseline study via informed consent form. Students who agreed to answer the questionnaire the first time were 2185 (participation rate – 80%). Students who completed the ASSIST both times (n = 1195) resulted in a response rate of 55%.

Measure

In this study, Tait et al.'s [41] Approaches and Study Skills Inventory for Students (ASSIST) was employed

to determine the change in medical students' learning approaches. Senemoğlu [6] analyzed the psychometric properties of the Turkish version of ASSIST and reported that its scales had internal consistency reliability varying from acceptable to high (0.71 to 0.81). She also investigated construct validity of Turkish version of ASSIST by confirmatory factor analysis and reported satisfactory fit [6].

The inventory comprises 52 statements compatible with the original ASSIST that students rate on a five-point Likert scale (5 = agree, 4 = agree somewhat, 3 = unsure, 2 = disagree somewhat, 1 = disagree). The three primary scales (deep, strategic, and surface) have four to five subscales each:

1. Deep approach includes four subscales (16 items): seeking meaning, relating ideas, use of evidence, and interest in ideas.

2. Strategic approach includes five subscales (20 items): organized studying, time management, alertness to assessment demands, achieving, and monitoring effectiveness.

3. Surface approach includes four subscales (16 items): lack of purpose, unrelated memorizing, syllabus-bound, and fear of failure.

Three subscales of the inventory had a different number of items. The score of the subscales were calculated by summing the items' scores. Subsequently the scores were converted with a 100-point scale to make comparison between them.

Procedure

During the orientation week of the first term, students have participated sessions that share detailed information about the medical school, curriculum, academic and social support system of the school. Orientation week program were also included a two-hour study skills session. At the study skills session, students were informed about the study and asked to read handout informed consent form which give more detailed information about the study.

Students were also informed about the follow-up study and there would be needed to use students' numbers to pair the questionnaire. The ASSIST forms were hand-out and were filled out by students who agreed to participate in the study.

Students were asked to re-answer the ASSIST at the end of the 2015–2016 academic year (May 2016). Researcher were visited the students in their

amphitheater and give information and re-asked to participate the study.

Statistical analysis

Data generated through ASSIST were summarized using mean and standard deviation (SD) to determine medical students' learning approaches' level. According to Tabachnick and Fidell [42], multiple analysis of variance (MANOVA) is employed for data where the dependent variable is more than one and the independent variable is categorical. As the number of dependent variables is more than one (strategic, deep, and surface) MANOVA were performed to compare differences of first-year students' learning approach scores in order to examine change in their preferred learning approaches over the years (2011–2015). Least significant difference test (LSD) which is post hoc multiple comparison tests, were applied to determine different groups. The second assessment scores did not meet the assumptions of the MANOVA. The analysis of variance (ANOVA) with LSD for post hoc comparison, were employed for each learning approach subscale score to compare differences in the second assessment scores for strategic and surface learning. Deep learning scores in the second assessment also did not meet the equal variance assumption of ANOVA. The nonparametric variance

analysis (Kruskal Wallis) and Mann Whitney U test to compare groups were employed for the deep learning score.

The first and second assessment ASSIST scores of medical students were compared using paired samples t-test. A p value < 0.05 was taken as significant. Statistical Package for the Social Sciences (SPSS) version 16 was employed for analysis.

RESULTS

The learning approaches scores of the medical students examined in this study revealed that the mean scores of strategic and deep learning were higher while the mean scores of surface learning were below (Table 1). The learning approach scores of students between 2011 and 2014 were ranked strategic, deep, and surface learning, respectively. However, in 2015, students were ranked deep, strategic, and surface learning.

MANOVA was used to investigate the changes in learning approach preference of first-year medical students from 2011 to 2015. The assumptions of the MANOVA were checked prior to the analysis. These included univariate and multivariate normality of variables, linearity, multi-collinearity, and univariate and multivariate outliners.

Table 1. Mean score and standard deviation of the learning approaches of medical students during first assessment

Cohort	Learning Approaches	First Assessment (October .....)		
		n	mean/100	SD
2011	Deep		75.75	9.67
	Surface	334	50.79	10.48
	Strategic		76.89	9.68
2012	Deep		75.79	9.48
	Surface	416	51.00	9.79
	Strategic		76.67	10.14
2013	Deep		75.58	9.73
	Surface	504	51.71	10.79
	Strategic		76.28	10.06
2014	Deep		76.43	9.51
	Surface	464	50.96	10.91
	Strategic		77.03	9.79
2015	Deep		76.38	9.83
	Surface	426	50.91	10.08
	Strategic		75.42	10.89

Kurtosis and skewness values were used to test normality. Skewness values for strategic, deep, and

surface learning were between 0.311 and 0.556, kurtosis values were between 0.556 and -0.503. These

values are expected in between +1 and -1 in order to prove normal distribution [43]. Outliners were examined and 41 data were extracted from the data set before the analysis. Therefore, data analysis included 2144 medical students. Statistically significant difference was found in MANOVA (F = 1109.75, Wilks' Lambda = 0.007, p = 0.000), and LSD test was used for pairwise comparisons (Table 2). There were statistically significant differences in strategic learning but not in deep and surface learning scores. The mean strategic learning approach scores of medical students who started at the Faculty in 2015 were slightly lower than students in 2014 and 2011.

The second assessment of the students' learning approaches provided information on those who were in different grades in 2016. This data revealed that the learning approach scores of medical students were ranked deep, strategic, and surface learning, respectively in each year or in each grade (Table 3). When the differences of the learning approach scores between the grades were examined, it is notable that the deep ($x^2 = 17.51$; p = 0.002) and strategic (F = 3.556; p=0.07) learning approach scores decreased in higher grades. There were no statistically significant differences in surface learning in the second assessment (F = 0.566; p = 0.687) (Table 4).

Table 2. The Results of MANOVA for Medical Students' Deep, Strategic, and Surface Learning Approaches' Scores during First Assessment

Learning Approaches	Source	Sum of Squares	df	Mean Squares	F	p	Difference (p<.05)
Strategic	Year	1.253 E7	5	2506006.3	24406.32	0.00	2011-2015; 2014-2015;
	Error	219629.46	2139	102.67			
Surface	Year	5601400.39	5	1120280.07	10263	0.00	
	Error	233487.1	2139	109.15			
Deep	Year	1.238 E7	5	2476529.46	26602.09	0.00	
	Error	199130.81	2139	93.09			

Table 3. Comparison of mean score and standard deviation of the learning approaches of medical students during first and second assessment

Cohort	Learning Approaches		First Assessment (October.....)		Second Assessment (May 2016)				
		N	mean/100	Sd	mean/100	Sd	Mean Differ.	t	p
2011	Deep		75.80	10.07	70.94	11.51	-4.86	4.47	0.00
	Surface	129	49.50	10.02	60.64	12.97	11.14	-9.79	0.00
	Strategic		76.89	10.29	68.01	11.70	-8.88	8.45	0.00
2012	Deep		76,14	9.27	71.52	11.50	-4.62	5.63	0.00
	Surface	285	50.43	9.73	62.14	12.30	11.71	-12.78	0.00
	Strategic		77.48	9.95	69.78	12.14	-7.7	8.61	0.00
2013	Deep		75.45	9.40	72.54	10.58	-2.91	4.77	0.00
	Surface	335	51.65	10.66	62.22	11.9	10.57	-14.78	0.00
	Strategic		76.84	9.99	71.30	12.00	-5.54	8.12	0.00
2014	Deep		77.22	9.19	74.14	11.49	-3.08	3.98	0.00
	Surface	231	50.14	10.42	60.23	11.84	10.09	-12.94	0.00
	Strategic		77.41	9.67	70.76	11.53	-6.65	8.64	0.00
2015	Deep		76.84	9.90	74.41	13.74	-2.43	2.10	0.03
	Surface	215	50.60	9.63	61.72	14.01	11.12	-9.44	0.00
	Strategic		76.31	10.71	72.66	13.56	-3.65	2.97	0.00

*Sd: standard deviation
**Mean differ.: Difference between mean score of first and second assessment

Table 4. Results of variance analysis for medical students' deep, strategic, and surface learning approach scores during second assessment

Learning Approaches	Source of Variance	Sum of Squares	df	Mean Square	F/x^2	p	Difference (p<.05)
Strategic	Between group	2122.302	4	530.58	3.556	0.007	2011-2013; 2011-2014; 2011-2015; 2012-2015
	Within group	177577.218	1190	149.23			
	Total	179699.520	1194				
Surface	Between group	766.510	4	191.63	1.221	0.300	
	Within group	186773.626	1190	156.95			
	Total	187540.136	1194				
Deep	Between group	1904.81	4	476.20	17.51	0.002	2011-2014; 2011-2015; 2012-2014; 2012-2015; 2013-2015
	Within group	162806.32	1190	136.81			
	Total	164711.12	1194				

Paired samples t test was employed to compare the learning approach scores of medical students between the first and second assessments. The learning approach scores of 1195 medical students were matched with two different time periods and included in the analysis. Results revealed that strategic and deep learning scores decreased in the second assessment while the mean score of the surface learning approach increased in all cohorts (p = 0.01) (Table 3, Figure 1).
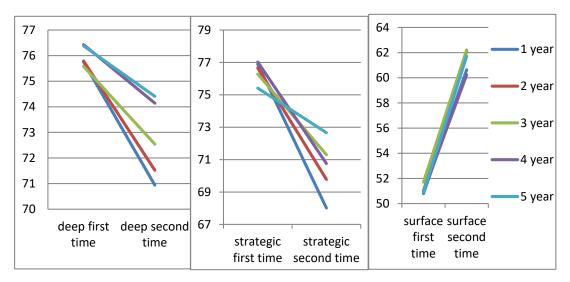

Figure 1. Difference in learning approach scores of medical students during first and second assessment

DISCUSSION

Studies on learning approaches primarily focus on examining the relationship between academic achievement and learning approaches [6, 10, 12, 13, 14, 15, 35] and report that the deep and strategic approach is associated with academic performance [12, 13, 14, 15, 18]. A limited number of studies on medical students are mostly descriptive and indicate that medical students prefer the strategic and deep learning approach to the surface learning approach [16, 34, 35] and emphasize the strong link between strategic learning approach and academic achievement among medical students [15]. Similarly, in this study, results reveal that medical students prefer the strategic and deep learning

approach to the surface learning approach at the beginning of medical school (first assessment). Students who succeed in the first percentile of the Undergraduate Placement Examination in Turkey are accepted to the medical faculty where the study was conducted. These students are higher achievers, thereby confirming the relationship between deep and strategic approach and academic performance.

When the second assessment scores are examined, it is observed that students' learning approach scores ranked deep, strategic, and surface learning approach, respectively (Table 3). During the second assessment, the elapsed time for each cohort group differed. The second assessment was conducted in May 2016 when the cohort of 2011 students were completing 5th grade, while the cohort of 2015 students were completing 1st grade. From this perspective, it can be assumed that the learning approach of students changed to deep learning over time. However, the difference between the first and second assessments needs to be examined in order to interpret these results.

As mentioned above, previous studies confirmed that medical students preferred strategic and deep approach to surface approach [15, 16, 34, 35]. However, earlier cross sectional studies also reported that medical students in the third grade preferred the surface approach to students in the first and second grades [25]. In this study there were no significant differences in surface learning approaches (F = 0.566; p = 0.687) whereas the deep (x^2 = 17.51; p = 0.002) and strategic (F = 3.556; p = 0.07) learning approach scores decreased in upper grades (Tables 3 and 4). It is stated that during the preclinical years, medical students adopt and maintain learning approaches to prevent failure (Shaw and Wedding 2001, cited in Chung et al. [31]).

The follow-up study during the second assessment revealed that the mean score of the strategic and deep learning approach were lower than the first assessment (Table 3). The result of the increase in surface learning scores and decrease in deep and strategic learning scores as they experienced the curriculum is significant although students' deep learning approach was found to be higher during the second assessment. The difference of the surface learning score between the first and second assessment was higher than deep and strategic learning scores. For instance, in the cohort of 2011 students, there was approximately a five-point decrease in the deep and strategic learning scores and

approximately a 10-point increase in the surface learning scores. This trend is similar for other cohorts. Cebeci et al. [25], indicated that as students gain more experience (in terms of years spent at school), they become less meaning oriented. Wickramasinghe and Samarasekera [36] found that pre-clinical and postgraduate trainees in surgery had the highest mean for deep approaches, while clinical students had the highest mean for surface and preclinical students for strategic approaches. This finding does not support the expectation that mature students prefer deep approach more than non-mature students (Ward 2011) [37, 38]. As Chung et al. [31] concluded, contextual factors (e.g., teaching methods, assessment, feedback, teacher), students' perceptions of these contextual factors, and characteristics of the students might underlie this complexity and may account for the change over time.

According to Newble and Entwistle [2], the majority of medical schools emphasize the organization of contents, teaching, and the assessment and evaluation processes but do not focus on the effects of curriculum components on students' learning processes. However, the adoption and enhancement of deep learning by students is desired in medical education, as this approach is associated with applied medical knowledge and long-term achievement [16]. Thus, it is important to conduct further studies to investigate the reasons of the increase in surface learning scores by considering the effects of the teaching and evaluation processes on students' learning, thus, developing and organizing the curriculum accordingly. Nevertheless, even the innovative curriculum model environment has reported difficulty in improvement of deep learning. Although some studies report longitudinal shifts to a deeper learning approach after curricular interventions [9, 27, 28, 29], others found no difference in deep learning approach scores over time [24, 30, 31]. Chung et al. [31] found that deep and strategic scores did not significantly change between years 1 and 4 (clinical year), but the surface mean score decreased in a case-based curriculum. They concluded that the deep approach to learning is a complex process and does not change after three years of medical school, although a case-based curriculum was believed to foster it. Balasooriya et al. [32] found that attempts to shift medical students towards a deeper learning approach by using a new Integrated Medicine Program surprisingly resulted in a significant subgroup of students moving in the opposite

direction and adopting a more surface approach, although a proportion of students did adopt a deep approach. Conversely, Papinczak et al.[24], in a case control study where cases experienced an intervention designed to aid deep learning, reported that both cases and controls moved towards a surface learning approach after one year at medical school.

Fox et al.[20], in a longitudinal study of more than 1,000 medical students, found learning approaches (deep, strategic, and surface) to be "both partly stable and partly modifiable" over time, suggesting that these learning approaches may indeed vary according to the different learning environments and challenges faced by students during medical training. It was stated that high workloads [13, 15, 26, 33] and a vast syllabus [26] had a positive association with the surface learning approach. The pattern of assessment was the most asserted reason for improving the surface learning approach [33, 34, 40]. Independent study time in the curriculum is also very important, as it has proven that students studying independently tend to adopt a deep approach to learning [9]. Deep learning may be facilitated when students feel they have adequate time to master and enjoy the topic at hand.

Although several programs are given importance in measuring and supporting medical students' learning approaches in the initial years, they do not receive sufficient attention throughout the clinical years. Thus, it is suggested that the existing curriculum, methods, and techniques used in the teaching-learning process and especially assessment methods that influence the strategic learning approach, should be reviewed to support the students by creating learning environments where they can learn knowledge and improve critical thinking skills. However, the results of this study strongly emphasize the need to maintain learning support throughout the curriculum including the transition between clinical years.

This study had some limitations related to assessment and study group. First, the study was conducted in one institution thus limiting the application of results to other medical schools. The study group included students who were high achievers in the Undergraduate Placement Examination. The study sampling needs to include students from different medical faculties. It would be useful to examine the learning approach profiles of medical students across different achievement levels and change their skills over time.

Second, this study only investigated well-known self-reporting instruments designed to assess student approaches to learning. Therefore, this technique limits this study. Thinking aloud, diaries, or microanalysis may be used to measure learning skills. Enrichment of data with these methods should be considered in further studies. In addition, this study describes and investigates differences in learning approaches but does not provide compelling evidence regarding the reasons for these results. Besides, although the study had follow-up, it was limited to two points in time, not assessment of all grades. The reasons for the decrease in medical students' deep and strategic learning scores should be explored by designing further quantitative longitudinal studies and research design should be enriched with qualitative researches methods.

In conclusion, the results of this study along with all these limitations are important because it examines how medical students change while experiencing medical curriculum and offers some insight into the development of medical curriculum. The aim is that students become independent and deep learners throughout university life and improve their learning skills. This study reveals that the learning approaches of medical students differ during the initial phase of school. Although the deep learning scores are higher, the surface learning scores increase over time. Therefore, the educational obstacles to students' independent learning and thinking skills need to be examined and curriculum should be developed to cope with these obstacles and improve the quality of education. Further research is required to examine the profiles of clinical students and identify methods assist them in becoming more independent learners.

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